

*Kul I cj # Dbqb -z*  
SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT  
*ersj vt`k D>gy3 nekte`ij q*

**BAE 1201**

*Kul .cwi wPwZ I cwi tek*  
INTRODUCTORY AGRICULTURE AND ENVIRONMENT

**tKum@Wt`fj c&gU wlg**

*tj LK*  
**W. tgv t mjZwb Dwib fFv**  
*Kul.ZEj wefivM, ersj vt`k Kul .nekte`ij q*  
**W. tgv Avaj nuj g Lwb**  
*dmj Dw`c weAvb wefivM, ersj vt`k Kul .nekte`ij q*

*m=uv`K*  
**W. tgv tZwv4j Bmj w**  
*Kul .I cj # Dbqb -z*  
*ersj vt`k Dbk3 nekte`ij q*  
**tgv mi I qvi tnvmb tPšaj**  
*Kul .I cj # Dbqb -z*  
*ersj vt`k Dbk3 nekte`ij q*

*iPbv&kj x m=uv`K I mgšqKvi x*  
**W. tgv tZwv4j Bmj w**  
*Kul .I cj # Dbqb -z*  
*ersj vt`k Dbk3 nekte`ij q*

*m=uv`K (wZxq ms`i Y)*  
**G. tK. Gg. Avkivdz Avj g**  
*Kul .I cj # Dbqb -z*  
*ersj vt`k Dbk3 nekte`ij q*

*G tKum@BwU tidwii KZ& wbi x tYi ci ersj vt`k Dbk3 nekte`ij tqi Kul .I cj # Dbqb -z*  
*Gi Qv t` i Rb` gwZ ntqtQ|*

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***Kw. .cwi vPvZ I cwi tek***  
**Introductory Agriculture and Environment**  
**BAE 1201**

*Kw. .I cj # Dbqb ~j*  
SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT



ersj vř` k D>gŷ nek|e` ij q

# Kul. cni PviZ I cni tek

(KRISHI PARICHITI O PARIBESH)

## INTRODUCTORY AGRICULTURE AND ENVIRONMENT

মুদ্রিত বিবরণ

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eysj v`k Dbk nekpe`ij q  
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G.U.W.W.C.; Gd.G.I  
**W. tgrt tZuchaj Bmjvg**  
eysj v`k Dbk nekpe`ij q  
**W. tgrt tgrtky ingub**  
eysj v`k Dbk nekpe`ij q  
**W. Avb g Augbj ingub**  
eysj v`k Dbk nekpe`ij q  
**W. tgrt kun Avj g miKvi**  
eysj v`k Dbk nekpe`ij q  
**tgrt mi l qvi trutmb tPajyn**  
eysj v`k Dbk nekpe`ij q

মুদ্রিত Zeyartb

Wib

Kul. I cni Dbqb`z

eysj v`k Dbk nekpe`ij q

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# mPcĪ

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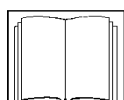
= Abjxj b/Povšl gj-vqb



= cvtVvEi gj-vqb

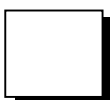


= DEi gvjv



= Z\_mf

### e- vj Lb



cvtVi i žcYkYxq AskK Avi I AvKIYxq Kti c0k#bi Rb" gvtS gvtSB  
De- vj Ltbi0 gra'tg Ztj aiv ntqtQ| c0ZuU De- vj Lb0 gtbvthwM w tq cob  
Ges gtb ivLtz tPov Kily|

### Abjxj b

Avcub cvWu fitjvfite eStz cvtQb wK bv Zv hvPvB Kivi Rb" cvtVi gvtS tKvbr tKvbr  
RvqMvq t`qv itqtQ Abjxj b| Abjxj b,tjv AvcbvK mgrav KitZ nte| Gme Abjxj b  
Avcbvi Avb I `qZv ewxZ mrvqZv Kite|

### mvi gg®

c0qvRtb cvtVi tktl mvi gg®t`qv AvtQ| mvi gg®cto Avcub wv0 cvtVi melqe` m0zK®  
AvZ mnRB avi Yv wbtZ cvtVeb|

### cvtVvEi gj-vqb

c0ZuU cvtVi tktl Avcub KZUKzeStz tctiQb Zv hvPvBtqi Rb" itqtQ cvtVvEi gj-vqb|  
cvWu fitjvfite tevSvi ci cvtVvEi gj-vqtb ckejtvi DEi t`qvi tPov Kily| AZci  
Avcbvi t`qv DEi BDubU tktl t`qv DEtii mvt\_ wgvj tq wbb| me,tjv DEi mWk ntj  
cieZPcvW i iYKily Ab\_vq cvWu cqv iq cob|

### Povšl gj-vqb

c0Z BDubUi tktl itqtQ Povšl gj-vqb| GtZ msvB I iPbvj-K ckeAvtQ| G ckejtvi  
DEi `Zmi Kivi tPov Kily, hv AvcbvK cixYvq fitjv djvdj KitZ mrvh" Kite| GtqT  
Abvb" Z\_mf i mrvh" wbtZ cvtib| GQov c0qvRtb Avcbvi wDUti i mvt\_I K\_v ejtz  
cvtib| BDubUi me,tjv cvW fitjvfite cotj Povšl gj-vqtb ckejtjv mgravtB tKvbr  
Amvav nte bv|



## BDibU 1 ejsj v`tki Kult fig, Rjevqyl dmj Drcv`b

**BDibU 1  
ejsj v`tki Kult  
fig, Rjevqyl  
dmj Drcv`b**

Avenl qvi      Zvi Ztg`i  
wfvE`Z dmj Drcv`b Lwi c-  
1, Lwi c-2 I iwe - GB wZb  
tgSm`tg nef<sup>3</sup> Kiv nq|

ejsj v`k Kul c`vib t`k| Gf`tki A\_`omZ Kul i Dci wbfP`kxj | ZvB Gf`tki mg`IKgRvU  
I Dbq`b Kul t`K tK`<sup>a</sup> KtiB AvenZ`Z nq| ejsj v`tki mvgwM`K DbwZ I mgw`x Kul. Dbq`tbi  
mstM I Zic`OZfite RwoZ| t`fSm`uj K Ae`vbMZ Kvi tY Gf`tk tgSm`gx evqy c`fve c`Pz  
epocvZ nq| AwZwi<sup>3</sup> epocvZ I DEivAj t`tK AvMZ b`-b`xi Xtj tKvb tKvb eQi eb`v  
t`Lv t`q| elP`Kv t`j cOZ eQi b`-b`xi metaS`Z AA`tj c`Pz cwi cti| dtj b`-b`xi metaS`Z  
AA`tj i gnuU `fveZtB tenk DeP`| ejsj v`tki Rjevqyngfveicb`f cOq mvi v eQiB tKvb bv  
tKvb dmj R`tb`f| eQti i tKvb mgq Kx ait`Yi dmj Rb`v`te Zv Rjevqy wewf`b`eDrcv`v`tbi  
Dci wbfP`kxj | Ab`w`tK dmj Drcv`tbi Rb` Rwg Pvl, exR ecb ev Priv t`ivcY, wbovbx  
t`qv, tmP cOqvM, Avc`bv`kK wQuv`bv t`tK i`iyKti dmj KZ`B, gvoivB, cOqvRvZKiY,  
BZ`w` Kvr t`j v`K Avenl qv c`fvev`S`Z Kti | Avenl qvi Zvi Ztg`i wfvE`Z dmj Drcv`b  
Lwi c-1, Lwi c-2 I iwe - GB wZb tgSm`tg nef<sup>3</sup> Kiv nq| Lwi c tgSm`tgi me dmj B epO  
wbfP`| iwe tgSm`tg tmP cOqvM`i gva`tg tevtiv avb I Mtgi Aven` Kiv nq|

Gf`tki Kul. GLt`bv A`tbKvst`k c`KwZi tLqvj L`yki Dci wbfP`kxj | th eQi AvkivZixZ  
epocvZ nq Ges tKvbifc cO`KwZK `h`h`M dmt`j i q`wZ nqbv, KIK tm eQi Avkivbj`f`c fij  
dj b cvq| Zv bv ntj gvt`Vi dmj nwi`tq Zv`tK A`tkl q`wZ I `y`Rvi m`e`S`x`b nO`tZ nq|  
Gf`tk Kl`tKiv GKB Rwg`tZ m`vaviYZt eQti `O`U dmj Aven` Kti v`tK| Zte tm`tPi  
m`y`eav v`Ktj tmL`v`b wZb`wU dmj I Pvl KitZ cvti | Dch`y` cwi`tek, fij ex`t`Ri e`envi,  
m`y`g gv`v`q mvi cOqvM I mgqgZ Avc`bv`kK e`envi dmt`j i dj b emotq t`q| ejsj v`tki  
A\_`omZi g`j- PmeKv`w`v n`t`j v Kul. | Kul i mO`z`l meP`x`b DbwZi DciB RvZixq A\_`omZi w`Kiv  
I DrKI wbfP` Kti | ZvB ejsj v`tki Kul i i`z`i Acwi m`xg|

GB BDibU QqvU cvt`V ejsj v`tki Kul. Z\_v Kul i avi Yv, figi c`KwZ, Rjevqy Rjevqy  
c`fve, fig I Kul. DcKi`t`Yi e`envi Ges ejsj v`tki A\_`omZ`tZ dmt`j i Ae`vb BZ`w`  
m`e`t`U w`e`w`i Z Avt`j vPbv Kiv n`t`q`Q|

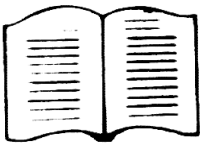
### cw 1.1 Kul.i aviYv I , iZj Ges ersj v`tki figi cKuz.



G cvV tkfI AvciB

- ◆ Kul.i aviYv e`vL`v Ki tZ cvi`teb|
- ◆ Kul.i , iZj e`vL`v Ki tZ cvi`teb|
- ◆ figi cKuzi `tfc iPiYz Ki tZ cvi`teb|

### Kul.i aviYv I , iZj



“Guj`vUj kã ‘Ager’ Ges ‘Cultura’ Gi mgštq “Agriculture” ev Kul.MvZ| ‘Ager’ A\_°Rig Ges ‘Cultura’ A\_°Pvl Kiv| ZvB kvãK A\_°Kul. ntjv Rig Pvl Kti dmj Drcv`b| wKš`mgtqi e`eavtb Kul.m`fU gvbjI mngZ aviYvi I me`iz NtUQ| eZgvtb Kul.ej tZ fig KI° Z\_v Rig cŰZKiY I e`e`rcbvi gva`tg wefbaecKvi km“, dj-gj-, MvQ-cvjv, kvK-mwã I dz, ci I ciRvZ `e” Ges grm” Drcv`b tK eSv`bv nq| iay Kul.ZZB (Agronomy) Kul.meAvb bq| th mKj me`vi e`envi Øvi v Drcv`b Kv h`m`ubæ n`tq \_v`K tm me\_tjvB Kul.meAvbi Ašf`| Avi tm\_tjv n`Q km” Drcv`b (Crop Production), ci`Cij b (Animal Husbandry), ci`PvKrmv (Veterinary Science), Kul.cŰKškj (Agricultural Engineering), Kul.A\_°mZ (Agricultural Economics) Ges Zrmsuk-ó melqmw`| GK K\_vq gvbjI Lv`, e`i, evm`vb, JIa Ges mmeR g`jv v` cŰqvRbxq tgšj K Dcv`vb ,tjv Drcv`tb cŰqvRbxq `eAvbK AvbB Kul.meAvb|

Kul.GKvU meAvb| Kul.tK BstiRtZ “Agriculture” Ges j`vUtb “Agricultura” e`j| `Guj`vUj kã ‘Ager’ Ges ‘Cultura’ Gi mgštq “Agriculture” ev Kul.MvZ| ‘Ager’ A\_°Rig Ges ‘Cultura’ A\_°Pvl Kiv| ZvB kvãK A\_°Kul. ntjv Rig Pvl Kti dmj Drcv`b| wKš`mgtqi e`eavtb Kul.m`fU gvbjI mngZ aviYvi I me`iz NtUQ| eZgvtb Kul.ej tZ fig KI° Z\_v Rig cŰZKiY I e`e`rcbvi gva`tg wefbaecKvi km“, dj-gj-, MvQ-cvjv, kvK-mwã I dz, ci I ciRvZ `e” Ges grm” Drcv`b tK eSv`bv nq| iay Kul.ZZB (Agronomy) Kul.meAvb bq| th mKj me`vi e`envi Øvi v Drcv`b Kv h`m`ubæ n`tq \_v`K tm me\_tjvB Kul.meAvbi Ašf`| Avi tm\_tjv n`Q km” Drcv`b (Crop Production), ci`Cij b (Animal Husbandry), ci`PvKrmv (Veterinary Science), Kul.cŰKškj (Agricultural Engineering), Kul.A\_°mZ (Agricultural Economics) Ges Zrmsuk-ó melqmw`| GK K\_vq gvbjI Lv`, e`i, evm`vb, JIa Ges mmeR g`jv v` cŰqvRbxq tgšj K Dcv`vb ,tjv Drcv`tb cŰqvRbxq `eAvbK AvbB Kul.meAvb|

Kul.gvbjI i tgšj K Pvn`vej x h\_v Lv`, e`i, Avk`qi tgšj K Dcv`vb ,tjvi thvMvb t`q|

Kul.gvbjI i tgšj K Pvn`vej x h\_v Lv`, e`i, Avk`qi tgšj K Dcv`vb ,tjvi thvMvb t`q| Kul.i Dbq`bi mvt\_ mvt\_ t`tki A\_°mZK Ges mvgvRK Ae`vi DbmZ NtU| Kul.ersj v`tki RvZxq DbmZ I mgv`xi tgiYU| ØRvZxq DbmZ I mgv`x ntjv MvQi b`vq| Kul.ntjv Zvi gj-, wki Zvi kvLv Ges emYR” Zvi cvZv| g`j 9|Z t`Lv w`tj Zv mg`l MvQv`K aYsm Kti t`qOÑ Pxbv G cëv`u Kul.wfP ersj v`tki Rb” LgB cŰhvR” | ersj v`tki mmeR DbmZ I mgv`x mgZKul.Dbq`bi m`t½ ubweofvte m`ú” | gvbjI Av`tZj mvt\_ RvZ Kul.i , iZj cY`Ae`vb ,tjv ubtæD`tj Kiv ntjv:

- gvbjI i tetP \_vKvi cãvb DcKiY ntjv Lv`Ñ hv Kul.t`tK Avtm|
- Kul.wk`i i KvPvgvtj i cãvb Dm |
- Kul.t`tki i vRt`t cãvb Dm|
- Kul.gvbjI i RmeKvi Dm |
- Kul.cY” Avg`vb i Bvbi gva`tg wefbae`tki gta” AvšRmZK m`úK Mto D`v |
- Kul.Rvj vbi Dm|
- evm`vb I Avmeec`I `Zwi tZ Kul i Ae`vb Ab`Kvh`

Rtbfi ci t`tK gZzchS|Kul.i m`t½ gvbjI ubweo m`úK`i tqtQ| gvbjI tetP\_vKvi Rb” Kul.c`Y`i Dci GKvšf`vte wfv`Kvj nŰZ nq| AZGe Kul.i , iZj Acwi mng|

**evsj v`tki figi cKuz.**

mravi Yfvte evsj v`tki cġq 87 fVM mgZj fig Zte fZtj i mgZv GKBi/c bq| fZtj i mgZvi wfvE`Z mgMġevsj v`kġK cvB fVM fVM Kiv ntqġQ| G, tj v ntj v t

**1| DġZfig**

Gj/c RġgtZ eIġ cwb Rtg br| AvBj w`tg cwb AvUwKtg dmj DrcbġKiv nq| gaxj I fvl qvtj i Mo Aġj, ivRkvx, w`brRcj I iscġi i AšMZ eġi>`Aġj, Kġgj w jvj gvB Aġj Ges wmtj tUi wUj v Aġj wbtq DġZfig MvZ| G Aġj i gvġKv cġPxb cġj j ōviv MvZ nI qvq GġK ōcġPxb cġj figō brtgI AvfġvZ Kiv nq| GLvbKvi gvU jvj eġYġ I Kġi hġ| GLvġb mravi bZ MRvvi, kij, P, bvbv iKg dj, tivcv Avgb avb, wvrfbġkvK-mvġa fij Rġbġ| DġZfigi tgvU AvqZb 23,300 eMġKtj wgvUvi |

DġZfig Aġj i gvġKv cġPxb cġj j ōviv MvZ nI qvq GġK ōcġPxb cġj j figō brtgI AvfġvZ Kiv nq| GLvbKvi gvU jvj eġYġ I Kġi hġ|

**2| ga`g fig**

GB Aġj Rġgi cwb AvBj ōviv wqġšZ nq| w`brRcj, iscġ, ivRkvx, e, ov, Kġqv, hġkvi, Ljyv, gqgbwmsni wKŲyAsk, XvKvi Dġi vsk, ewi kij, I wmtj tUi wKŲyAsk, Kġgj -v, tbrqvLwġ I PġMġgi cevġj wbtq ga`g fig MvZ| AvDk avb, Avgb avb I cvU G Aġj i cġvb dmj | Gi tgvU AvqZb 62,133 eMġKtj wgvUvi |

**3| wPZfig**

G Aġj eIġKtj mravi YZt 3-4 dġ cwb nq Ges tKvb tKvb mgq cwb i D`PZv `vovq 10-12 dġ| cvebr I dvi `cġ tRj vi AvġKvsk Aġj, XvKvi tRj vi `wġbvk, Kġgj w I tbrqvLwġ tRj wġqi cġġgisk, e, ov, Ljyv I wmtj tUi wKŲyAsk wbtq G Aġj MvZ| wQvUtg tebrv Avgb, AvDk, cvU I iwekm` G Aġj i cġvb dmj | Gi tgvU AvqZb 34,950 eMġKtj wgvUvi |

**4| AZ`šwPZfig**

t`tki wvrfbġvġb Aew`Z wej, nvl i I b`x brj vi Zxi eZġGj vKvgr wbtq G Aġj MvZ| eIġKtj G Aġj cwbġZ wgvġZ vġK Ges wvU nġi gZ t`Lvq| eIġKtj Gmg`I Gj vKvq cwb i Mfxi Zv 30 dġ chšġnġZ cvġi wKš`kvZKtj ga`vb e`wZZ Ab`vb i wKtg hvq| i we tġšmġg tmtPi mrvġh` GLvġb tevtiv avb Kiv hvq| G Aġj i AvqZb 4,142 eMġKtj wgvUvi |

**5| cġvvo Aġj**

cveZ` PġMġg, PġMġg tRj vi wKq`sk, Kġgj w tRj vi jvj gvB Aġj, wmtj U tRj vi `wġY-ceġsk, tbrqvLwġ tRj vi Dġi cevsk Ges gqgbwmsn tRj vi Dġi-ceġsk wbtq G Aġj MvZ| AġbK, tj v tQvU eo cġvvo, wUj v Ges Gġi cv fig wbtq G Aġj MvZ| PġMġg Ges cveZ` PġMġgi cġvvoqv Aġj B evsj v`tki GKgvI w`ġY`cġvvoX Gj vKv| GLvbKvi cġvvoġi mġeP Pġv wKtqv vlvġs Gi D`PZv 1,232 wgvUvi | cġq mg`I Aġj B eb Rġtj AveZ| GLvġb Avbri m, Kvġj fij nq| AvqZb 18,122 eMġKtj wgvUvi |



**Abġj b (Activity):** f, Ztj i mgZvi Dci wfvE` Kġi mgMġevsj v`kġK KZ fVM fVM Kiv ntqġQ Ges Kx Kx? Avcbri Gj vKvi gvU Kx aiġbi? Gi `evkŲ, tj v wġ Ljy|



**mvigg®**

Kwl.ejtZ Riq c0`ZKiY I e'e`rcbri gva'tg newfbæcKvi km", MvQ-cijv, dž, djgj-, kvK-mwâ, ci I ciRvZ `ê`w` Ges grm" Drcv`btk ešvq| Kwl. gubtji tgšvj K Pwn`vejxi thvMvb t`q| ZvB Kwl.i ,ižjAcwi mvg|

mvavi Yfvte ersj vt`tki c0q 87 fvm mgZj fig Zte fZtji mgZv GKBi/c bq| fZtji D`PZv Abymti ersj vt`tktk DPzfig, ga`g fig, wPzfig, AZ`š' wPzfig Ges cinvox AAjN G cvDv fvtM fvm Kiv ntqtQ| DPzfigi gwU jvj etYp I K¼ihy; ga`g figi AvqZb 62,133 eM`K.wg. hv Ab`uj i Zžbvq AtbK tewk| wPzfigtZ elKvtj mvavi YZt 3N4 dlt cwb Rgv nq; t`tki newfbæ`vtb Aew`Z wej, nvi I b`xvjvi ZxieZx® GjvKimgw wbtq AZ`š'wPzRigi AAj MvVZ Ges AtbK,tjv tQvU-eo cinvo, wUjv I Gt`i cv`fig wbtq cinvox AAj MvVZ|



**cvfVvEi gj-vqb 1.1**

mWVK DEti i cvfkqUK wPy (✓) w`b

1/ Kwl.ej tZ Kx eSvq ?

K) Kwl.A\_ Rwg Pvl Kiv/

L) Kwl.A\_ Rwg Pvl Kti dmj Drcv`b/

M) Kwl.A\_ gvw-gjwM cvj b/

N) Kwl.A\_ km, dj-dj, kvK-kwâ, MwQcij v, grm Ges ci-cwL Drcv`b/

2/ fZtj i mgZvi Dci wfvE Kti evsj vt`kK KqW FvM FvM Kiv ntqtQ ?

K) `BwU

L) wZbwU

M) Pvi wU

N) cvBwU/

3/ cwrwvqv AAjtj fij nq tKvbwU ?

K) avb

M) Avbvi m

L) cvU

N) ZvqvK/



### Zvcgvĭv

Zvĭci Aw` Drm ntjv mh<sup>9</sup> mh<sup>9</sup> t\_K weiki t\_Yi gva t\_g Zvc evqgUj tf` Kti Avmvi ct\_ bvbvfi te evavcŮB n l qvq G Zvc euj vs t\_k K t\_g hvq | mh<sup>9</sup> nŮZ wekvi Z th Zvc (Radiant energy) c\_ extZ Avtm Zv t\_K t\_mŮi Zvc (Insolation) etj hv wefbvfi te evqgUj t\_K DĚB Kti | t\_mŮi Zvc c\_ exi t\_j l Rj fv t\_M c\_ iZZ n l qvq f\_ c p DĚB nq | ct\_i f\_ ZK G Zvc wekvi b Kivq evqgUj cbivq DĚB nq | evsj v t\_ki Zvcgvĭv tgvUvgy d\_ D\_ | t\_ki Avakvsk AAj mgZj fvq (87%) n l qvq Ges ` w t\_b mg y, DĚi w ngvj q ceZ v Kivq G t\_ki ZZ kvZ ev Mig Abf Z nq br | Z te Lwi c t\_g Ům t\_g i we t\_g Ům t\_g A t\_c t\_v Zvcgvĭv teuk | Lwi c t\_g Ům t\_g Zvcgvĭv mvavi YZt 24° tmj wmqvm nŮZ 35° tmj wmqvm Gi g t\_a t\_ v t\_K | Z te t\_Kvb t\_Kvb mgq G Zvcgvĭv 43° tmj wmqvm chŠi D t\_v v t\_K | Zvcgvĭv t\_ki w t\_b v Āj nŮZ DĚi v Āj t\_j μgk e w t\_c t\_Z v t\_K | kvZ kvZ Zvcgvĭv 7° tmj wmqvm t t\_K 27° tmj wmqvm chŠi t\_Lv hvq | w t\_b i mg y DcKj t t\_K G Zvcgvĭv DĚi w t\_K μgk nwm t\_c t\_Z v t\_K | G mgq t t\_ki DĚi v Āj i t\_Kvb t\_Kvb t\_Rj vq Zvcgvĭv 4° tmj wmqvm chŠi t\_b t\_g Avtm | t t\_ki DĚi v Āj Lwi c t\_g Ům t\_g Zvcgvĭv teuk nq Avevi i we t\_g Ům t\_g GLv t\_b Zvcgvĭv Ab v b AĀj i Z žbvq Kg v t\_K | G AĀj Kg Zvcgvĭv teuk w b v t\_K etj w K Qy K Qy d m j t h g b : Mg GLv t\_b fvj R t\_b t | Zvcgvĭvi w f v Ě Z evsj v t\_k t\_K w b w j w L Z w Z b w AĀj f v M K i v hvq :

### DĚi AĀj

Lwi c t\_g Ům t\_g me t\_P t\_q teuk Zvcgvĭv c w i j w t\_Z nq ep Ěi i v Rk v n x , i s c y l w b v R c y t R j v q | 1992 m t\_b i v Rk v n x t\_Z m t\_e P P 43° tmj wmqvm Zvcgvĭv t\_i K W K i v n t\_q t\_0 |

### ga g AĀj

ep Ěi g q g b i m s n l X v K v t R j v m g t\_n g a g Zvcgvĭv w e i v R g v b v t\_K | Lwi c t\_g Ům t\_g GLv t\_b m t\_e P P 38-39° tmj wmqvm Zvcgvĭv n t\_q v t\_K |

### w t\_Z v ce t\_A j

ep Ěi e w i k v j , K u g j w l t b i q v L v j x t R j v m g t\_n Lwi c t\_g Ům t\_g A t\_c t\_v K Z . Kg Zvcgvĭv c w i j w t\_Z nq | G m g q G m e AĀj 34- 35° tmj wmqvm Zvcgvĭv w e i v R g v b v t\_K |

### ep Ůc v Z

e w i g Ůj t t\_K e v Ů x f e b c Ů μ q v q D w w e Z c p ž c w i g v t\_b R j x q e v Ů e v a t\_Z t f t\_m t e o v q | e v a t\_Z R j x q e v Ů a v i Y t g Z v Zvcgvĭvi m t\_ l Z t\_c Ů Z f i t\_e R w o Z | t\_Kvb K v i t\_Y e v a t\_Z t\_j i Zvcgvĭv 10° tmj wmqvm Gi w b t\_P t\_b t\_g G t\_j A w Z w i <sup>3</sup> R j x q e v Ů N b x f e b c Ů μ q v q f\_ c t\_ d t\_b t\_g Avtm hv ep Ůc v Z b v t\_g c w i w P Z | Lwi c t\_g Ům t\_g evsj v t\_ki w t\_b c w i d\_ g w K t t\_K t\_g Ům t\_g e v a t\_Z t\_c v m M t\_i i D c i w t\_q c e w n Z nq d t\_j G B t\_g Ům t\_g c p ž e p Ůc v Z nq | i we t\_g Ům t\_g e v a t\_Z DĚi - ce w t\_K A e w Z ceZ AĀj nŮZ c e w n Z nq etj ep Ůc v Z nq b v e j t\_j B P t\_j | evsj v t\_ki tgvU ep Ůc v t\_Zi c v t\_i f i t\_M i P v i f v M B nq e l R k v t\_j | me t\_P t\_q teuk ep Ůc v Z nq R b y - R j v b g v t\_m | Z te G B ep Ůc v t\_Zi c w i g v y t t\_ki ce P K nŮZ c w i d\_ g w t\_K μgk nwm t\_c t\_Z v t\_K | 1992 m t\_b i c w i m s L v b A b f v q x P A M Ůg l w m t\_j t\_U h v μ t\_g 2241 Ges 3504 w g w j w g U v i ep Ůc v Z N t\_U hv Ab v b t\_Rj v i Z žbvq A t\_c t\_v K Z . teuk | me t\_P t\_q Kg ep Ůc v Z nq i v Rk v n x t\_Rj v q hv g v i 849 w g w j w g U v i | w m t\_j U t\_Rj v i j v j L v t\_j e r m t\_i t t\_ki m e f c t\_v teuk ep Ůc v Z nq (6496 w g w j .) Ges me t\_P t\_q Kg ep Ůc v Z nq i v Rk v n x t\_Rj v i j v j c t\_j (1199 w g w j .) | t t\_ki e v r m i i K M o ep Ůc v Z 222 w g w j w K Ů b t f a t nŮZ g v P q v m chŠi ep Ůc v Z nq g v i 30 w g w j w g U v i | t t\_ki ep Ůc v Z c Ů q v R t\_b i A w Z w i <sup>3</sup> n l q v m t\_Ě j l m g q g Z l c w i g v y g Z b v

w m t\_j U t\_Rj v i j v j L v t\_j e r m t\_i t t\_ki m e f c t\_v t\_e k x ep Ůc v Z nq (6496 w g w j .) Ges me t\_P t\_q Kg ep Ůc v Z nq i v Rk v n x t\_Rj v i j v j c t\_j (1199 w g w j .) |



th mg -DwMcC tKej gvĭ  
tKvb wvĭŃ wĭ b -NĖ  
cĭiB dĵ, dj t`q  
Zvĭ`i tK eo wĭ b DwMcC  
eĵj |

**eo wĭ b DwMcC**

th mg -DwMcC tKej gvĭ tKvb wvĭŃ wĭ b -NĖ cĭiB dĵ, dj t`q Zvĭ`i tK eo wĭ b DwMcC  
eĵj | wvĭŃ dĭUv wvĭŃ qĭWi (Photo period) cĭeGmKj DwMcC tKvb mĭtgB dĵ, dj t`q  
bv |

wĭ b wĭbĭtcŃ DwMcC i dĵ,  
dj Drcv`tb dĭUv  
wvĭŃ qĭWi tKvb cĭve  
tbB |

**wĭ b wĭbĭtcŃ DwMcC**

tKvb tKvb DwMcC wĭ b wĭbĭtcŃ | wĭ b wĭbĭtcŃ DwMcC i dĵ, dj Drcv`tb dĭUv wvĭŃ qĭWi tKvb  
cĭve tbB |

eo wĭ b DwMcC i dĵ, dj MĭŠKvĭtj Ges tQvU wĭ b DwMcC i dĵ dj kxZ I emŠKvĭtj Avĭtm |  
evsj vĭ`tki wewfbagvĭfmi wĭ tbi -NĖ wĭbĭtcŃ qv nĭjv |

gvĭtmi bvg	wĭ tbi -NĖ	
	NvUv	wgvbU
Rvbgwvi	10	40
tdeqwwi	11	04
gvP	11	37
GwĭcŃ	12	24
tġ	13	04
Rly	13	31
RjvB	13	36
AvMó	13	18
tmĭP=ĭ	12	40
Aĭ±vei	11	58
btĭf=ĭ	11	15
wvĭtm=ĭ	10	48

**evqycĕvn**

evqygŮtj i Zvcgvĭvi cv\_ĖK`i dĭj mŃ evqygŮj xq Pĭtci cv\_ĖK`i KviĭY cĭġ cĭZ gĭtZ<sup>©</sup>  
evqyGK`vb nŃZ Ab`-vĭb -vĭvšĭi Z nĭ`Q | evqy GB -vĭvšĭi tK evqycĕvn eĵj | evsj vĭ`tk  
cĕvbZt`ġai tbi evqycĕvn t`Lv hvq | h\_v t | mĭgvqK (Seasonal) Ges 2 | AwbqwgZ  
(Irregular) evqycĕvn | mĭgvqK evqycĕvni ġta` ġt`tk -j evqymġy`evqyGes tġšmġg evqy  
Dĭj LthvM` | Ab`w`tK AwbqwgZ evqycĕvni ġta` mĭBĭKvb ev NvYSo, Kvj ħekvLx Ges  
ŮtbĖwvi big Kiv thĭZ cĭvi | kxZKvĭtj tġšmġg evqyDEi ceĖ K nŃZ cĕvnnZ nq Ges G  
evqy MvZteM Kg Ges tKvbĭfc Rj xq ev`ú -vĭKbv dĭj G evqycĕvni dĭj tKvb evŃcvZ  
nq bv | gvP`GwĭcŃ gvĭtm ġt`tk Kvj ħekvLx AvNvZ nĭtb Ges Rvbgvĭtj i tek ŃqŃwZ NUvq |  
Rly-tmĭP=ĭ gvĭtm -wĭY-cwĭġ wĭ K nŃZ tġšmġg evqycĕvnnZ nq | G evqymġy`nŃZ cĖZ  
Rj xq ev`ú eġ Avĭb Ges Gmġq t`tk cĖZ evŃ nq | Aĭ±vei-btĭf=ĭ gvĭtm mġy`DcKj eZĭ<sup>©</sup>  
AAĭj mĭvibZt mĭBĭKvb I Rĭj v`Qvm nĭq -vĭK | eĵj vĭcmvMĭi Zĭi tklivZ I tĭvĭi  
wĭ tK -j fĭM nŃZ -j evqymġy`ĭ wĭ tK Ges Acĭvĭtġ mġy`t`tK mġy`evqy`j fĭvMi wĭ tK  
cĕvnnZ nq |



**Abĭnj b (Activity):** Avcbvi wĭKU`-AvenvI qv Awdm nŃZ Z`-msMĭh Kĭi MZ 1 eQĭi i  
(cĭZ gvĭtmi c\_xK c\_xK Mo) wĭ em -NĖ AvĭcĭwĭK Av`Zv evŃcvZ Ges Zvcgvĭvi weei Y QK  
AvKĭvĭi`Zvĭ Kiab |

**Kul .tgšmy**

evsj v eQti 2 gvfm GK FZznq| G,tjv nt`Q MR`S, elP, kir, tngš, kxZ I emš| MKŠ` tKib dmj B`B gvfm Zvi Rxeb Pμ m`úbeKi tZ cvtibv| ZvB Kul.KvtRi m`yavt\_`mg`l eQi tK c`vbZt`w Kul.tgšm`g fVM Kiv ntqtQ -

- iwe tgšmy (Rabi season)
- Lwi c tgšmy (Kharif season)|

**iwe tgšmy**

btf`af gvfm iwe tgšmy i i nq Ges tkl nq tdeyix gvfm|

btf`af gvfm iwe tgšmy i i ynq Ges tkl nq tdeyix gvfm| th mKj dmtji RxebKvj m`úY`ev AwaKisk mgq G tgšm`g AwZemnz Kti tm,tj v`K iwekm` etj | thgb- ZivGK, tMvj Avj yMg, gmj, tLmvi x, tQij v BZ`w` |

**Lwi c tgšmy**

Lwi c tgšmy i i nq gvP` gvfm Ges tkl nq At`vei gvfm|

Lwi c tgšmy i i ynq gvP`gvfm Ges tkl nq At`vei gvfm| th mKj dmtji Rxeb P`μi m`úY`ev AwaKisk mgq GB tgšm`g AwZemnz nq tm,tj v`K Lwi c km` etj | thgb- AvDK aib, cvU Ges w`fbaM`S`Kvj xb kvK-mw`a |

**Lwi c tgšm`g K Avei`B fVM fVM Kiv ntqtQ| h\_vt-**

**Lwi c-1**

GtK c`K Lwi c tgšm`g| ej v nq| Lwi c-1 gvP`gvfm i i ynq Rly gvfm tkl nq|

**Lwi c-2**

Lwi c-2 RjvB gvfm i i ynq Ges At`vei gvfm tkl nq|

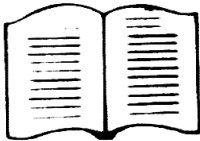
iwe tgšm`g Zvcgv`Iv, ew`ocvZ Ges Av`Zv Kg \_v`K| w`b tQvU nq Ges ivZ eo \_v`K| Gmgq tgšm`g evqyD`Ei-ce`w` K n`tz c`emnz nq etj t`tk ew`ocvZ Kg nq| iwe dmtji g`ta` D`j-L`thwM` ntjv iwe mw`a thgb- Avj y d`z`Kuc, evavKuc, Utg`tUv, j vD, Mg, mwi Iv, wZw, Pxbver`vg I Wvj RvZiq dmj |

Lwi c tgšm`g Zvcgv`Iv , ew`ocvZ Ges evZv`tm Av`Zvi cw`i gvY tenk \_v`K| w`b eo I ivZ tQvU nq| w`b-cw`og tgšm`g evqyc`v`tni dtj Gmgq t`tk c`P`z ew`ocvZ nq| Lwi c dmtji g`ta` i`tqtQ X`uom, c`BkvK, AvDK aib, BZ`w` | GLv`b D`j`L Kiv th`z c`ti th, t`Kej GKelx`dmj mg nt`KB iwe Ges Lwi c dmj Ablyqx fVM Kiv m`e`|

**Lwi c -1 , Lwi c-2 Ges iwe FZ`Z Zj`bvqj-K cv`R` w`b`ta` I qv`ntj vt**

Zj`bvi w`f`E`	Lwi c-1	Lwi c-2	iwe
tgqv`	gv`P`P` c`lg t`_t`K R`jbi tkl ch`S`	RjvB Gi c`lg t`_t`K At`vetii tkl ch`S`	btf`af`ii c`lg t`_t`K tdeyixi tkl ch`S`
ew`ocvZ	ew`ocvZ gvSvi x Ges tgšm`gi t`k`ti i w`_t`K i i ynq	mvi v tgšm`gB ew`ocvZ nq	L`B Kg, c`lg w`_t`K mvgv`b` nq
w`kj vev`o`	w`kj v ew`o` tenk nq	L`B Kg nq	L`B Kg nq

NySo I UtbfWw	NybSo I UtbfWw nl qri mtebr teuk/	Kg	Kg/
ZvcgvIv	ZvcgvIv Ly teuk/	teuk/	Kg/
tgN	tkfi i w tk AvKvtk tgN_vtK/	mvi v tgsmgB tgN _vtK/	cug w tk tgN_vtK/
w`tbi`N <sup>e</sup>	w`b mgvb t_tK eo nq/	eo t_tK mgvb nq/	mgvb t_tK tQvU nq/
er <sup>u</sup> rFeb	er <sup>u</sup> rFeb teuk nq/	Kg nq/	grSvix/
Av`Zv	evqjZ Av`Zv grSvix	tekx/	Kg/
ti vM-evj vB	dmj ti vM evj vB grSvix	tekx nq	Kg nq/
cavb dmj	cavb dmj - AvDk avb, cvU, wZj, KvDb BZ`w`/	Avgb avb/	Mg, tMj Avj yWj RvZxq Lv`/



**mvi gg<sup>o</sup>**  
 evsj vt`tki DEti fvi tzi cuoGe½ I Avmvg, cte<sup>e</sup>fvi tzi wlcjv ivR` I gqvbgvi, cuotg  
 fvi tzi cuoGe½ Ges`w`tY et½vcvMi |  
 tKvb wbw`e mgta tKvb`vtbi evqgUjxq Ae`vtK tm`vtbi H mgtaq Avnvl qv etj |  
 Acictq tKvb`vtbi ASZt 25 ermii Avnvl qvi MoK H`vtbi Rj evqyej | dmj  
 Drcv`tb ZvcgvIv, evocvZ, Av`Zv, mth<sup>p</sup> Avtjv, w`tbi`N<sup>e</sup> Ges evqgein cfvzi myuo  
 cfve we`gib |  
 Kwl. tgsmg cavbZ`gu -1| iwe tgsmg - btf<sup>e</sup>fii cug notZ tdeqvixi tkl chSj | 2/  
 Lwi c tgsmg - gv<sup>p</sup>gv<sup>t</sup>mi`i ynOtZ Atzvei gv<sup>t</sup>mi tkl chSj | Lwi c tgsmg tK Lwi c-1 Ges  
 Lwi c-2 G`B fvM fvM Kiv hq |



**ciVvEi gj`iqb 1.2**

mWVK DËti i ciVvEi UK iPý (✓) w`b,

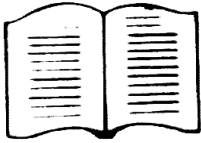
- 1/ ersj vt`tki AvqZb KZ ?
  - K. 1,45,999 eMqK. ug.
  - L. 1,47,570 eMqK. ug.
  - M. 1,73,548 eMqK. ug.
  - N. 1,63,432 eMqK. ug.
- 2/ Rj erqyKZ ermti i Avenl qvi MoK eSvq ?
  - K. 10 ermi                      L. 5 ermi
  - M. 20 ermi                      N) 25 ermi |
- 3/ tKvb Rj erqyAZ`maK WÜvl bq AZ`maK kxZI bq ?
  - K. g`yfvrcbaRj erqy
  - L. Pi g fivrcbaRj erqy
  - M. bWZkxZvò Rj erqy
  - N. mgfivrcbaRj erqy
- 4/ tKvb tRj vq ewócvZ Kg nq ?
  - K. XvKv                      L. i vRkvnx
  - M. ewi kvj                      N. imtj U|
- 5/ i we tgSmg tKvb gym t`tK tKvb gym chSÍ?
  - K. Rvbgvi x nótZ Rly gym chSÍ|
  - L. tdeyvi x nótZ RjvB gym chSÍ|
  - M. btf`t nótZ tdeyvi x chSÍ|
  - N. gvP`nótZ A±vei chSÍ|

### cw-1.3 Mqcyj v I RxeRšf Dci Rjevqj cfiē



G civ tkfi Avciēb

- ◆ Rjevqj Dwmc ēēpfiēi wfiēēZ wēf<sup>3</sup> evsj v̄tki wēfbēAĀj kbv<sup>3</sup> KiēZ cviēb |
- ◆ tKvb AĀtj Kx aiēbi Mqcyj v RtbēZvi eYēv w̄tZ cviēb |
- ◆ tKvb AĀtj Kx aiēbi RxeRš'evm Kfi Zvi wēēiY w̄tZ cviēb |



Rjevqj Dci wbfē Kfi t̄tki wēfbēv̄tb wēfbēaiēYi Dwmc Rtbē Ges wēfbēRxeRš' evm Kfi | tKvb Rxe GKKfiē cKūZtZ v̄KtZ cviēb | m̄vaviYZ wēfbētMēfi Riemgā mgwōMZfiē GKv̄tb evm Kfi | tewki f̄vM Rxe m̄vū<sup>3</sup> vq Dwmc I cōYxi mgwō ōvivi M̄vZ | GtKK AĀtj GtKK aiēYi Mqcyj v I RxeRš' cwi j w̄jZ nq hv H AĀtj i cwiēkZš; ev BtKwmtōtgi Dci wbfēkij |

evsj v̄tki Rjevqj ēēpfiē I Dwmc aiēYi Dci wbfē Kfi GtK w̄vqj wLZfiē f̄vM Kiv thēZ cviē |

- 1| M̄v b`xi wēv̄kyngfiēg AĀj (The Ganges Plane)
- 2| w̄Pin̄w̄ir cĪSiv AiYvĀj (Evergreen and Semi-evergreen Forests)
- 3| cĪSiv AiYvĀj (Deciduous Forests)
- 4| g'vbtMv̄f AiYvĀj (Mangrove Forests)

#### M̄v b`xi wēv̄kyngfiēg AĀj

t̄tki c evĀtj i wKoy  
Abyē cinio I w̄jv ēwZZ  
cōq mgMōevsj v̄tk B GKūU  
wēv̄kyngfiēg |

t̄tki c evĀtj i wKoy Abyē cinio I w̄jv ēwZZ cōq mgMōevsj v̄tk B GKūU wēv̄kyngfiēg | wēfbēb`-b`x I Gt̄ i kvL̄v cKiv L̄v Rv̄tj i gZ mgMōt̄tk Ōwōtq Av̄tQ | t̄tki mgfiēg AĀj

Gme b`x I kvL̄v b`x wētašZ cij ōvivi M̄vZ | G AĀtj i Dwmc mg n̄tK wZbfv̄tM Kiv hvq | thgb- RjR Dwmc, Abiev`x Rūgi Mqcyj v Ges Avev`x Rūgi dmj | eIēKv̄tj hLb cēž ēvōcvZ nq ZLb wēj, n̄vli I cKēzi wēfbēRjR Dwmc Rtbē | Giv n̄tjv cvZv̄tKij v, cvZv̄S, KPi cvbv, kvcjv, c`ž q̄ž` cvbv, t̄Uvcv cvbv, w̄vōcvbv, w̄v̄vivi, BZ`w̄ | n̄vli, wēj I cKēzi w̄Kbvi vq m̄vZt̄mēZ gw̄UēZ bj Lv̄Mōv, Kj gx, t̄ntj Āv, c̄w̄b gw̄iP, evZ tkvjv, BZ`w̄ Dwmc t̄L̄v hvq | Gt̄ i Rbē I esk ēv̄x G t̄gšm̄t̄gB tewk |

wēfbēcR̄v̄v̄zi gv̄ō, ēv̄ō, m̄vc Gme Rjv̄k̄tq evm Kfi | ēv̄ōi c̄w̄bēZ hLb P̄w̄i w̄K f̄ti hvq ZLb Gme cōYxivi wēfbēRv̄qMv̄q Ōwōtq c̄ti | GmgqB Gt̄ i cR̄bb mgq | eIēKv̄tj hLb b̄v̄PzRūg c̄w̄bēZ f̄ti hvq ZLb wēfbēcōYx evoxi Av̄tk c̄v̄tk DēzRv̄qMv̄q P̄tj Av̄tm | kvZKv̄tj Gme n̄vli wēfbēv̄k nōtZ Av̄Zw̄ c̄w̄L̄iv Ḡtm f̄ix Kfi Ges eIēAv̄m̄vi m̄v̄t\_ m̄v̄t\_ Giv P̄tj hvq |

Avev`thv̄M` Rūg Ōvov evoxi Av̄tk c̄v̄tk, tij jv̄Bb I iv`li cv̄tk, b`xi avi I Ab'v̄b` m̄vavi Y Rv̄qMv̄q wēfbēJlax, j̄Y I Ab'v̄b` Dwmc t̄L̄v hvq | Gt̄ i Rbē I ēv̄x Av̄ev̄l qv̄ ōvivi w̄bq̄w̄šZ | Gme v̄tb th mKj Dwmc Rtbē Gt̄ jv̄ n̄tjv - tkZt̄v̄b, t̄m̄v̄ub, kvKbt̄U, Kv̄ubt̄U, n̄vZxi'o, āž̄iv, c̄w̄b gw̄iP, w̄kqv̄j gw̄Z, KpZv̄N̄v̄iv BZ`w̄ | Gt̄ i t̄Kvb̄v̄ L̄wi c t̄gšm̄t̄g Avev̄i t̄Kvb̄v̄ i wē t̄gšm̄t̄g Rtbē | Gōvov w̄Koy w̄Koydmj Df̄q t̄gšm̄t̄g I P̄v̄l Kiv nq Ges b̄v̄i t̄Kj, Zvj, m̄ḡv̄i, t̄LR̄j, BZ`w̄ evoxi Av̄tkc̄v̄tk ev iv`li av̄ti t̄L̄v hvq | Ōvqv cōv̄bKv̄ix ēj w̄t̄m̄t̄e t̄ZZž, eU, BZ`w̄ M̄g evsjvi n̄vU evR̄v̄ti b̄R̄ti c̄to | t̄tki Dēi-c̄w̄ōḡv̄Ātj t̄q̄t̄zi Av̄tj ev iv`li av̄ti c̄ēž evej v̄ M̄vō t̄P̄v̄tL c̄to |

DeP gml I Avenl qv dmj Drcv`tbi Rb` Abxj n lqvq mgZj fig AAjt miv eQiB  
nefbaedmj Rtbj Rj evqyl Avenl qvi Dci wfiE Kti GLvrb nefbaedmj nefbaedmj  
Rtbj\_vtK| tKvb tKvb dmj Lwi c tgsmtg fij Rtbj Avevi tKvbLv i ayi ne tgsmtgB nq  
Avevi wQywkQydmj Df q tgsmtgB Rtbj evk, Avg, Rvg, bwi tKj, AvZv, tj eyKj v, ij Pz  
tej, Klvj, tcqiv, Rv`jv, BZ`w` dtj i MvQ c lq c lZ`K emotZB t`Lv hvq|

eroxi Avtk crtki tSvC ev Svto wkqj, tewR, Li tMvk, mvc, Bmvc, KvUeovj, ebueovj,  
LvUvm Ges bvbv i Kg cvmL t`Lv hvq| kxZKvtj Giv `ieZx`vrb Qvotq wQvvtq\_vtK| wKs`  
el tKvtj Giv eroxi Avtk-cr tk DPz`vrb Ptj Avtm| wQywkQydmj thgb- mvc, e`vO c fuz  
kxZKvtj MtZ`vtK| Zvcgvlv I epocvZ erovi mvt\_ mvt\_ Zviv MZ`tK tei ntq Avtm|

**Pinir I cvZvSiv ebvAj**

PEMog, cveZ` PEMog I mtjU tRjvi cvnvx AAjt Aew`Z ebvAj G AAjt i AšMZ| G  
AAjt c lZ` epocvZ nq| Dw`i ai tbi Dci wfiEKti G GjuKvi Dw`mg n tK Pvi fvtM  
fivM Kiv ntqtQ- Pinir, cvZvSiv, evk Svo I ZY. fig| Pinir Dw`i gta` MRB,  
`ejvg, tgnwlv, wvi I, Rvij, ARj, eU, AtkvK, BZ`w` i nefbaedRwZi eZgvb| G Qvov  
nefbaedAvtivr Dw`i gta` i tqtQ div`gm, Awk, BZ`w` |

cvZvSiv etji gta` i tqtQ tm\_b, Pj Zv I Mgvni | nefbaedRwZi evk GLvrb c lZ` Rtbj  
dvkv RvqMvq thLvrb etji msl`v Kg tmLvrb c lZ` Nvm Rtbj| cvnvtoi Xtj P, Avbvim I  
Kjvi Pvl Kiv nq| cvnvtoi dtK dtK R2j cwi`vi Kti DcRvZxq tjvtKiv GLvrb Sg  
c`wZtZ Rvq Pvl Kti | PEMog i w`bvAj ivertii Pvl nq|

nefbaedRwZi eb` RxeRš`G ebvAjtj evm Kti | Gt` i gta` eb`nvZx, iKi, wPZvevN, Mqvj,  
ebMiyebi, mRviyebi, nbgvb, nefbaedRwZi mvc wtkl Kti ARMi mvc c`vrb| dmj  
cvKvi mgq nvZx, iKi, evbi, wQvcvml cvnvx R2j t`tK tbtg Gtm dmtj i wZ Kti  
\_vtK|

**cvZvSiv ebvAj**

G ebvAj t`tki ga`eZx`I DEivAjtj Atc`vKZ.Kg epocvZ GjuKvq nefbaedRwZi Qvovb  
Ae`vq AvtQ| fvlqvji Mo, gaxji Mo, Mvov cvnvtoi cv`tk Aew`Z ebvAj,  
tkicji i vsuqv ebvAj, etj`ebvAj Ges Kvgji kjj wenvi G AAjt i AšMZ| Gme  
ebvAjtj e`ji mRi gta` kZKiv 98 fivM kvj MvQ| Gme ebvAjtj epocvZ Atc`vKZ.tenk|  
nefbaedRwZi RxeRš` I ci cvmLi mgstq Gme kvj eb MvZ| kxZKvtj Gme ebvAjtj MvQi

cvZv Stj hvq Ges emš Kvj bZb cvZv MRvtZ`i yKti |

eb` c`vxi gta` evbi, Li tMvk, wkqj, ebueovj, LvUvm, tewR, KvUeovj, iKi, ev`j,  
Bmvc, AvvAv, `vovk mvc, tMvLiv mvc, BZ`w` t`Lv hvq| R2jtj i gvSLvrb evBt` el tKvtj  
KB, wks, gv`j, cvj, j vlv, wvbKvrb, tUsiv, evBg, ivOv, Zg BZ`w` gvQ cvl qv hvq|

**gvbtMof ebvAj**

mgj`i DcKj eZ`j eYv<sup>3</sup> gml tRvqi fivli Kvij me mgqB w`Rv`vtK Ges GLvrb th  
wtkl ai tbi ebvAj Mto DvtQ Ziv gvbtMof ebvAj bvtg cwi`PZ| evsj vt`ki w`Y-  
civog AAjt i 2000 eMgvBj GjuKv vbtq G AAj MvZ| Gi gta` 35 eMgvBj cUqvLij x  
tRjvi w`b-civogvAj I evk Ask Ljybv tRjvi w`b AAj vbtq MvZ Ges cte`vtj Ktj,  
civog i vq g2j b`x I w`b etjvcvMli vrv cwi`wvZ| GLvrbKvi Rj evqAv`Ges me`v

cvZvSiv ebvAjtj  
e`ji mRi gta` kZKiv 98  
fivM kvj MvQ|

mgj`i DcKj eZ`j eYv<sup>3</sup>  
gml tRvqi fivli Kvij  
me mgqB w`Rv`vtK Ges  
GLvrb th wtkl ai tbi  
ebvAj Mto DvtQ Ziv  
gvbtMof ebvAj bvtg  
cwi`PZ|



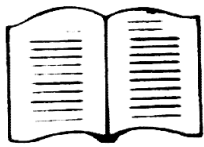


### cw 1.4 fvgi e`envi I dmj cwimsL`vb



G cvV tkfI Avciwb

- ◆ ejsj vt`tki f-fvM Kx Kx LtZ e`eüZ nt`Q Zv wPwYZ Ki tZ cvi teb |
- ◆ ebfvg, Avev` i AbjcvthvMx, Avev` thvM` Rvgi eYw w` tZ cvi teb |
- ◆ Pj wZ cwZZ I Avev` thvM` cwZZ Rvgi kbv³ Ki tZ cvi teb |
- ◆ cKZ.dmj x Rvg, GK dmj x, wØ-dmj x I Z-dmj x Rvg Kx Zv msAvwqZ Ki tZ cvi teb Ges Zvt` i cwimsL`vb w` tZ cvi teb |
- ◆ km` PvfI i wbeozv Kx Zv e`L`v Ki tZ cvi teb |
- ◆ dmj cwimsL`vb m`fÜ Z` cÖvb Ki tZ cvi teb |



ejsj vt`tk tgvU Rvgi cwigvY cÖq 1,49,00,000 tn±i (we.we.Gm. 2000) | G t`tki f-fvM wewfbalvtZ e`eüZ nt`ZQ | G, t j v nt j v t

ejsj vt`tk tgvU Rvgi cwigvY cÖq 1,49,00,000 tn±i

- 1 | ebfvg (Forest land)
- 2 | Avev` i AbjcvthvMx Rvg (Area not available for cultivation)
- 3 | Avev` thvM` ev Pvl thvM` Rvg (Cultivable land)

Avev` thvM` Rvg tK` gfvM fvm Kiv hvq | h\_v t

- K) Avev` thvM` ev Pvl thvM` cwZZ Rvg (Culturable waste land)
- L) Pvl KZ.dmj x Rvg (Cultivated land) |

Pvl KZ.dmj x Rvg tK Avev` gfvM fvm Kiv hvq | G, t j v nt j v t

- i) eZgvb ev Pj wZ cwZZ Rvg (Current fallow land)
- ii) cKZ.dmj x Rvg (Net cropped area)

cKZ.dmj x Rvg tK wZbfvM fvm Kiv hvq | h\_v t

- a) GK dmj x Rvg (Single cropped area)
- b) wØ-dmj x Rvg (Double cropped area)
- c) wÎ-dmj x Rvg (Triple Cropped area)

#### 1 | ebfvg

ejsj vt`tk cÖq 26,28,000 tn±i Rvg tZ eb i tq tQ hv tgvU fvgi cÖq kZKiv 18 fvM i gZ (we.we.Gm. 2000) | cÖkwZK fvimvg` i qvi Rb` tKvb t`tki 25% ebvAj \_vKv DvPZ | ebfvgi w` K nÖtZ cävB cvBvU epEi tRjv nt`Q- creZ` PÆMvg, Ljybv, PÆMvg, wmtj U Ges Uv½vBj | th me tRjvq tgvfUB ebvAj tbB tm, t j v nt`Q epEi dmi`cj, hvtkvi, Kwöqv, e, ov I crebv | mvari bfvteB Gt`tk ebvAj i cwigvY Kg Zvi cti I thfvte AvbqvšZ Ges Acwi Kiv Z Dcv tq ebvAj aYsm Kiv nt`Q Zv hv` tiva bv Kiv nq Zte fuel tZ G t`k gi fvg tZ cwii YZ nÖtZ cvti hvi wKQyAvj vgz GLbB t`tki DEivAj t`Lv w` tq tQ |

ejsj vt`tk cÖq 26,28,000 tn±i Rvg tZ eb i tq tQ hv tgvU t`j fvM i cÖq kZKiv 18 fvM i gZ | cÖkwZK fvimvg` i qvi Rb` tKvb t`tki 25% ebvAj \_vKv DvPZ |

#### 2 | Avev` i AbjcvthvMx Rvg

G Rvg tZ evoxNi, nvU-erVii, kni-e`i, Avdm-Av`vj Z, -ğ-Ktj R, gmtR`-gü`i, gv`tmv BZ`w` Aew`Z | Gi cwigvY cÖq 34,15,000 tn±i hv tgvU Rvgi kZKiv cÖq 23 fvM (we.we.Gm. 2000) |

### 3| Avev`thvM` Riq

Pvl`thvM` cWZZ Riq, Pj wZ cWZZ Riq I cKZ.dmj x Riqi cwi gvYi mgwó ntj v Avev`thvM` Riqi cwi gvY|

Avev`thvM` er Pvl`thvM` Riq ej tZ cKZct`KZUkzRiq`Z dmj Avev` Kiv m`e ZvtK eSvq| Pvl`thvM` cWZZ Riq, Pj wZ cWZZ Riq I cKZ.dmj x Riqi cwi gvYi mgwó ntj v Avev`thvM` Riqi cwi gvY| Avi I mnRfvte ej v hvqN

$$\text{Avev`thvM` Riq} = \text{Avev`thvM` cWZZ Riq} + \text{Pvl KZ.dmj x Riq} \\ = \text{Avev`thvM` cWZZ Riq} + \text{Pj wZ cWZZ Riq} + \text{cKZ.dmj x Riq}$$

ersj v`k cwi msL`vb e`jiv, 2000 Abgvnti G t`tk Avev`thvM` Riqi cwi gvY c`q 88,03,239 tn±i | vbtæGi Ab`vb` tkYweFvM, tj v Avtj vPbv Kiv ntj v t

#### (K) Avev`thvM` er Pvl`thvM` cWZZ Riq

eiox-Ni, nuU-erRvi, Avdm-Av`vj Z, uk`qv cWZÖvb, gmuR`-gv`i BZ`w`i AvtkcvtK wKQy Riq cWZZ \_vtK hv wKQyv hZwb`tj B Pvl`vett`i Avl Zvq Avbv hvq| Gifc Riq`K Avev`thvM` cWZZ Riq etj Ges Gi cwi gvY c`q 3 j`q tn±i hv tgvU Riqi kZKiv c`q 2 fvM| Gifc cWZZ Riqi cwi gvY w`b w`b Ktg AvmtQ|

#### (L) Pvl KZ.dmj x Riq

Pvl KZ.dmj x Riq ej tZ eSvq th Riq Pvl`vett` Kti dmj Drcv`b Kiv nq| Pvl KZ.dmj x Riq = Avev`thvM` Riq N Avev`thvM` cWZZ Riq| Ab`K\_vq, Pvl KZ.dmj x Riq = Pj wZ cWZZ Riq + cKZ.dmj x Riq| Gi cwi gvY c`q 85 j`q tn±i, hv tgvU Riqi kZKiv c`q 57 fvM|

#### (i) Pj wZ er eZ`vb cWZZ Riq

Ab`vb` eQi Avev` Kiv ntj I tKvb KvtY Avtj vP` eQti Kgc`q GK tgvntgi Rb`I Avev` Kiv bv ntj ZvtK Pj wZ er eZ`vb cWZZ Riq etj | Kvi Y, tj v n`tZ cvti Abvev`v, AvZev`v, Liv, extRi Afve BZ`w` | ersj v`tk c`q 3.49 j`q tn±i Pj wZ cWZZ Riq AvtQ hv Kiq`q i`b`Z Avb`Z nte| Gi cwi gvY tgvU Riqi kZKiv c`q 2.34 fvM|

#### (i i) cKZ.dmj x Riq

GK, w` Ges w`-dmj x Riqi thvMdj B ntj v cKZ.dmj x Riq| Avgv`i t`tki c`q 81.38 j`q tn±i Riq cKZ.dmj x Riqi Avl Zrvf<sup>3</sup>| Gi cwi gvY tgvU Riqi kZKiv c`q 54.61 fvM|

GK, w` Ges w`-dmj x Riqi thvMdj B ntj v cKZ.dmj x Riq| Avgv`i t`tki c`q 81.38 j`q tn±i Riq cKZ.dmj x Riqi Avl Zrvf<sup>3</sup>|

#### (a) GK.dmj x Riq

th Riq`Z mvi v eQi GKwU gvT dmj Rb`v`bv nq ZvtK GK-dmj x Riq etj | Avgv`i t`tk GK.dmj x Riqi cwi gvY c`q 30 j`q tn±i | Gifc Riqi cwi gvY mgkt Ktg AvmtQ| Gi cwi gvY cKZ.dmj x Riqi kZKiv c`q 37 fvM|

#### (b) w` dmj x Riq

th Riq`Z eQti `w` dmj Rb`v`bv nq ZvtK w`-dmj x Riq etj | Gt`tk w`-dmj x Riqi cwi gvY 41.48 j`q tn±i i I tevk| G Riqi cwi gvY mgv`stq evotQ| Gi cwi gvY cKZ.dmj x Riqi kZKiv c`q 51 fvM|

#### (c) w`-dmj x Riq

th Riq`Z eQti wZbvU dmj Rb`v`bv nq ZvtK w`-dmj x Riq etj | Avgv`i t`tk eZ`v`b w`-dmj x Riqi cwi gvY c`q 10 j`q tn±i | bZb bZb chv<sup>3</sup>, RvtZi D<sup>me</sup>, Kul.DcKiY Ges tmP mveav evx`i dtj Gi cwi gvY w`b w`b teto Ptj tQ| GwU cKZ.dmj x Riqi kZKiv c`q 12 fvM|

**meşgŭl dmj x Rıg (Total cropped area)**

$$meşgŭl\ dmj\ x\ Rıg = GK\ dmj\ x\ Rıg + (\iŭ-dmj\ x\ Rıg\ 2) + (\iŭ-dmj\ x\ Rıg\ 3)$$

Lwi c-1, Lwi c-2 Ges i we tgşmg űgıj tğ GK eQti meşgŭl th cwi gvY RıgtZ Avev` Kiv nq ZvB meşgŭl dmj x Rıg | meşgŭl dmj x Rıg = GK dmj x Rıg + (ıŭ-dmj x Rıg x 2) + (ıŭ-dmj x Rıg x 3) | evsj v`tk tgŭl dmj x Rıgi cwi gvY cűg 1,42,78,138 tn±i (ıe.ıe.Gm. 2000) |

**km` Pıfl i ıbreoZv (Cropping Intensity)**

GKıŭ RıgtZ eQti hZıŭ dmj dj v`bv nq Gi kZKiv nri tk km` Pıfl i ıbreoZv etj | tKıv Rıgi km` Pıfl i ıbreoZv 200% ev 300% ej tZ eŞıq H RıgtZ eQti h\_ııtg` ı ev űZbıŭ dmj Pıfl Kiv nq |

$$km\` Pıfl\ i\ ıbreoZv = \frac{meşgŭl\ dmj\ x\ Rıg}{cKZ.\ dmj\ x\ Rıg} \times 100$$

1999-2000 m`b evsj v`tk km` Pıfl i ıbreoZv űQj 175.45% (ıe.ıe.Gm. 2000) |

tKıv t`tki fıg űeıfbrıLvZ e`eüZ n`Z cıti | fıg e`enrtii LvZıqıx cwi gvYMZ ıbt`RbıB mıarı Yfıte fıg e`enri cwi msL`ıb ıntmte cwi ıPZ | ıbt`ı(QK-1) evsj v`tki fıg e`enrtii cwi msL`ıb Ztj aiv nűj t

QK-1 t evsj v`tki fıg e`enrtii cwi msL`ıb (tn±i) t

mj	eb fıg	Aev` i Athıŭl` Rıg	Aev` thıŭl` Rıg	Aev` thıŭl` cıZZ Rıg	Pıfl KZ. dmj x Rıg	eZgıb cıZZ	cKZ. dmj x Rıg
1995-96	2151683	3961007	8702237	531749	8170488	392134	7778354
1996-97	2156119	3917707	8765733	524060	8249673	389706	7851967
1997-98	2254876	3750574	8833759	502208	8331551	363402	7968149
1998-99	2255870	3700809	8889069	445344	8443725	451417	7992308
1999-2000	2627530	3414979	8803239	316194	8487044	348988	8138057

mj	GK dmj x Rıg	ıy dmj x Rıg	ıZb dmj x Rıg	meşgŭl dmj x Rıg
1995-96	3186855	3521525	1094254	13512667
1996-97	2912077	3934299	1004820	13795135
1997-98	2865908	4084839	1016960	14086466
1998-99	2999190	4013765	979352	13964777
1999-2000	2993927	4148178	995951	14278138

(Drn: ıeıeGm-2000)

**dmj cwi msL`ıb**

tKıv t`tki tgıŭ Kx cwi gvY RıgtZ Kx Kx dmj Avev` Kiv nh, tm,tjvi tgıŭ Drıv` b KZ Ges cűZ tn±ti tm,tjvi Drıv` tbi cwi gvY Ges Zvi ınmıe m`űıq cűZte` btk dmj cwi msL`ıb etj | t`tk tKıv eQi Kx cwi gvY avb, Mg, cıŭ, AvL, ZıgvK, Wıj I `Zj RıvZıq Ges Ab`ıv` dmj Drıcbıng Zı GKgvı dmj cwi msL`ıb nűZ cvı qı m`e |

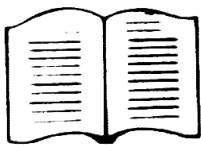
avtbi Rigi gta` Avgb  
avb 5843.7 nvrvi tn±i  
RigtZ Drcbæq hv tgvU  
avbx Rigi kZKiv 57  
fM|

vbta` QK (2) nôtZ t`Lv hvq th avbB mefPtq tek cwi gvY RigtZ Rtbv| avtbi Rigi gta`  
Avgb avb 5843.7 nvrvi tn±i RigtZ Drcbæq hv tgvU avbx Rigi kZKiv 57 fM|  
tevtiv avb Drcbæq 2580.3 nvrvi tn±i Ges AvDk avb 1649.4 nvrvi tn±i | tgvU avbx  
Rigi kZKiv 25.5 I 16.4 fM h\_vµtg tevtiv I AvDk avb Drcbæq| eZgvtb (1993-  
094) mefgvU 10073.6 nvrvi tn±i RigtZ avb Drcbæq Ges tgvU Drcv`tbi cwi gvY  
18302 nvrvi tgvUK Ub| MZ KtqK eQtii LwZqv nôtZ t`Lv hvq th Mg Prtli Rigi  
cwi gvY tgvUgvU w`wZkxj | eZgvtb 882.2 nvrvi tn±i RigtZ Mg Drcv`b Kiv nq Ges  
Drcv`tbi cwi gvY 1908 nvrvi tgvUK Ub| AvšRwZK evRvti cıfıi gj` Ktg hvı qvq cıU  
Prtli Rigi cwi gvY w`b w`b Ktg AvmtQ| eZgvtb ersj v`tk 477.9 nvrvi tn±i RigtZ cıU  
Pvl nt`Q Ges Drcv`tbi cwi gvY 812 nvrvi tgvUK Ub| eZgvtb 174 nvrvi tn±i RigtZ  
6951 nvrvi tgvUK Ub AvL Drcbænt`Q| ZvgvK A\_`Rix dmj | ZvgvK Drcv`tbi Rıg Ges  
Drcv`b tgvUgvU w`wZkxj | Wıj dmj I `Zj exR dmtj i Drcv`b I Rigi cwi gvY w`b w`b  
Ktg AvmtQ Ges G`gıU dmj B GLb gj`evb `et`wK gıv LıP Kti mef`k nôtZ Avg`vbx  
KıfZ nq| eZgvtb 546.7 nvrvi tn±i RigtZ wewfbæWıj dmj Ges 511.5 nvrvi tn±i  
RigtZ wewfbæ`Zj exR dmtj i Pvl Kiv nh Ges Drcv`tbi cwi gvY h\_vµtg 417 I 700  
nvrvi tgvUK Ub|

QK - 2 t cäv cäv dmtj i Avev`KZ.Rıgı cwi gvY I Drcv`b |

dmj	1998-99		1997-98	
	Avev`KZ Rıg (00000 tn±i)	Drcv`b (00000 Ub)	Avev`KZ Rıg (00000 tn±i)	Drcv`b (00000 Ub)
avb	10115.389	19905.0	10262.2	18862.0
AvDk	1424.500	1617.0	1565.8	1875.0
Avgb	5164.500	7736.0	5808.4	8850.0
tevtiv	3527.500	10552.0	2889.5	8137.0
Mg	882.200	1908.0	804.5	1803.0
cıU	477.900	812.0	577.4	1057.0
AvL	174.000	6951.0	175.2	7319.0
Pv	48.560	56.186	48.56	50.575
ZvgvK	31.565	29.0	32.779	37.0
Wıj dmj	546.722	417.0	682.695	518.0
%Zj exR	511.515	700.0	560.886	483.0

(Drm: w.e.w.e.Gm. 1999)



**mvi gg®**

ersj v`tk tgvU Rıgı cwi gvY 1,49,00,000 tn±i | Gt`tki f\_fıMtk cävZ wZb fıfM fıM  
Kiv hvq h\_v-ebfıg, Avev`i Abg`thwMx Rıg Ges Avev`thwM` Rıg| cıKwZK fıvımg` i qıvı  
Rb` tKvb t`tki 25% ebrAj vıKv DıPZ wKš` ersj v`tk i tqtQ gvı 18%| ersj v`tk  
mefgvU dmj x Rıgı cwi gvY 1,42,78,138 tn±i Ges km` Prtli i wıeoZv 175.45%|

t`tki tgvU Kx cwi gvY RıgtZ Kx Kx dmj Avev` Kiv nq Ges Zıv`i tn±i cıZ dj b I tgvU  
Drcv`b dmj cwi msL`vb nôtZ Rıvı hvq|



**сүтVĔi gj-ıqb 1.4**

mwK DĔti i сүтk,UK ıPý (✓) ı`b

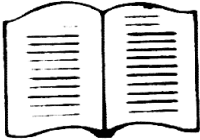
- 1| еısj ıť`tk tgvU Rıgi сwi gvY KZ ?  
K) 1,45,35,996 tn±i      L) 1,50,52,512 tn±i  
M) 1,49,00,000 tn±i      N) 1,62,42,512 tn±i |
- 2| еısj ıť`tki f- fıMtk cāvZt KqfıM fıM Kiv nıqıQ ?  
K) `k fıM      L) ıZb fıM  
M) сvEt fıM      N) mvZ fıM |
- 3| GK, ıØ I Z:dmj x Rıgi mgıó Øiv tKıv Rıg MıVZ nq ?  
K) сkZ.dmj x Rıg      L) meıgvU dmj x Rıg  
M) Avev`thıM` Rıg      N) PıI KZ.Rıg |
- 4| tKıv t`tk Zvi tgvU AvqZıbi kZKıv KZ fıM eb\_ıKıv eıĀbıq ?  
K) 40 fıM      L) 13 fıM  
M) 20 fıM      N) 25 fıM |
- 5| ıewfıbıvıbi gıa` tKıv avb me tPtq teık RıgıZ Drcıbıq ?  
K) AvDk avb      L) Avgb avb  
M) teıııv avb      N) teıbv Avgb avb |
- 6| eZıvıb (1997-98) еısj ıť`tk avıbi Drcı`b KZ ?  
K) 15.5 j ıı Ub      L) 12.5 j ıı Ub  
M) 18.8 j ıı Ub      N) 20.5 j ıı Ub |
- 7| еısj ıť`tk tgvU Avev`thıM` Rıgi сwi gvY KZ ?  
K) 7,54,862 tn±i |      L) 88,03,239 tn±i |  
M) 4,195,140 tn±i |      N) 5,734,200 tn±i |

**cw-1.5 Kul.DcKiY e`enitii eZgub Ae`v**



G civ tkfi Avcub

- ◆ Kul.DcKiY Kx Zv e`vLv KitZ civteb|
- ◆ exR I mvi weZitYi weeiY w`tZ civteb|
- ◆ hmsK I MZvbymZK cxwZtZ tmP cUv`bi cwi msL`vb w`tZ civteb|
- ◆ Avc`bvkK e`enitii eZgub Ae`vi weeiY w`tZ civteb|



DcKiY ntjv cUqvRbxq wRnbmcl hv tkvb e` ^Zwi ev DrcbeKitZ `ikvi nq| Kul. DcKiY ejtZ eSvq dmj Drcv`b KitZ miwmi Kx Kx wRnbmcl`i cUqvRb| Kul. DcKiYtK `fivM fivM Kiv thtZ cvfi | h\_vt

K) Ae`MZ DcKiY Ges

L) e`MZ DcKiY|

Ae`MZ DcKiY ntjv klgK, Z\_v gvby, Miy gmi Ges hmsK kw<sup>3</sup> | Avi e`MZ DcKiY ntjv gj-Z exR, mvi, cwb, Ges Avc`bvkK|

Ae`MZ DcKiY ntjv klgK, Z\_v gvby, Miy gmi Ges hmsK kw<sup>3</sup> | Avi e`MZ DcKiY ntjv gj-Z exR, mvi, cwb, Ges Avc`bvkK| Avgiv GLv`b e`MZ DcKiY m`fU Avtj vPbv Kitv|

**exR**

evsj v`tki AnaKisk KIK Kul`f`f` dmj Drcv`tbi Rb` wbtR`i Nti iw`fZ exR e`envi Kti \_v`Kb| evsj v`k Kul.Dbqb Ktcf`ikb (we. G. wv. wv) Zv`i exReaB Lvqvi \_tjv`Z wefbaRv`Zi dmtj i Dbz exR DrcbaKti Kl`Ki gv`S wep`q Kti; hv I cUqvRtbi Zjv`bq Zv AwZ migv`| ZvQvov cUqvRt`b we. G. wv. wv. we`k nU`ZI exR Avg`vbx Kti Kl`Ki gv`S wep`tqi e`e`v Kti \_v`K| we. G. wv. wv. KZK wep`qKZ wefbaRv`Ri cwi msL`vb wbt`e (QK-1) t` I qv ntjv|

QK - 1 t Dbz exR wep`tqi weeiY (tKwR)|

mb	AvDk avb	Avgb avb	tefiv avb	Mg	tMj Avj	mii lv	kxZKjxb kvK-mw
1990-91	892752	3025545	143685 6	16592150	6256863	49633	5853
1991-92	780939	3126365	2156761	1628425 6	6520372	82786	6990
1992-93	518084	3559431	745740	9667596	6343659	50296	519

(Drm: we.we.Gm. 1994)

Dctiv<sup>3</sup> QK nU`Z t` Lv hvq th we.G.wv.wv. gj-Zt avb (AvDk, Avgb, tefiv), Mg, tMj Avj y mii lv Ges kxZKjxb mvK-mw`i exR wep`q Kti \_v`K| 1992-93 m`b 518084 tKwR AvDk avtbi exR wep`q Kiv nq hv AvtMi eQi \_tjvi Zjv`bq Kg| GKB eQti Avgb avtbi exR wep`tqi cwi gvY wQj 35,59,431 Ges 7,45,740 tKwR hv ce@Zx`eQi \_tjvi Zjv`bq tevk | GB mgq Mg, tMj Avj y mii lv I kxZKjxb kvK-mw`i exR wep`tqi cwi gvY h\_v`t`g 96, 67,596 ; 63, 43, 659 ; 50, 296 Ges 519 tKwR hv ce@Zx`eQi \_tjvi Zjv`bq Kg| GtZ cUxqgvY nq th Kl`Kiv wbtRivB dmj Drcv`tbi Rb` wbtR`i DrcbeexR tevk e`envi KitQb|

**mvi**

i v m v i q u b K m v i w n t m t e d m j t q t z A v g i v B D w i q v, u l c j m g z v i d m t d u, m g z v i d m t d u, u g D t i u A e c l v k, u R 1/4 m j t d u, m j d v i B Z w m v i e e n v i K t i u m k | Z v t i u k Q y m k Q y A v g v t i t t k D r c b e n q G e s u k Q y m k Q y m e t t k n o t z A v g w b K i t z n q | e w M Z D t i r t M G m e m v i A v g w b K i v n t q u t k | t t k i v m v i q u b K u k i m s v i w e i f b a e K v i L v b v q m v i D r c b e n t q u t k | e Z g v t b t t k K x c w i g v Y m v i e e u z n t o Z v u b w j u L Z O t K ( Q K - 2 ) t L v t b v n t j v |

QK - 2 t i v m v i q u b K m v i w e m t q i w e e i Y |

m t i i b u g	m b ( t g u k U b )		
	1990-91	1991-92	1992-93
BDwi qv	1322964	1531518	1493125
uJ. Gm. uc	513704	456843	419262
Gg. uc.	146925	136313	122405
GBP. uc. I Ab vb	10567	2330	--
tgvU	1994160	2127004	2034792

(Drm: u. e. Gm. 1994)

D c t i v o Q K n o t z t L v h v q t h m t i i e e n v i 1991-92 m t b A v t M i e o t i i Z j b v q t e t o t o G e s 1992-93 m t b Z v A v e i K t g t Q | 1990-91, 1991-92 G e s 1992-93 m t b m e f g u l m v i e e n v i i c w i g v Y u j h v m t g 19,94,160 ; 21,27,004 G e s 20,34,792 t g u k U b |

**cwb**

w e i f b a e t m P c x u z i g v a t g d m t j i R u g t z t m P t q v n q | t t k e Z g v t b t g v U d m j x R u g i c w i g v Y 13.7 u g u j q b t n i i | G i g t a h w i s k c x u z t z t m P c o v b K i v n q t g v U d m j x R u g i 19.46 k z i s t k G e s M Z u b m u z k c x u z t z t m P c o v b K i v n q 4.46% R u g t z | e w k 76.3% d m j x R u g G L b l t m t P i A v l Z i v A v b v m e e n q u b | e v s j v t t k h i r l c p z c w i g v Y e w o n q u k s G i A m g w e z i t y i d t j i w e t g s m t g d m j d j v t b v i R b w e t k l K t i t e r t i v a v b, M g, t l m j A v j y B Z w m d m t j i R u g t z t m P w t z n q | A w a K c w i g v Y R u g t m t P i A v l Z i v A v b t z c v i t j L v w N v U w z K g t e | w e i f b a e h s c w i z i m v n v t h e v s j v t t k K x c w i g v Y R u g t z w e i f b a e o t i t m P c o v b K i v n t q t o u b t a e O t K ( Q K - 3 ) Z v t L v t b v n t j v |

QK - 3 t t m P c o v b w e l q K c w i m s L v b ( 0 0 0 0 0 t n i ) |

h w i s k c x u z t z t m P c o v b K i v n q t g v U d m j x R u g i 19.46 k z i s t k G e s M Z u b m u z k c x u z t z t m P c o v b K i v n q 4.46% R u g t z |

eQi	t j v v j d u c i u	M f x i b j K c	A M f x i b j K c	M Z u b m u z K	L v j	t g u
1990-91	674.80	615.45	1131.01	432.66	172.86	3026.79
1991-92	684.70	656.00	1293.40	414.10	170.60	3228.80
1992-93	686.20	645.20	1336.10	415.80	185.80	3252.20

(Drm: Kul. WvBw, 1996)

**Avc` b i k K**

d m j t k w e i f b a e A v c w n o t z i q l v K i v i R b w e i f b a e c k v i A v c b i k K e e n v i K i v n q | A v c t j v n t j v - A v m v Q v, t c v K v g v K o, t i v M R x e v Y y B u j u k s e v u t g A v u g Y K t i G g b

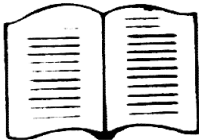
tcvKv ev c0Yx| Giv Kg tewk mevB dmj ev exRi kTjy G,tjvtK`gy Kivi Rb` newfba  
Avc`bvkK e`envi Kiv ntq`vtK|

tcvKv-gvKo, tivM-ejvB, AvMvQv I B0jy gvivi Rb` h\_vptg KxUvbkK, QTVK bvkK,  
AvMvQvbkK I tivWwUmvBW, BZ`w` e`envi Kiv ntq`vtK| G,tjv cvDWi, Zij Ges  
`vbr`vi Ae`rq cvlqv hvq| ersj vt`k tek KtqK eQi ati Gt`i e`envi Pjt AvmtQ Ges  
w`b w`b Gt`i e`envi tetob PjtQ| 1992 mtb Avc`bvkK e`envi Kiv ntqtQ 7307.22  
tgvUK Ub Ges 1993 mtb Zv tetob`votqtQ 7640.49 tgvUK Utb| 1994 mthi c0g  
Qqgvtm Gi e`envi ntqtQ 4744.8 tgvUK Ub|

QK - 4 t ersj vt`k Avc`bvkK e`envi (tgvUK Ub)|

mb	Kv bvkK			QTVK bvkK		AvMvQv - bvkK	tivWwU -mBW	tgvU
	`vbr`vi	Zij	cvDWi	cvDWi	Zij			
1992	5601.01	1045.1	79.30	28.88	421.41	89.86	41.64	7307.2
1993	5819.65	1003.7	84.15	63.41	502.07	111.38	57.11	7640.5
1994 (RivyRty)	481.19	481.2	34.33	4.95	228.37	80.54	26.60	4744.8

(uDrn: e. we. Gm. 1994)



**mvi gg®**

Kvl.DcKiY c0vYZ`0cKvi - e`MZ Ges Ae`MZ| e`MZ DcKiY ntjv exR, mvi, cvb  
Ges Avc`bvkK| KI`Kiv tewki fvM tjtTb wbrT`i Drcw`Z exR e`envi Kti Ges  
mvgvb` cwi gvty we. G. wv. wn. n0tZ μq Kti | ersj vt`k KI`Kiv c0vbZ BDviqv, wU. Gm.  
wv. Ges Gg. wv. mvi e`envi Kti | tgvU dmjx Rvigi 19.46 kZvstK hvSK c0vZtZ Ges  
4.46 kZvstK MZvbMvZK c0vZtZ tmP c0vb Kiv nq| Aewkó 76.3% dmjx Rvig GLbl  
tmtpi Avl Zvq Avbv nqv| Kvl.tjtT Avc`bvkK e`envi w`b w`b tetob PjtQ|



**cvfVvEi gj-vqb 1.5**

mWVK DEti i cvfkqUK wPy (✓) w`b

1/ DcKiY KZ cKvi ?

K) Pri cKvi L) `B cKvi M) wZb cKvi N) cvEi cKvi |

2/ e`MZ DcKiYtK KZfvM fvM Kiv ntqtQ ?

K) Pri fvM L) `gfvM M) wZb fvM N) cvEi fvM |

3/ i vnvqubK mvti i e`envi Kx i Kg ?

K) eZgvtb AvtMi Zjbrq evotQ | L) w`wZkxj Ae`vq AvtQ |

M) eZgvtb AvtMi Zjbrq KgvtQ | N) KI tKiv mvi e`envi Ki tQbv |

4/ eZgvtb tgvU dmj x Rvgi KZ fvM tmP cDvb Kiv nq ?

K) 20.52 fvM L) 25.30 fvM

M) 23.92 fvM N) 30.72 fvM |

5/ dmjt i Avc` aYsm Kivi Rb` Kx e`euZ nq ?

K) Avc` bvkK M) AvMvQvbkK

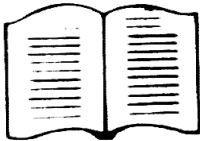
L) KxUvbkK N) `j YbvkK |

### cw 1.6 ersj v`tki A\_ŠmZtZ dmtj i Ae`vb



G crV tkfI AvciB

- ♦ ersj v`tki RvZiq Avtq dmtj i Ae`vb Dtj L KižZ cvi`teb|
- ♦ RvZiq A\_ŠmZtZ tKvb dmtj i KZUKzAe`vb Zv kbr<sup>3</sup> KižZ cvi`teb|
- ♦ tKvb tKvb dmj Avg`vbx I i Bvnb Kiv nq Zv i PivýZ KižZ cvi`teb|



ersj v`k Kul. cãvb t`k| Gt`tki gvbtj i cãvb tckv ntjv Kul. A\_Šr dmj Drcv`b| ersj v`tki kZKiv 68.5 fM gvby G tckvq ubtqvMRZ Ges t`tki tgvU Af`šlxy Drcv`tbi 35% Avtm Kul. t\_žK| RvZiq Avtqi msnfVMB (39.37%) thvMvb t`q GB Kul. LvZ (we. we. Gm. 1994)|

ersj v`tki kZKiv 68.5 fM gvby Kul. Kvr R ubtqvMRZ Ges t`tki tgvU Af`šlxy Drcv`tbi 35% Avtm Kul. t\_žK|

RbmsL`v ep`xi dtj t`tk dmj x Rigi cwi gvY w`b w`b nrm cvt`Q| mEi Gi `ktK gv`vncQy Rigi cwi gvY uQj cãq GK GKi| eZgvtb Zv Ktg Gtm `vãtqtQ 0.25 GKi| GB μgnmgyb Riq t\_žK μgeaēvb RbmsL`vi Lv` Pvn`v ci-Y KižQ Gt`tki wevfbedmj | Rigi cwi gvY nrm tctj I avb I Mtgi Drcv`b ep`x cvl qvi dtj Lv` NvUvZ MZ nek eQi atj GKB chēq i tqtQ| weMZ 1950-51 A\_ŠeQti Gt`tk Lv` Drcv`tbi cwi gvY uQj 62 j`ŋ Ub| weMZ vzb `ktK t`tki Lv` Drcv`tb cfrZ DbvZ mvaZ ntqtQ| 1960-61 A\_ŠQti Lv` ktm`i Drcv`b 97 j`ŋ Utb DbvZ nq| 1989-90 mtb Gi cwi gvY `vãq 1 tKvU 64 j`ŋ Utb | A\_Šr 29 eQti Gt`tk Lv` ktm`i Drcv`b cãq uQ. b tefoqtQ| Gmgq Lv` ktm`i cēp`xi nvi uQj kZKiv 2.20 Ges RbmsL`v ep`x uQj 2.28 fM| 1992-93 A\_ŠeQti Lv` ktm`i Drcv`b `vãq 1 tKvU 72 j`ŋ Utb| Drcv`b evotj I RbmsL`v ep`xi Rb` Avgvt`i Lv` NvUvZ t\_žKB hv`Q| Gme Z\_` t\_žK t`Lv hvq Lv` ktm`i Drcv`b ep`x bv ntj μgnmgyb RiqžZ μgeaēvb RbmsL`vi Lv` Pvn`v ci-Y m`e ntZv bv| KulžZ DbvZ chēp`xi e`envi Ges D`P dj bkxj RvZ D`m`v`tbi dtj B Zv m`e nt`Q| ZvB GK\_v ubtm`t`tn ejv hvq th ersj v`tki A\_ŠmZtZ dmj LgB , i ZcY`FvgKv i vLžQ|

ersj v`tki cãvb dmj , tjv ntjv, avb, Mg, crV, AvL, ZvqvK, Pv, Avj yWj I `Zj RvZiq km`| ersj v`tki A\_ŠmZtZ Gt`i Ae`vb ubt`vAvtj vPbv Kiv ntjv:

#### avb

eZgvtb 39u D`P dj bkxj RvtZi avb D`m`v`eb Kiv ntqtQ hvi cãq AvakvskB KIK chēq gv`V Pvl Kiv nq|

ersj v`tk avtbi Rigi cwi gvY Kgtj I cãZ GKK RiqžZ Gi Drcv`b ep`x cvt`Q| Avtm avtbi Drcv`b nvi uQj tn±i cãZ 2-3 Ub Avl GLb Zv 5-6 Utb DbvZ ntqtQ| eZgvtb 39u D`P dj bkxj RvtZi avb D`m`v`eb Kiv ntqtQ hvi cãq AvakvskB KIK chēq gv`V Pvl Kiv nq| 1970 mtj Pvtj i Drcv`b uQj cãq 10 vgvj qb Ub eZgvtb Zv cãq 19 vgvj qb Utb DbvZ ntqtQ| Gi ci I Gt`tk Pvtj i NvUvZ i tqtQ hv Avg`vbi gva`tg ci-Y Kiv nq|

#### Mg

`vbr RvZiq Lv` ktm`i gta` avtbi ciB Mtgi `vb| Mg ersj v`tki A\_ŠmZtZ Lg GKUv fvgKv bv i vLž I avtbi mnKvix Lv` vntmte Mg Zvi `vb Kti ubtqtQ| t`tk tenk cwi gvY Riq tm`Pi Avl Zvq Avmvi dtj Ges Mtgi tPtq evOvuj iv fvZ tenk cQ` Kti weavq eZgvtb Mtgi Rigi cwi gvY Ges Drcv`b `B-B w`vZkxj ntq AvmtQ| Mtgi dj b ep`xi Rb` ersj v`k Kul. Mtel bv BvovUUDU A`veax 16u D`P dj bkxj Mtgi RvZ D`m`v`eb KtižQ Ges KIžKi gv`V G\_`tjvi cãq me KŪU Pvl Kiv nt`Q| 1997-98 A\_ŠQti ersj v`tk 80.4 j`ŋ tn±i RiqžZ 18 j`ŋ tgvUK Ub Mg Drcv`ntqtQ|

**ciU**

ciU ersj vt`tki cãvb A\_Rix dmj |  
A\_Rix dmj |

ciU ersj vt`tki cãvb A\_Rix dmj | eZ@vrb vek/ evRvti cıfUi Pın`v Ktg hvl qvq Zvi `vgI Ktg tMtQ; dtj ciU Pıtl KIKt`i Drmın Ktg tMtQ| wKQyb AvtMI ersj vt`k wtkfj 69wU t`tk ciU iBmb KiZ | Drcw`Z ciU I ciURvZ `te`i 70% wewfbæt`tk iBmb Kiv nq| AvtM cãZ eQi ersj vt`tk 70 j`f tej ciU DrcbænOtZv hv eZ@vrb Gtm tvtKtQ 40 j`f tetj | 1992-93 A\_@Qtıi gıP@93 chSı 788 tKmU 90 j`f UrKı ciURvZ `e` Ges 224 tKmU 90 j`f UrKı KıPr ciU iBmb Kti Avq nq| t`tki `e`wK gytı 16% Avq nq ciU I ciURvZ `e` iBmb Kti | eZ@vrb JIa I tcvlvK wktıi cıvtKıRstqi Rb` cãq 11 kã tKmU UrKı gıj`i 1 j`f 4 nıRvi Ub BÜwotıvj tMw KıMR Avg`vnb nt`Q| ciURvZ `e` w`tq G KıMR `Zwi Kti `e`wK gytı mvktı mæe| Rıyb (70% ciU + 30% mzyı) `Zwi KıtZ GLb cıfUi Avk e`eüZ nt`Q| b`xi ewa fıvzb tivta PıfUi e`ı , iZcY`fıgKı cvj b KıtQ|

**Pv**

Pv ersj vt`tki wZıx cãvb A\_Rix dmj |  
A\_Rix dmj |

Pv ersj vt`tki wZıx cãvb A\_Rix dmj | 1997-98 mtb Pv evMrtbi Avl Zıv Rıgi cııgıY wQj 48.5 nıRvi tn±i Ges Drcv`b wQj 50.5 nıRvi tııUK Ub| Af`sıxY Pın`v wııUtq Gi cãq AfaR cııgıY wtk iBmb Kiv nq| Pv iBmb Kti 1988-89 A\_@Qtıi Avq ntqtQ 1208 wııı qb UrKı, 1989-90 A\_@Qtıi 1201 wııı qb UrKı, 1990-91 A\_@Qtıi 1544 wııı qb UrKı, 1991-92 A\_@Qtıi 1296 wııı qb UrKı| esj vt`tk Pv Gi Drcv`b w`b w`b evotQ|

**AvL**

AvL ersj vt`tki wPıb I o Drcv`bKııx cãvb A\_Rix dmj |  
o Drcv`bKııx cãvb A\_Rix dmj |

AvL ersj vt`tki wPıb I o Drcv`bKııx cãvb A\_Rix dmj | eZ@vrb t`tk 1,74,000 tn±i RııgtZ AvL Drcbænq Ges evrmiı K Mo Drcv`b 72-76 j`f Ub| Drcw`Z AvtLi 23 j`f Ub e`eüZ nq wPıb Drc`tbi Rb` Ges 31 j`f Ub AvL e`eüZ nq o Drcv`tbi Rb`| evKı AvL exR wntmte I wPıetq Lıı qvi Rb` e`eüZ nq| t`tk eZ@vrb wPıb I o Drcv`tbi cııgıY h\_vııtg 1.9 j`f Ges 3 j`f Ub| t`tk evrmiı K 3 j`f Ub wPıb Ges 6 j`f Ub oıı Pın`v wııUtZ 1 tKmU 10 j`f Ub AvL Drcv`b cãqvRb| AvtLi Drcv`b ewxı j`f` B`fıZMtelYı BbııwıUDU 23 wU D`P dj bkıı B`fıZRıv D`wıeb KtııQ| t`tk wPıbı Pın`v wııUtııvı Rb` cãZeQi cãq GK j`f Ub wPıb Avg`vnb KıtZ nq|

**ZıgvK**

ZıgvK ersj vt`tki Ab`Zg A\_Rix dmj Ges miKtıi ivR`^ Av`vtqi Ab`Zg Drm| ersj vt`tk eZ@vrb 89 nıRvi tn±i RııgtZ cãq 36 nıRvi tııUK Ub ZıgvK Drcbænq hv t`tki Af`sıxY Pın`v wııUtZ m`fıg|

**Wıj RıvZıx km`**

t`tk Wıj RıvZıx ktm`i Pın`vi cãq teıki fıMB eZ@vrb Avg`vnb KıtZ nq| wemZ KtqK eQtı ersj vt`tk Wıj RıvZıx ktm`i Rııgi cııgıY I Drcv`b Ktg tMtQ| t`tk tmtPi Avl Zıv Rııgi cııgıY teıo hvl qvi dtj KıtKııv GLb tm RııgtZ Wıııı cııetZ`aııb Pıı KıtQ Zte Wıııı dj b ewxı Rb` miKıı c@Póv Pııııııı hıı`Q Ges ersj vt`k Kwl. MtelYı BbııwıUDU I ersj vt`k cııgıYKwl. BbııwıUDU tek KtqK RııZıı gıııı, tQııı, gııı I gııı KıııBtııı Dbııı RııZ D`wıeb KtııQ|

**^Zj exR RvZiq km`**

mwi lv ersj vt`ki c`avb ^Zj exR RvZiq km`| eZgvtb ^Zj exR RvZiq km` wntmte t`tk mqvextbi Pvl nt`Q Ges mqvextb Pvl i D34j m`ebv itqtQ| wKŠ`mqvextb μvm Kivi tgvkb bv \_vKvq Avgvt`i tZtj i NvUvZ ugUvtZ c`Z eQi 3 t`tk 6 nvrvi ugvi qb UvKvi mqvextb ^Zj wef`k n`fZ Avg`mb Kitz nq| Gt`tk ^Zj exR RvZiq dmtj i Rvgi cwi gvY w`wZKxj itqtQ| ^Zj exR ktm`i dj b ep`xi jt`j` t`tki Kul.Mtelbv c`Z`vrb mgr mwi lvi 10uU, Pxbver`vtgi 6uU, MR`vZtj i 3uU I wZw i 1uU D`Pdjbkxj RvZ D`v`eb KtitiQ| G`tjv Pvl i Avl Zvf,<sup>3</sup> Rvgi cwi gvY evortZ cvitj ^Zj Avgv`mbi cwi gvY Ktg Avmte Ges t`tki A`v`vZtZl ht`o Ae`vb ivLte|

**ivevi**

t`tk ivevi Drcv`b ep`x cvlqvq KvPr ivevi Avg`mb μgk nvm cvt`Q Ges G LvtZ D`tj L`thvM` cwi gvY `et`wK g`yi mvtkt nt`Q| eZgvtb (1994-95) A`eQti GB mvtktqi cwi gvY c`q 20 tKwU UvKv| wefbaivevi evMvb n`fZ eZgvtb c`q 3 nvrvi Ub KvPr ivevi Drcv`b nt`Q hv w`tq t`tki 250uU ivevi RvZ `e` Drcv`bKvix c`Z`vrb tgvU emlR Pm`vi 30% ugUvtbv m`e nt`Q|

**dj, dj I kvKmw`**

XvKvq eZgvtb c`Zw`b 5 j`j UvKv g`tj`i ZvRv dj wefbaivevi nt`Q|

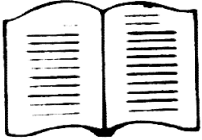
ersj vt`tk dj GLb emYwR`K cY`| XvKvq eZgvtb c`Zw`b 5 j`j UvKv g`tj`i ZvRv dj wefbaivevi nt`Q | t`tk eZgvtb 2 nvrvi weNv RvgtZ emYwR`Kfite dtj i Pvl nt`Q&| c`q 15 nvrvi tjvK c`Z`j Ges ctiv`jfvte dj e`emvi mvt` RvZ| 1993-94 A`eQti ersj vt`k 12 j`j UvKv g`tj`i ZvRv dj tm`w` Avite i Bmb Kti |

dtj i Drcv`b w`b w`b ep`x cvt`Q Ges th cwi gvY Drcbent`Q ZvtZ t`tki Pm`v ci-Y nt`Q| KvUvj mn wKQydj wef`tk i BmbI nt`Q | eZgvtb ersj vt`k n`fZ 15uU i AwaK t`tk 48 cKviti i kvKmw` i Bmb nt`Q | 1992-93 A`eQti 313.5 ugvi qb UvKvi Ges 1993-94 A`eQti 323.5 ugvi qb UvKvi mw` wef`tk i Bmb Kiv nq| t`tk mw` Drcv`b Kivi jt`j` Kul.MtelYv c`Z`vrb mgr wefbaRvtZi D`P dj bkxj RvZ D`v`eb KtitiQ|

Dcti i AvtjvPbv n`fZ GUV `u`o th ersj vt`k Kul i Dci wbfPkxj nI qv mtej wefbaKvity Gt`tki dmj mgr A`v`vZK t`j`i Avkvbj/c Ae`vb ivLtz cvitQ bv| c`KwZK `h`vM, mgZ cwi i bvi Afive, Kul.bmwZgvjv ev`evqtb Amdj Zv, KIKt`i AAZv I `wii`? MtelYv I m`utvityi g`ta` thvMvthvMi Afive BZ`w`B c`avb KviY| t`tki A`v`vZK t`j`i dmtj i Ae`vb AvtjvI evote GUVB Avgvt`i c`Z`vkv|



**Ablyj b (Activity):** òesj vt`tki A\_òxiz Z dmtj i Ae`vbó kxl R GKul mswq]B i Pbr wj Lly|



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esj vt`tki kZKiv 68.5 fM gvbym i tckv ntjv Kwl. | t`tki tgvU Af`šlxY Drcv`tbi 35% Ges RvZixq Avtqi 39.37% thwMvY t`q GB Kwl. | MZ wZb`k ktk t`tki Lv` Drcv`b còq w`Y tetotQ| avb Avgtv`i còvb `vbrRvZixq Lv`km Ges Gi ciB Mti Ae`vb| esj vt`tk D`weZ D`P djbkj avb I Mti RvZi msl`v h\_vmtg 39 I 16 hvi tewkj fVMB KIK chiq Pvl nt`Q | cvU I Pr h\_vmtg esj vt`tki còvb I wZixq còvb A\_Rix dmj | th`tjv iBmb Kti Gt`k còz`et`wkK gyv Avq Kti | t`tk eZgvtb evnbwR`K wfvE`Z dz Drcw`Z nt`Q | A\_òwZK t`q]t dmtj i Ae`vb μgvštq evotQ|



**ciVvEi gj`vqb 1.6**

mivK DEti i ciKkUK iPý (✓) w`b|

- 1| ersj vt`ki kZKiv KZ fVM gvbly dmj Drcv`tb mbtqwmRZ ?  
K) 50.5 fVM      L) 68.5 fVM      M) 70.7 fVM      N) 62.5 fVM|
- 2| RbmsL`v ep`xi dtj Lv` km` Kx Ae`vq AvtQ ?  
K) evotQ      L) KgvtQ      M) w`wZkxj AvtQ      N) Ly tevk KtgtQ|
- 3| MZ 25 eQtI Ptj i Drcv`b KZ `Y ntqtQ?  
K) cvB, Y tetotQ      L) `B, Y KtgtQ  
M) `B, Y tetotQ      N) wZb, Y tetotQ|
- 4| Drcw`Z cvU I cvURvZ `te`i kZKiv KZ fVM i Bmb nq ?  
K) 100 fVM      L) 70 fVM      M) 50 fVM      N) 60 fVM|
- 5| mbtai tKvbU wef`tk i Bmb nq ?  
K) Mg      L) Zzv      M) AvL      N) Pv|
- 6| mi Kvfi i ivR`Av`vtqi Ab`Zg Drm tKvb dmj wJ ?  
K) AvL      L) avb      M) ZiqvK      N) Pv|



### Peršl gj'iqb

#### mswǵB I iPbigj-K cǵæ

- 1/ Kwl.ej tZ Kx eSvq?
- 2/ Kwl.i , iǵj Avtj vPbv Ki ly|
- 3/ evsj vt`tki f-cKwZi eYǵv w`b|
- 4/ evsj vt`tki tǵSmij K Ae`v eYǵv Ki ly|
- 5/ Avenrl qv I Rj evqyej tZ Kx eSvq?
- 6/ Avenrl qvi Dcv`vb , tǵvi big wj Lly|
- 7/ Kwl.tǵSmg mǵtÜ mstǵtǵ Avtj vPbv Ki ly|
- 8/ evsj vt`tki wewfbæbvĀtj RtbǵGgb me MvQ cvj vi big wj Lly|
- 9/ MvQcvj v I RxeRšf Dci Rj evqj cǵve eYǵv Ki ly|
- 10/ g`vb tǵMǵf ebvĀj mǵtÜ Avtj vPbv Ki ly|
- 11/ evsj vt`tki eb`ci cwlLiv tKgb cwi tǵtk evm Kti tm mǵtÜ Avtj vPbv Ki ly|
- 12/ Kx Kx LvZ evsj vt`tki f-fvM e`eüZ nt`Q Zv wj Lly|
- 13/ meǵvU dmj x Rvǵ mǵtÜ Avtj vPbv Ki ly|
- 14/ km`Pvtl i wbeoZv mǵtÜ Avtj vPbv Ki ly|
- 15/ dmj cwi msL`vb ej tZ Kx eǵSb? cvtUi Pvl w`b w`b Kǵg AvmtQ tKb?
- 16/ Kwl.DcKiY ej tZ Kx eǵSb? Kwl.DcKiY , tǵvi big wj Lly|
- 17/ evsj vt`tki KlǵKiv tKvb tKvb Drm t\_ǵK exR cvb Zv eYǵv Ki ly|
- 18/ KlǵKiv tKvb tKvb ivmǵqubK mvi e`envi Ktib? MZ wZb eQti i mvi weZitYi aviv t`Lv|
- 19/ tKvb tǵSmǵg tmǵPi cǵqvRb temk Ges tKb Zv Avtj vPbv Ki ly|
- 20/ wewfbæAvc`biktKi big wj Lly Ges tKb Gt`i dmtj i RvǵtZ e`envi Kiv nq?
- 21/ evsj vt`tki A\_ǵmZtZ cvtUi Ae`vb Avtj vPbv Ki ly|
- 22/ evsj vt`k Kx Kx dmj Avǵ`vnb I iBvnb Kti Zvi Zwj Kv w`b|
- 23/ Wvj I `Zj RvZ ktm`i Aver`thvM` Rvǵi cwiǵvY I dj b w`b w`b Kǵg hv`Q tKb Avtj vPbv Ki b|



**DĖi gij v**

**cW-1.1:**

1| N, 2| N, 3| M|

**cW-1.2:**

1| L, 2| N, 3| M, 4| L, 5| M|

**cW-1.3:**

1| K, 2| M, 3| N, 4| L, 5| M, 6| K, 7| N|

**cW-1.4:**

1| M, 2| L, 3| L, 4| N, 5| L, 6| M, 7| L|

**cW-1.5:**

1| L, 2| K, 3| K, 4| M, 5| K |

**cW-1.6:**

1| L, 2| K, 3| M, 4| L, 5| N, 6| M|





Kul. I cju Dbq b ǵ

Rb` e`envi nq| joiBtqi tǵviM tek Pov `vtǵ weu nq| AwQj gjuM eǵǵbenoqv tRjvi  
 mi vBj I PÆMǵgi Avtǵvivi v vbrq t`Lv hvq| Mjv tQvj v gjuMi Mjvq tKvb cij K \_vtK bv|  
 Giv AvKvǵi eo| Mjvi dǵ tek eo Ges jvj istǵi | wntj U tRjv I weifbæitb weuQbæitb  
 G gjuM t`Lv hvq| LwU PvUMtǵi gjuM PÆMǵ tRjvi Avtǵvivi v vbrq t`Lv hvq| Giv  
 AvKvǵi eo, Mjv j ǵǵ, gv\_v tQvU, gv\_vq Sǵ \_vtK| gv\_vq cij tKi tMj Sǵ gjuM  
 evsj vt`tki cǵ meP B t`Lv hvq| Gt`i gv\_vi cij K tMj nǵ GK „Q Sǵ `Zix Kǵi | Sǵ  
 I Mjvi dǵ Lǵ tQvU I jvj istǵi |

Mǵ MǵÄi cǵǵ wej ev tWveq th mg`Inva Pto teovtZ t`Lv hvq G, tǵv t`kx RvǵZi cǵvZ  
 nǵw| Giv AvKvǵi tQvU I wWg Kg t`q| t`kx nva AZ`šl Kó minòzP Aj Ges mZKǵ Gt`i  
 cij tKi is weifbæaitbi nǵ \_vtK| t`kx nva ni gǵa` bvtMKǵix, gwU nva, miv nva, ivR nva  
 cǵvZ. Dǵj -LthvM`| bvtMKǵix Ges gwU nva wntj tU cvl qv hvq Ges miv nva evsj vt`tki  
 meP t`Lv hvq| ivR nva tKn tKn mL Kǵi cij b Kǵi b| ivR nva Lǵ Kg wWg t`q|

Keǵi kǵšl cǵxK wntǵte weuPZ| Giv Lǵ myi I kvšl cǵx Ges wbtRǵ`i Lvevi  
 wbtRivB mSMǵ Kǵi Lvq| Keǵi evovtZ wKsev tcvov evovtZ \_vKǵZ cǵv` Kǵi| Avǵvt`i  
 t`tk AǵtK mL Kǵi KeZZi cǵtj b| Giv cǵZ t`o gǵm GK tRvov ev`Pv t`q| Keǵi i  
 ev`Pvi gǵsm Lǵ myr` y RvZ I eY`Abyvǵi Keǵi weifbæAvKvZ I istǵi nq| th me RvZ  
 Avǵvt`i t`tk t`Lv hvq Giv nǵj v Rvj vj x, wmi vRx, j tǵǵ I tevM`v x|

**OK t ci cvLi msL`v I Drcv`b**

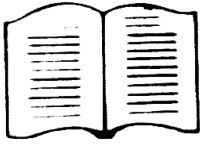
K. tǵvU msL`v

Mewi ci I nuogjuM	msL`v
Mi	2,33,86,000
gwi	8,02,000
QvMj	3,21,86,000
tfo	10,92,000
gjuM	12,42,79,000
nva	1,35,68,000

**L. ewl R Drcv`b**

gǵsm	5,04,702 tǵvUK Ub
`ǵ	14,11,959 tǵvUK Ub
wWg	253,96,96,000 wU

(Drm: Kul. Wǵqwi , 1996)



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 Miygini, Qmij, tfoi, nva, gjm Ges Kezi ubtqB Mpcwiz Z ci`cmlLi RMr| PivMvBqv,  
 ^fi ex, cvebvBqv brtg `vbxq RivZi MiyAvtQ| guntli gta` Rjv guntli clavb` tenk| e`vK  
 te%j Qmij Qvor Ab` tKvb QvMti RivZ Gt`tk tbB|weirfbæAAtj AvvQj, MjvtQijv,  
 PivMvBqv Ges gv\_vq tMij Svb gjm t`Lv hvq| Avgrt`i t`tk th me nva t`Lv hvq tm, tjv  
 ntjv cawZ nva, miv`v nva, bvtMKix I ivRnva| Keztii gta` Rivvjx, mivRx, jtjy` I  
 tevM`v`x RivZ Gt`tk t`Lv hvq| weirfbæci`cml t`tk Avgiv vWg, `x I gism cvB|



**cvfVvEi gj`vqb 2.1**

mVVK DEti i cvfkqUK wPy (✓) w`b

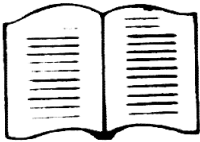
- 1/ `fi ex tKvb RvZi Mi y?
  - K. Aveigk<sup>a</sup>                      L. wqk<sup>a</sup>                      M. t`kx                      N. Dbz
- 2/ gvnI tKv\_vq\_vkZ tenk cQ` Kti ?
  - K. iKfbv`vfb                      L. DEz`vfb                      M. ZY.fvgtZ                      N. Rj vk tq
- 3/ eisj v`tki wbr`QvMti i RvZ tKvbU ?
  - K. e`vK te½j                      L. wvUx                      M. cvUbrB                      N. hgvrcvi x
- 4/ tKvb RvZi gjvM j ovB Kti ?
  - K. Mj v tQj v                      L. AvQj                      M. PvUMtqi gjvM
  - N. gv\_vq cvj tKi tMj SvU gjvM |
- 5/ t`kx RvZi gjvMi wlg civoi qgZv tKgb ?
  - K. tgvUvgw                      L. Kg                      M. tenk                      N. gvSwi |
- 6/ nva tKv\_vq\_vtK ?
  - K. cmbtZ                      L. gvUtZ                      M. MvQ                      N. gvU I cmbtZ |
- 7/ bvtMkix nva eisj v`tki tKvb AAjt cvl qv hq?
  - K. XvKv                      L. ivRkvx                      M. w`brRcj                      N. wvtj U |
- 8/ Kezi Kgvtm GK tRvor evPv t`q ?
  - K. t`ogvtm                      L. `B gvtm                      M. wZb gvtm                      N. Qq gvtm |

## cw 2.2 ci`cwiLi RvZ cwi`PvZ, RvZxq A\_`BvZtZ ci`cwiLi Ae`vb



G cvV tk`l Avci`b

- ◆ ci`cwiLi RvZ cwi`PvZ j v`f Ki`tZ cvi`teb|
- ◆ D`tj-L`thvM` Rv`tZi ci`cwiL\_`tj vi`e`wkó` eY`Bv Ki`tZ cvi`teb|
- ◆ tKvb Rv`tZi ci`cwiL Kx Kv`R e`eüZ nt`Q Zv Rv`tZ cvi`teb|
- ◆ RvZxq A\_`BvZtZ ci`cwiLi Ae`vb gj`vqb Ki`tZ cvi`teb|



### ci`i RvZ cwi`PvZ

#### Mi`yRvZ

- 1| `fai Rb` - jvj w`Üx, kv`xl qvj, \_vc`Kv`P, nj`vob w`clvRqvb, Rv`m,`\_`tqY`m, Av`qi kv`qi, ev`vqx m`Bm|
  - 2| Kv`Ri Rb` - nvi`qvbv, ev`Mbvix, av`b`l \_vc`Kv`P |
  - 3| `g I Kv`R Df`tqi Rb` - nvi`qvbv I \_vc`Kv`P |
- w`b`v`Kt`qKw`U Db`Z Rv`tZi Mi`y cwi`PvZ t`qv nt`j vt kv`xl qvj

kv`xl qvj Rv`tZi Mv`fx  
 `vbK 9-10 wj Uvi `g t`q  
 Ges cl`q 280 w`b `yeZx  
 \_v`K| ej` ev` l`w nvj  
 P`f`l i Ab`g`thvMx|

cwK`v`bi cv`Ave c`k`i gi`U`fMv`gvi`x Gi Drcw`E`j | Mv`fx Av`Kv`ti w`KQv`v j`v`f, nvj Kv`-  
 cv`Zjv, t`QvU cv` I Mv`Z axi | Gt`i gv`v Av`Kv`ti t`QvU Ges Kc`v`tj i`vb DP`z j`wZ Kv`b I b`v`fx  
 S`z`v`bv| P`d I Mj K`v`f tek eo| I jvb eo I S`z`š| Mv`tqi is nvj Kv`j`ij ev` nvj Kv`nj`y|  
 `vbK 9-10 wj Uvi `g t`q Ges cl`q 280 w`b `yeZx \_v`K| ej` ev` l`w nvj P`f`l i  
 Ab`g`thvMx|

#### jvj w`Üx

cwK`v`bi w`Üzc`k`i Ki`v`Px, jv`m`tejv I nvq`ivev` Gi Drcw`E`j | Mv`tqi is jvj e`fj  
 Gt`K jvj w`Üx e`fj | Gw`U t`QvU gv`v`l qvjv t`g`v`Uv I L`v`Uv Rv`tZi Mi`y w`ks t`g`v`Uv I m`v`g`b`i  
 w`t`K ev`Kv`v`bv| Kc`ij cl`k`l Kv`b`i Av`Kvi gv`Svix, b`v`P`i w`t`K S`z`v`bv, I jvb tek eo I  
 m`Mv`WZ| b`v`fx eo I S`z`v`bv| G Mi`yc`ZKj Ae`v`mn` Ki`tZ cv`ti Ges `g`l t`q tenk|  
 `vbK 8-10 wj Uvi `g t`q Ges cl`q 350 w`b `yeZx \_v`K|

#### \_vc`Kv`P

cwK`v`bi w`Üzc`k`i \_vc`Kv`P t`Rjv`q Gi Drcw`E`j | Gw`U k`³ I gRe`z Mo`b`i ga`gv`Kvi  
 kv`³ kv`j`x ci` | ej` Mv`ox I jv`z`j Uv`b`i Kv`R e`eüZ nq| Mv`fx tenk cwi`gv`Y `g t`q|  
 `vbK `g t`q 9-11 wj Uvi Ges eQ`ti i 300 w`b `yeZx \_v`K| Mv`tqi is m`v`v| w`ks I P`d  
 ga`g Av`Kv`ti i |

#### nj`vob w`clvRqvb

nj`v`Üi w`clvR`v`Ü c`k`i Gi Drcw`E`j | `g`vj Rv`tZi Mv`fxi g`ta` GRv`Z Zj b`ig j K`f`v`te  
 eo| ki`x`i i m`v`g`b`i Ask w`PKb Ges I jvb tek eo| kixi tek t`cx h`y | Mv`fx\_`tjv kv`š  
 `f`v`tei w`KŠ`l`w`\_`ij e` t`gRv`Ri | Mv`tqi is Kv`tjv m`v`v`q w`P`v Ges G`t`qi th t`Kv`b GKw`U  
 c`v`vb` \_v`K|

**Rum**

BDti vc I Avtgi Kvq t`Lv hvq| `xvj RvtZi gta` Rvmmeftcflv eo| t`tni MVb Dbz I myi | I jvb tek eo| Ptd tbB| Mtqi is jvj, nRnYv I tj tRi is Kvjtjv| tMPrity AF`| evrmi K `x Drcv` b 2,750–4,000 wj Uvi |

**nwi qvbn**

nwi qvbn RvtZi Mvfx `nbK 9–10 wj Uvi `x t`q| ej` j v2j I Mvox Uvbi KvR e`euZ nq|

fvtZi nwi qvbn AAjtj i G Miyv`v, `xN`D`P I ewj o| nks j`p, nPKb I gmY| t`tni eY` m`vU ev nvj Kv ami | `nbK 9–10 wj Uvi `x t`q| ej` j v2j I Mvox Uvbi KvR e`euZ nq|

**eMbvix**

cvtK`tbi mUzAAjtj Gi DrcmE`j | Miy`nRvq, ewj o, `p I kixi mYmVZ | Mtqi is m`v Ges Ktai is Kvjtjv| `nbK 2–3 wj Uvi `x t`q| GB MiyKóminòzGes Mvox I j v2j Uvbi Rb` Dc`hvMx|

**avb**

cvtK`tbi Bmjvgev` AAjtj i GB MiyMvox I j v2j Uvbi Rb` e`euZ nq| kixi k<sup>3</sup> I gReZ| G Miy`x Kg `x t`q|

**gintli RivZ**

evsj v`tk nR`^tKvb DrKó. RvtZi gvnI tbB| ewni ntZ Avbn RvtZi gta` gjov, bxjv, iwf I KdU D`j -L`hvM`| gjov RvtZi gvnIB evsj v`tk tevk t`Lv hvq| G RvtZi cwi nPrz nbt`at` qv ntjv|

**giov**

giov RvtZi gvnI Kó minòzGes evsj v`tki Rj evqz Dc`hvMx|

fvtZi wj-x I nwi qvbn Gt`i DrcmE`j | kixi eo, cv t0vU, nks LvU I evkvbvn Ges Kvjtjv| Prgov Kvjtjv Ges ckgI Kvjtjv| `x gintli gv\_v mYmVZ nKŠ`c`y` gintli gv\_v fvi x I tgvUv| Kcvtj i m`y`fvm Plov I DEx Giv Kó minòzGes evsj v`tki Rj evqz Dc`hvMx|

**QvMjtj i RivZ**

Dt`ik` Ablyqx QvMjtj i RivZtK nbaj nLZ fvtM fvm Kiv ntqtQ:

1| `x Drcv`bKvix RivZ t m`mbb, G`vstjv, b`y`qv, `vgvmKvm, n`UK Gj cvBb, UsMb evM, hgv`cvix, evi evix, m `vbxqv|

2| gism Drcv`bKvix RivZ t e`vK tel2j, tevqi, hgv`cvix, n`Rqv, tg-U-A, tKwš tKUR|

3| Prgov Drcv`bKvix RivZ t g`ebw, e`vK tel2j |

nbt`hgv`cvix I e`vK tel2j bigK `v RvZ m`tU Avtj vPbn Kiv ntjv t

**hgv`cvix**

M2v, hgv` b`xi ZxieZPAAj G QvMjtj i DrcmE`j | fvtZ G QvMj tevk t`Lv hvq Zte evsj v`tki tKvb tKvb AAjtj n`Bfite G QvMj bRti cti | `nRvq, `xN`c`n`kó

fvi Zixq G QvMj ami ev`vgx, KLtbr Kvttj v ZvgvtU ev mv`v istqi ntq \_vtK| Gt`i uks P`vPv  
I LtUv Ges clq 10-12 BwA j`st Sj`sl Kiv enb Kti | G RvZixq QvMjtj i`QDi ai gvtS j`st  
ZjZtj Awak cwi gvtY tj vg \_vtK| G RvtZi QvMj`w`bK 2-3 wj Uvi`st`q|

**e`vK teZj**

e`vK teZj ersj vt`ki  
Kvttj v QvMj bvtg cwi wPZ  
Ges t`tki meP`B t`Lv  
hvq|

GvU ersj vt`ki Kvttj v QvMj bvtg cwi wPZ Ges t`tki meP`B t`Lv hvq| Gi kixi LtUv Ges  
big Kvttj v tj vg`jiv AveZ| Gi Kvb`tj v mvavi YZt Dci w`tK Lvov \_vtK| uks Kvttj v Ges  
2-3 BwA j`st nq| Aí eqtm Mf`Zx nq Ges Oq gym ci ci ev`Pr t`q| GRvtZi Lvni  
gism AvZ DrKó. G RvZixq QvMjtj i Pvgov gmY I tgvj vtqg nq Ges eq`v QvMjtj i mv`v ev  
ami etYP`w`v \_vtK|

**tfovi RvZ**

tfovi RvZtK w`baj wLZ w`lq`stj vi Dci wfvE Kti tkw`w`fvm Kiv nq|

- 1| gism ev ckg Drcv`tbi nvti i Dci wfvE Kti |
- 2| g`Li istqi Dci (mv`v ev jvj) wfvE Kti |
- 3| uks Gi Dcw`wZ Ges Abzw`wZi Dci wfvE Kti |
- 4| DrcwE Abjvqx Gj vKvi Dci (DBzfvq, ceZ, w`st`vg) wfvE Kti |
- 5| cktgi w`wfbzv Abjvti |

Dcgnvt`tk th mKj RvtZi tfovi t`Lv hvq tm`stj v ntj v w`ewi K, I qvRwi, KvMub, tj vni,  
nvi bvb, `vgmb, BZ`w` | tj vtgi Rb`w`LvZ Ggb`w` RvZ m`stU w`st`Avtj vPbv Kiv ntj v|

**tgvitbv**

G RvZixq tfovi DrcwE`j t`ub t`tk| Gt`i gly I cv mv`v, Kiv I cvtqi tMrovj`tZ  
jvj`P ev`vgx isGi`wM t`Lv hvq| Gt`i cv Ges gv`vi tenki fivMB ckg Oviv AveZ|  
Pigovi`Yv`stYi Dci wfvE Kti tgvitbv`K wZbvtM fivM Kiv ntq`Q| h\_v t

G-UvBc: tgvUv RvZ| tfovi gv`v ntZ tj`tRi tMrov ch`stKvKovtbr cktg AveZ \_vtK|  
w`-UvBc: Nvtoi ckg e`Zix mg`tkixi Atc`vKZ.Kg cktg AveZ \_vtK|

w`-UvBc: Pvgov tMjv`cx is Gi| ckg Zjvbg j`K fite gmY| gistmi gvb Ab``RvtZi  
Zjvbg DEg|

**tivgbx bvm**

Bsj`vtUi tivgbx bvm`AA`stj Gt`i DrcwE`j | Giv metPtq tQvU RvtZi tfovi| Gt`i cv  
tQvU I mv`v| gly mv`v Ges Kcvtj GK`Q ckg \_vtK| Gt`i uks tbB|

**cwLi RvZ cwi wPZ**

**gvjMi RvZ**

nij Kv RvZ I fvi x RvZ -G`st`kbtZ tgvj MgvjM`K fivM Kiv hvq| th me gvjMi I Rb Kg  
Zviv nvj Kv RvtZi A`st` ; thgb- tj Mnb`Ges th me gvjMi I Rb`teKx Zv ntj v fvi x RvZ;  
thgb- tivW AvBj`vU tivW| Dbz LvU gvjMi DrcwE`j Abjvti Giv Avtgvj Kiv, GikqmUK,  
Bsj k I fga`mvMiq AA`stj i RvZ w`st`te cwi wPZ| Gt`i gta` th me RvZ ersj vt`tk  
cwi wPZ Zvt`i m`stU w`st`P Avtj vPbv Kiv ntj v:

**tnvqBU tj MnY**

Gul fga'mvMiq tkYxi Ašf<sup>9</sup> | DrcwE<sup>-j</sup> BZvjx| eZg<sup>9</sup>tb me<sup>9</sup>tki me 7<sup>9</sup>tb c<sup>9</sup>hvi jvf  
Ki<sup>9</sup>tQ| t<sup>9</sup>tni AvKvi AvKwZ tQvU| wWtgi AvKvi eo, G<sup>9</sup>t<sup>9</sup>i mv<sup>9</sup>v, ev<sup>9</sup>vgx, bxjvf, nj y I  
Kvj RvZ AvtQ| Zte mv<sup>9</sup>v is-Gi GKK S<sup>9</sup>U<sup>9</sup> we<sup>9</sup>nkó DcRvZ me<sup>9</sup>tP<sup>9</sup>tq Rbuc<sup>9</sup>q|

**tiw AvBj 7 tiw**

ewYwR<sup>9</sup>K nvBweW m<sup>9</sup>o<sup>9</sup>i  
Rb<sup>9</sup> Avi. AvB. Avi Gi  
wWg e<sup>9</sup>en<sup>9</sup>vi Kiv nq| Giv  
Avgt<sup>9</sup> i t<sup>9</sup>tk 150-200  
wWg t<sup>9</sup>q|

Gul Avt<sup>9</sup>gwi Kiv tkYxi Ašf<sup>9</sup>,<sup>9</sup> fvi<sup>9</sup>x RvZ| Gul mst<sup>9</sup>q<sup>9</sup>tc Avi. AvB. Avi bvtg cwi wPZ| t<sup>9</sup>tni  
cvj K jvj wKš<sup>9</sup> tj t<sup>9</sup>Ri w<sup>9</sup>tki cvj K, Mjv Ges Wvbr<sup>9</sup>i cvj K wKQ<sup>9</sup>y<sup>9</sup> Kvtjv| wWtgi is ev<sup>9</sup>vgx|  
ewYwR<sup>9</sup>K nvBweW m<sup>9</sup>o<sup>9</sup>i Rb<sup>9</sup> G gj<sup>9</sup>m<sup>9</sup>i wWg e<sup>9</sup>en<sup>9</sup>vi Kiv nq| Giv Avgt<sup>9</sup> i t<sup>9</sup>tk 150-200  
wWg t<sup>9</sup>q|

**wbD n<sup>9</sup>v<sup>9</sup>úkv<sup>9</sup>vi**

Avt<sup>9</sup>gwi Kvi wbn<sup>9</sup>v<sup>9</sup>úkv<sup>9</sup>vi bvgK 7<sup>9</sup>tb Gi DrcwE<sup>9</sup> etj Gifc bvgKiY Kiv ntqtQ| A<sup>9</sup>tbKuv  
tMjvKwZ, eo AvKv<sup>9</sup>i i Ges nvj Kv nj y eY<sup>9</sup>we<sup>9</sup>nkó G gj<sup>9</sup>m<sup>9</sup> c<sup>9</sup>h<sup>9</sup>vZt g<sup>9</sup>sm c<sup>9</sup>lvbKvix| Gi  
Ab<sup>9</sup>vb<sup>9</sup> 7<sup>9</sup>we<sup>9</sup>nkó<sup>9</sup> i g<sup>9</sup>ta<sup>9</sup> AvtQ nj y e<sup>9</sup>tY<sup>9</sup>P<sup>9</sup> cv Ges GKK S<sup>9</sup>U<sup>9</sup> wWtgi is ev<sup>9</sup>vgx| eZg<sup>9</sup>tb  
nvBweW gj<sup>9</sup>m<sup>9</sup> Zwi Ki<sup>9</sup>tZ G<sup>9</sup>t<sup>9</sup>i e<sup>9</sup>en<sup>9</sup>vi Kiv nq|

**d<sup>9</sup>Bl<sup>9</sup>ng**

Gul fga<sup>9</sup> m<sup>9</sup>vMiq tkYxi Ašf<sup>9</sup> RvZ| DrcwE<sup>9</sup>-j w<sup>9</sup>gki| G<sup>9</sup>t<sup>9</sup>i Mjvi w<sup>9</sup>tk am<sup>9</sup>i Ges mg<sup>9</sup>-  
kix<sup>9</sup>i mv<sup>9</sup>vKvtjv istqi w<sup>9</sup>gkY| Giv L<sup>9</sup>y P<sup>9</sup>Áj I PjvK Ges t<sup>9</sup>kx gj<sup>9</sup>m<sup>9</sup>i gZ G<sup>9</sup>t<sup>9</sup>i Qvov  
Ae<sup>9</sup>vq cvj b Kiv hvq| G<sup>9</sup>t<sup>9</sup>i Kvtbi jwZ mv<sup>9</sup>v| gv<sup>9</sup>vi S<sup>9</sup>U<sup>9</sup> AvKv<sup>9</sup>i tQvU, tet<sup>9</sup>Rvi Ges jvj |  
Avgt<sup>9</sup> i t<sup>9</sup>tk Giv eQ<sup>9</sup>i 150-200 wWg t<sup>9</sup>q|

**nv<sup>9</sup>tni RvZ**

cw<sup>9</sup>\_extZ me<sup>9</sup>ak nva  
cvj b Kiv nq Pxb t<sup>9</sup>tk  
Ges evsj vt<sup>9</sup>tki 7<sup>9</sup>vb  
wZxq|

me<sup>9</sup>tk<sup>9</sup>22 c<sup>9</sup>Kv<sup>9</sup>i i nv<sup>9</sup>tni RvZ AvtQ| t<sup>9</sup>kx nva mn me<sup>9</sup>tk<sup>9</sup> RvtZi nva| Avgt<sup>9</sup> i t<sup>9</sup>tk cvj b  
Kiv nq| cw<sup>9</sup>\_extZ me<sup>9</sup>ak nva cvj b Kiv nq Pxb t<sup>9</sup>tk Ges evsj vt<sup>9</sup>tki 7<sup>9</sup>vb wZxq|  
evsj vt<sup>9</sup>tki nva AvKv<sup>9</sup>i tQvU, Kg wWg t<sup>9</sup>q Ges wWtgi AvKvi tQvU| t<sup>9</sup>kx RvtZi nv<sup>9</sup>tni  
cwi Pq w<sup>9</sup>b<sup>9</sup>7<sup>9</sup>7<sup>9</sup> qv ntjv|

**b<sup>9</sup>t<sup>9</sup>Mk<sup>9</sup>j<sup>9</sup>x nva**

evsj vt<sup>9</sup>tki w<sup>9</sup>tj tU I fvi<sup>9</sup>tZi KvQvto G nva cvl qv hvq | G<sup>9</sup>t<sup>9</sup>i Mjv I ek<sup>9</sup> mv<sup>9</sup>v Ges  
kix<sup>9</sup>i Ab<sup>9</sup>vb<sup>9</sup> Ask Kvtjv| cv I tVtUi is nj y| wWtgi is nvj Kv bxj ev me<sup>9</sup>7<sup>9</sup>vf| eQ<sup>9</sup>i  
Giv c<sup>9</sup>q 100wWg cv<sup>9</sup>i |

**gv<sup>9</sup>U nva**

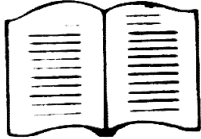
evsj vt<sup>9</sup>tki w<sup>9</sup>tj U tRjvq G nva cvl qv hvq| nv<sup>9</sup>tni cvj K ami e<sup>9</sup>tY<sup>9</sup>P<sup>9</sup>| cvj t<sup>9</sup>Ki Dci gv<sup>9</sup>tS  
gv<sup>9</sup>tS Kvtjv wM<sup>9</sup>\_vtK| tVU I cvtqi is nj y A<sup>9</sup>\_ev Kvtjv| wWtgi is mv<sup>9</sup>v|

**mv<sup>9</sup> v nva**

evsj vt<sup>9</sup>tki c<sup>9</sup>q me<sup>9</sup>PB G<sup>9</sup>t<sup>9</sup>i G RvZ t<sup>9</sup>Lv hvq| G<sup>9</sup>t<sup>9</sup>i t<sup>9</sup>tni cvj K mv<sup>9</sup>v, tVU I cv nj y,  
AvKv<sup>9</sup>i tQvU| wWtgi AvKvi tQvU| GQvov Avgt<sup>9</sup> i t<sup>9</sup>tk we<sup>9</sup>fbacwZ nva cvl qv hvq| G<sup>9</sup>t<sup>9</sup>i  
wWg Drc<sup>9</sup> t<sup>9</sup>bi nvi Kg| Giv tek Kó minòzl P<sup>9</sup>Áj |



eZgvtb e`euZ i vniqbK mvti kZKiv 10 fivM Avgiv ci m`u` nZ tctq \_vK| Avgvt` i cPij Z Rjy vbi 20 fivM Avtm ci m`u` nZ| t`tk cZ eQi 7 wgvj qY Ub tMvei Rjy vbi vntmte e`euZ nq dtj t`tki tek eo AstKi UvKv GLvtZ miktq nq|



**mvi gg®**

wefbæRvtZi Mi ywefbæKvtR e`euZ nq| `jai Rb` jvj wUx, kvxl qvj, \_vcKvi, nj wó b wclwRqv, KvRi Rb` nwi qvbi, evMbvix, avbæ \_vcKvP Ges `g I KvR Dftqi Rb` nwi qvbi I \_vcKvi RvZ DEg| guntli Dtg-LthvM` RvZ nj gyov gunt| QvMti RvZtK `g Drcv`bKvix gvsm Drcv`bKvix I Pvgov Drcv`bKvix G wZb RvtZ fivM Kiv ntqtQ| e`vK te½j evsj vt`tk KvRjv QvMj bvtg cwiwPZ| gvjMi RvtZi gta` tnvqvBU tj MnY,® tivW AvBj`vU tivW, wB n`v`umvqv, dvBl wG Ges nvtai DbZ RvtZi gta` LwK K`vt`f, wRsmWs, BwUqv i vbi evsj vt`tk jwvj Z cwj Z nt`Q| tgvU RvZxq Avtqi 9% Ges i Bwb Avtqi 13% ci m`u` mve tm±ti i Ae`vb|



**ciVvEi gj`vqb 2.2**

mivK DEti i ciVvEi UK vPy (✓) ir b|

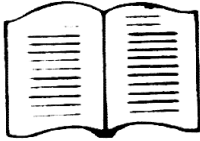
- 1| *ibtai tKvb RvZiU`y I Kvr Dftqi Rb`e`euZ nq ?*  
K. jvj imUx                L. njvob vclvRqvb                M. nivi qvbr                N. avbe
- 2| *`y Drcv`bKvi x tKvb Dbz QvMij i RvZ ersj vt`k t`Lv hvq ?*  
K. bveqvb                L. G`vstjv                M. UsMb                N. hgvicvi x
- 3| *im-UvBc tKvb RvZi tfovi ASMZ ?*  
K. KvMvb                L. tgvitbr                M. I qvvrvi                N. wevi K
- 4| *mv`v istqi GKK RvZ tKvb RvZi gjvMi ?*  
K. tivW AvBj vU tivW                L. vbdn`v`ukvqv  
M. tnvqvBU tj MnY©                N. dvBI vg
- 5| *tKvb nvva me tPtq tevk vlg t`q ?*  
K. ivRnvva                L. vRsmvs nvva  
M. Lvk K`vt`f nvva                N. BvUqvb ivbri
- 6| *tgvU RvZiq Avtq ci m`z` mevmt`ti i Ae`vb KZ ?*  
K. 10%                L. 9%                M. 20%                N. 24%

### cw 2.3 ejsj vt`tki grm` m`ut` i cwi i PwZ I cwi msL`vb



G ciV tkfI Avci b

- ◆ ejsj vt`tki grm` m`ut` i Drm, tj vi eYv v i tZ cvi teb|
- ◆ gvtQi tkvYieb`vm Ki tZ cvi teb|
- ◆ ejsj vt`tki A\_ %wZK , i zcY gvtQi Zwi j Kv c`Z Ki tZ cvi teb|
- ◆ ejsj vt`tki grm` m`ut` i cwi msL`vb ej tZ cvi teb|



### grm` m`ut` i cwi i PwZ

grm` m`ut` i Drmmgr:

ejsj vt`tki grm` m`ut` i Pwi w Drm i tqtQ| G, tj v ntj v:

- 1| Af`šli xY gY Rj vkq
- 2| Af`šli xY ex Rj vkq
- 3| Avatj vbr cwi b i Rj vkq
- 4| mvgY K Rj vkq |

### Af`šli xY gY Rj vkq

Af`šli xY g<sup>3</sup> Rj vktqi gta` itqtQ b`x l Lwo AAj, nvl i, vej, n` Ges ciebfig| eZv`tb t`tk tgvU gY Rj vktqi cwi gvY 40,47,316 tn±i |

gY Gj vKvi m`½ hY Rj vktqK Af`šli xY gY Rj vkq etj | Af`šli xY gY Rj vktqi gta` itqtQ b`x l Lwo AAj, nvl i, vej, n` Ges ciebfig| ciebfig el`Kvtj cwb tZ fti b`xi m`\_ GKvKvi ntq hq Ges i Ktbr tgdmtg RigtZ cwi bZ nq Ges ZLb tmLv`b dmtj i Pvl ver` Kiv nq| wvrfbæKvi tY Af`šli xY gY Rj vktqi gvtQi msL`v l Drcv`b μgvMZ Ktg h`"Q| eZv`tb t`tk tgvU gY Rj vktqi cwi gvY 40,47,316 tn±i |

### Af`šli xY ex Rj vkq

th mKj Rj vkq b`x, nvl i ev vej i m`\_ hY bq Gt` i tK Af`šli xY ex Rj vkq etj | Af`šli xY ex Rj vktqi gta` itqtQ cKz, w`w, evl i, BZ`w | eZv`tb t`tk tgvU ex Rj vktqi cwi gvY 1,52,378 tn±i |

### Avatj vbr cwi b i Rj vkq

b`x l mgY` i m`zg` j tK Avatj vbr cwi b i Rj vkq etj | Gme Gj vKv b`xi cwbewwZ cYvKvi K l mgY` i cwi b i cYvKvi K vvi v c`vewwšZ nq| Avatj vbr cwi b i Rj vkq th tKv Rj vktqi tPtq Avak Drcv`b vlgZv m`z bæ nq| Avgv`i t`tk Avatj vbr cwi b AAj mVZv`v i t`tk K· evRvi chš`ie`Z| DcKz`xq wPswv Lvgvi Gj vKv ev Avatj vbr cwi b i Rj vktqi AvqZb 2,60,000 tn±i |

### mvgY K Rj vkq

mvgY K Rj vktqi GKvš A\_ %wZK Gj vKv 200 buUK`ij gvBj Ges gwtmvcib 85,153 eM`Ktj wgvUvi chš`ie`Z|

Avgv`i t`tki `v`v i tqtQ et`vcmwMi | GuU mvgY K grm` m`ut` i Drm| mvgY K Rj vktqi GKvš A\_ %wZK Gj vKv 200 buUK`ij gvBj Ges gwtmvcib 85,153 eM`Ktj wgvUvi chš`ie`Z| mvgY K Rj vktq AvURbvj wdkwi l Uij wdkwi w`tq gvU ai v nq|

**gvřQi cřřwZ**

evsj vř`tki Af`řiıY  
Rj vřtkř cřř 260 cřřwZi  
ıgVv cıbi gvQ AvřQ/  
GQıov Gme Rj vřtkř Avi I  
12 cřřwZi ıeř`kx gvQ I  
24 cřřwZi ıPřıo gvQ  
AvřQ/

evsj vř`tki Af`řiıY Rj vřtkř cřř 260 cřřwZi ıgVv cıbi gvQ AvřQ/ GQıov Gme Rj vřtkř  
Avi I 12 cřřwZi ıeř`kx gvQ I 24 cřřwZi ıPřıo gvQ AvřQ/ mıgř`K Gj vřkvq iřtkřQ 475  
cřřwZi gvQ Ges 36 cřřwZi ıPřıo gvQ/ gvřQi tkřııweb`ım ıewřbıei Kg nřZ cřři | `eÁııbK  
`ıóřKıv nřZ řMıĀ ev cııeri Abyıřıi gvřQi tkřııweb`ım DEğ/ Aveıı cıııteřki Dci ıřııE  
Křı Z\_v ıgVv cıbi gvQ Ges řj vřv cıbi gvQ ııřııte ıPııřZ Kıv řtkřZ cřři |

ıgVv cıbi gvQ nřl o, evl o, cřřž, ıııN, b`x, Lıj , ıej BZ`ııřZ evı Křı | ř`řni Zıjvıq  
Gř`i ıWg avıY řřgZv teık/ Gıv SvKı teřa Pj vřřıv Křı | Gř`i gv\_vq řKıv AvBk řbB/  
K`ıU ıdk e`Zıx Ab`me gvřQi ř`n gvSıııx I řQıU Avřřk řıwZ`ıřK/

**řMıĀ AbyıřııKQycıııPZ ıgVv cıbi gvřQi bıřgi Zııj Kv ıbře`ıř` qv nřj v:**

<b>řMıĀ</b>	<b>gvřQi bıg</b>
A`ıvıe`ıvıUıw (Anabantidae)	KB, Lıj mv
e`ııMııw (Bagridae)	ııR, AvBı, evNv AvBı, Zj -v AvBı, řMıj mv, řUııv, Křıř v eřřıx/
P`ııbıw (Channidae)	MRıı, řkıj , UıKx, řZřj v UıKx/
mıBıKıw (Cichlidae)	řZj ııcqv, bıBřj ııUKv
řKıııw (Cloridae)	gv_ı, AvıdKıv gv_ı
Křcıw (Clupeidae)	Bıj k, Mb_`ıııqv, Pııcř v
řKııeıUıw (Cobitidae)	teıZ ev řeřgvQ ev ıııbgıQ, ıZğ gvQ/
ıııııııw (Cyprinidae)	iB, Nııbqv, Kııj evDK, bıvıı bıv gřMıj , evUv ev LııK, KvZj v, gııřkıj , KgbKıv, mi cııı, ıZZcııı, RıwZ cııı, dıııı cııı, řgvj v, UıUřKbx, bııřKıx řPj v, dııřřPj v, cıZv řPj v, mı`v eřřıx, ııVv/
KıPıw (Kuchidae)	Křř
řnřUřı vııbDıııUıw (Heteropnewstidae)	ıks ev ııkııř
bıvıwıw (Nandidae)	řf`v ev řgııb/
břUvcıUııw (Notopteridae)	đıj , ıPZj
cıvMııııw (Pangasidae)	cıvMıı
ıııj eBıw (Schilbeidae)	NıDııv, evZııı, KıRııj , evPı/
ıııAvıııw (Sciaenidae)	řcııqv
ıııj ıııw (Siluridae)	řevııj , cıe`v, Kııb cıe`v/
řUııı řWıvıUıw (Tetraodontidae)	řUcv, cUKv, WıvıvKıv, evıa cıZı, `ııııKıv/

KvL.1 cĵ Dbaĵ ħĵ

eĵĵvcmiMi t\_ĵK Avni YKZ.A\_ĵwZK tĵĵĪ iĵĵĵĵĵ vbr cmbi cĵvb gvQ, ĵĵ v nt"Q evM`v ĵPšio, evMvZvi v ĵPšio, Pvk v ĵPšio, nvi br ĵPšio, Mj `v ĵPšio, KvUv gvQ, ĵĵ vbr tUsiv, tKvi vĵ ev tFUiK, j BU`v gvQ, i vĵv gvQ, tmbvĵ x evUv, mvgĵĵK cvĵĵm, j vL&v, cwi gvQ, tcvqv, j vĵ vĵcvqv, iĵcPv`v, dvBm`v, Bvĵ k I Uĵv|

Dcĵi evYĵ gvQ, ĵĵ v Avĵiv vbtRiv LvB Ges ĵKQyAsk vĵ`ĵk i Bvb Kĵi `eĵ`ĵk gĵĵ Avq Kwi |

**grm` mĵĵ` i cwi msL`vb**

eĵĵ vĵ`ĵki grm` mĵĵ` i cwi msL`vb vbtĵĵ` qv ntĵ v t

**1| Af`šĵĵ grm` mĵĵ`**

K.

<b>ex Rĵĵq</b>	<b>Rĵĵĵĵ AvqZb (tn±i)</b>
cĵĵ	1,46,880
evl i (gĵ b`x)	5,488
DcKĵ xq ĵPšio Lvĵvi Gj vKv	2,60,000

L.

<b>gĵ Rĵĵq</b>	<b>Rĵĵĵĵ AvqZb (tn±i)</b>
b`x	10,31,563
vĵĵ	1,14,161
KvBvB nĵ	68,400
cĵeb fĵg	28,32,792

**2| mvgĵĵK Rĵ mĵĵ`**

eĵĵvcmiMĵi i AvĀĵĵ K Gj vKv	12 bĵĵK`ĵĵ gvBĵ
GKvš A_ĵwZK Gj vKv	20 bĵĵK`ĵĵ gvBĵ
DcKĵ xq mĵgĵĵi Lv	480 bĵĵK`ĵĵ gvBĵ
gnĵĵmĵcvb	85,153 bĵĵK`ĵĵ gvBĵ
DcKĵ xq tcvĵ vi / GbĵKvRvi	8,73,000 bĵĵK`ĵĵ gvBĵ





**cvfVvEi gj-vqb 2.3**

mivK DEti i cvfkqUK wPy (✓) w b|

1| eivj v`tki grm m=ut`i Dm KquU ?

- K. BwU
- L. PwU
- M. cvBwU
- N. wZbwU

2| eivj v`tk KZ cRvzi wgv cmbi gvQ AvtQ ?

- K. 260
- L. 475
- M. 12
- N. 36

3| mivgyK Rj vktqi GKvšA\_ wvZK Gj vKv KZ bWUK`vj gvBj chšwe`Z.?

- K. 400
- L. 200
- M. 500
- N. 1200

4| gv, i gvQ tKvb tMtI i Ašf, ?

- K. mvBwW
- L. KšcwW
- M. KpwW
- N. tKwi wW

5| jvBU`v gvQ tKvb Rj vktq evm Kti ?

- K. Af`šlxY ex Rj vktq
- M. Avav tj vbr cmbi Rj vktq
- L. mivgyK Rj vktq
- N. Af`šlxY gy Rj vktq

6| tgvU gy Rj vktqi AvqZb KZ tn±i ?

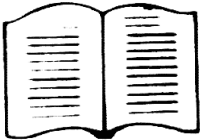
- K. 10,31,563
- M. 40,46,916,
- L. 28,32,792
- N. 40,47,316

### cw 2.4 evsj v`k RvZxq A\_`mZtZ grm` m`ut` i Ae`vb



G cvV tkfI Avciwb

- ◆ evsj v`k Drcv` Z grm` m`ut` i weei Y w` tZ cvi`teb|
- ◆ evsj v`k n`fZ thme grm` I grm`RvZ cY` wef`tk i Bmb Kiv nq tm,tjvi bvg ej`tZ cvi`teb|
- ◆ evsj v`k i A\_`mZtZ grm` m`ut` i Ae`vb eY`v Ki`tZ cvi`teb|



ÓgvtQ-fvtZ ev`zvj xÓ K\_wU t`tk gvtQi , i`zi h\_v\_B Dcj wä Kiv hvq| evsj v`k i RvZxq A\_`mZK Dbq,b, Rb`fMwó Kgfms`vb Ges `ef`wkK gy` AR`bi t`f`f` grm` Pvl wef`kI fvgKv cvj b Ki`tQ| grm` m`ut` Gf`tki Ab`Zg c`KwZK m`u` | b`xgvZK.GB evsj v`k grm` m`ut` i GK Adz`š fiv`vi |

Avgt` i t`tk c`YR  
 AvgfI i c`vb Dm n`t`Q  
 gvQ| c`YR AvgfI i  
 kZKiv 80 f`M Avtm gvQ  
 t`tk| gvQ Mto c`q  
 kZKiv 20 f`M AvgfI  
 AvtQ|

Avgt` i t`tk c`YR AvgfI i c`vb Dm n`t`Q gvQ| Lv` wntmte Gi , i`zi AZ`waK| kix`i Rb` G,wV,w Lv` c`Y AZ`š c`qvRbxq| gvQ ÓGÓ I ÓwVÓ Lv` c`Y mg`x| gvtQi Pvgovq c`z cwi gvtY Lv` c`Y ÓwVÓ i`tqQ| D`P i`Pvcw`kó ti`Mx`i Rb` f`wZKvi K tKvtj tóij gvtQ tbB ej`tj B Ptj | evsj v`k c`YR AvgfI i kZKiv 80 f`M Avtm gvQ t`tk| gvQ Mto c`q kZKiv 20 f`M AvgfI AvtQ|

evsj v`k eZ`v`b c`q 12 j`f tgvUK Ub grm` Drcv`b nq| Gi gfa` 9 j`f tgvUK Ub Af`šixY Rjvkq t`tk emK 3 j`f mvgv`K GjvKv t`tk| Gf`tki c`q 12 j`f t`vK mve`f`wbK fite Ges GK tKwU t`vK LÚKvj xbfite gvQ Pvl, gvQ aiv, gvQ e`emv I Rvj ebtbi gva`tg RweKv wbe`f` Kfi \_v`K| GQvov gvQ msi`fY I c`p`qvRvZKiY, mieivn I teP`f`Kbri Kv`RI A`bK t`vK wbtq`wRZ AvtQ A\_`f` grm` m`z` gvb`yi Kgfms`v`bi t`f`f` , i`z`c`Y`f`vgKv cvj b Kfi Avm`tQ|

evsj v`k n`Z thme grm` I grm`RvZ cY` wef`tk i Bmb nq tm,tjvi n`tjv wngvqZ wPswó, wngvqZ gvQ, i`UwK, j`eYv` gvQ, n`v`z`ti i cvLbv, tcvUKv, K`Qc ev KwmQg Ges KvKíov| 1994-95 m`tb grm` m`u` i Bmb Kfi evsj v`k 1307 tKwU UvKv Avq Kfi | G mgq grm` m`ut` i Ae`vb wQj wR.wV.wc.`tZ 4% Ges i Bmb Avtq 12% hv Ab`vb` eQ`ti i Zj`v`q tenk|

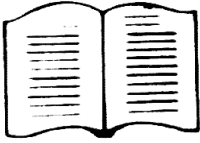
grm` m`ut` i Ae`vb wbt`w` qv n`tj v:

- grm` Drcv`b : 1.187 wgvj qb tgvUK Ub
- Kgfms`v`b t
  - mve`f`wYK : 1.2 wgvj qb e`w`<sup>3</sup>
  - LÚKvj xb : 10 wgvj qb e`w`<sup>3</sup>
- `ef`wkK gy` AR` (1994-95): 1307 tKwU UvKv
- wR.wV.wc.`tZ Ae`vb : 4%
- i Bmb Avtq Ae`vb : 12%
- c`YR AvgfI mieivn : 80%

gvQ i`ayLvevi wntmte bq, eis Gf`i eR`h\_v nvo, cvLbv, AvBK, bwo-fjw BZ`w` cwi Z`<sup>3</sup> Ask w`tq wdkwvj I `Re mvi `Zwi Kiv hvq| Gme wdkwvj nwa-gjwMi Lvevi wntmte e`eüZ nq|



**Ablyj b (Activity):** evsj vt`tki RvZiq A\_0mZtZ grm" m=ut`i Ae`vb m=ut`K©GKuU  
msv`fjB cEÜ wj Ly (Aby`200 kã)|



**mvi gg©**

evsj vt`tki 10% tj vK grm" m=ut`i mvt\_ cZ`fj ev c`iv`fjvte RmZ| grm" m=ut` i Bmb  
Kfi evsj vt`k 1994-95 mtb 1307 tKvU UvKv Avq Kfi | Gmgfq mRmW.nc. tZ grm"  
m=ut`i Ae`vb wj 4% Ges i Bmb Avq 12%|



**cvfVĚi gj`vqb 2.4**

mĭVK DĚti i cvfk`UK ĩPý (✓) ĩ`b|

1| cĕYR Avıgđi i cĕvb Dm Kx ?

- K. gvsm
- L. gvQ
- M. ĩVg
- N. `đ

2| gvđQi Pıgovq tKvb Lv`cĕY i tđđQ?

- K. Lv`cĕY G I ĩV
- L. Lv`cĕY ĩV
- M. Lv`cĕY ĩm
- N. Lv`cĕY G

3| Gđ`tk ĩveđıWYKfvte grm`mđđ` i ĩvđ\_ RıoZ tj vđKi msL`v KZ?

- K. 12 j đ
- L. 50 j đ
- M. 75 j đ
- N. 1 tKvU

4| i Bıvb Avđq grm`mđđ` i Ae`vb KZ ?

- K. 4%
- L. 8%
- M. 12%
- N. 15%

5| ĩdmıgđ Kx ĩ`đq `Zıı nq ?

- K. ĩPııo gvQ ĩ`đq
- L. Kvđıoı ĩ`đq
- M. tcvUKv ĩ`đq
- N. gvđQi Avđk I bııo fııo ĩ`đq|

6| evsj vt`tk grm` Drcv`b KZ ĩgııđ qb tgvUK Ub ?

- K. 1.187
- L. 2.871
- M. 3.538
- N. 2.120



AwfambK A`Kul.R  
ebvqb ntjv Kul.i  
civkvcnk ev Kul.i minPth`  
ebvqb Mto tZvj v|

BwZgta`B Gt`tk iinyntqtQ| AwfambK A`Kul.R ebvqb ntjv Kul.i civkvcnk ev Kul.i  
minPth`ebvqb Mto tZvj v| Gt`K wZb avivq fVM Kiv thtZ cvti -

**1. KulR ebvqb aviv :**

- K. Kvôj Dw`i mvt\_ dmtj i Pvl
- L. et`ji mmi i mvt\_ A`ev et`ji bxp dmtj i Pvl
- M. emZevUx`evMvb

**2. ebvqb PviY aviv t**

- K. eû elRme Dw`i gvtS ci` cvj b
- L. Kvôj Dw`i mvt\_ PviY D`vb
- M. Kvôj Dw`i mvt\_ gÿ gjvMi Pvl

**3. KulR ebvqY PviY aviv t**

- K. GKmvt\_ eû elRme Kvôj Dw`i, ci` Ges dmtj i Pvl
- L. emZ evUx`evMvb

**th me`vb KulR ebvqb Kiv thtZ cvti tm`vb, tjvntjv t**

- K. cwZZ fvg I enij gq bxpZl DlxGj vKv
- L. iv`l, tijc\_ I evtai`gavi
- M. b`xi Zxi I cÿz`cvo
- N. me`nnavi tYi e`envi thvM`vb h\_v nvU, evRvi BZ`w
- O. Awdm, Kj Kvi Lvbv, `ÿ, Ktj R I Dcimbvj q cÿY
- P. emZ emoi Awv`bv
- Q. gvV dmtj i t`jZ



**Ablyj b (Activity):** KulR ebvqtb i wefbaavi D`j lceR ersj vt`k Gi`iÿj I m`tebv  
m`utK`Avcbvi gZvgZ w`b|

**cwi tekMZ I A`wZK wefbaet`ji cwiPvZ**

cwi tek i Dbq` Ges A`wZK fite jvfevb nl qvi Rb` et`ji Ae`vb Acwi mxg| Nti i LwJ,  
Avmeve cI, tbSKv, Mi`y Mvox, tLj bv, wkt`i KivPvgj, Rvj wvb Ges gvutZ`Re c`v`thvMvb  
t`qv BZ`w` eûmea KvR et`ji e`envi I ZtcÿZ fite RwoZ| ZvQvov wKQymKQyMvQ is  
Drcev`b, wKQyMvQ JIa, AvVv I iRb`Zwi tZ Ges ivevi MvQ ivevi Drcev`tb e`eüZ nq|

cwi tek I cwi cvnk`RZvi Dci wfiE Kti ersj vt`ki wefbaeA`tj wefbaei tbi eb m`v  
ntqtQ| G`tjv ntjv civvox eb, g`vbtM`f eb Ges kij eb| Gme ebvA`tj thme Dw`i Rtbÿ  
tm m`tU wbt`vAvtj vPbv Kiv ntjv|

**civvox eb**

M`gÿj xq GB wPimeR I Avav wPimeR eb cãvYZt MR, wmfU I Rvij, BZ`w` RvZxq  
et`ji mgstq MwZ| G eb PAVvg I cveZ` PAVMg tRjvq Aew`Z| GLvbKvi et`ji gta`  
tm`b, Mvgvi, Rvij, wZivR, Pvg, KoB, tjvov KvV, MR, tZj my, eqjvg, wUvj, etniv,  
QwZg, Kvgt`e, U`wUqv, nviMvRv, evRis, wmfU, iZv, Wwvj, D`j, Kzov, ewi, LvcFZ,  
AR, P`uK, civbmVR, evUbv, gqbv, wblj, fwi, Kzsg, wns`wi, eyjv, XvKIqv, tnjv,

KvL.1 c j n Dbq b ˘z

gij wMwi , wPKi w m , agPv , ebmg , i t 3 vb , Kvj ˘ v , tQj t d v B , tKvg , KvBbRj , evnij , Kwners ,  
WwKig , ex i t d j v BZ ˘ w ˘ D t j -L t h v M ˘ | G Qvov Gme A A ˘ t j c P ˘ z c w i g r t Y evk l R t b ˘ |

**g ˘ v b t M ˘ f eb**

m ˘ y i x , t M I q v c f w Z g ˘ v b t M ˘ f R v Z x q D w ˘ m c m g ˘ x G e b v A ˘ j L j b v , c U q v L v j x , e w i k v j ,  
t b v q v L v j x I P A ˘ M ˘ g m g ˘ y Z U G j v K v q w e ˘ Z | G L v b K v i c a ˘ v b e ˘ j n t j v m ˘ y i x , t M I q v , t M v i v b ,  
t K I i v , f v i v , c i i , K ˘ v s K v i v , t e t q b , M i v b , ˘ y v j , t M v j c v Z v B Z ˘ w ˘ |

**k v j eb**

k v j e v M R v i x e ˘ j G e s A b ˘ v ˘ w P i m e ˘ R I c ˘ c Z b k v j e ˘ j m g s ˘ t q m ˘ eb c a ˘ v b Z t M v R x c j ,  
U v ˘ v B j , g q g b w m s n t R j v q G e s w e ˘ j B f i ˘ t e Q o v t b v i s c j I w ˘ b v R c j t R j v q w e i v R g i b | K v V  
D r c v ˘ K M v Q k v j , K o B , t m v b v j y m k i , L t q i , e ˘ t n i v , n w i Z K x , Q w g , K v V j , R v g , R v g i j ,  
e v e j , t e j , g u q v , K ˘ g , w k g j , A v g , w b g , t Z Z ˘ , B Z ˘ w ˘ G L v t b f v j R t b ˘ | A ˘ w Z K f i ˘ t e  
g j ˘ e v b t K v b M v Q K x K v R e ˘ e u Z n q Z v i w K Q y D ˘ v n i Y w b t ˘ e ˘ I q v n t j v :

**K w I R j w b D r c v ˘ K e ˘ j**

A R ˘ , A t k v K , w b g , A v g , A v g j v , A v g i v , B i c j B i c j , B D K ˘ w j c U m , K ˘ t e j , K o B , K ˘ g ,  
K b K P r a v , K c ˘ , K v W P i c v , K v g i v ˘ v , K v V j , K v A ˘ Y , K K ˘ z w P Z v , K ˘ e ˘ K ˘ z , M R ˘ , M v e , M v g v i ,  
t M I q v , t M j g n i , P r a v , P v j Z v , Q w Z g , R v g , R v i j , w R I j , t W D q v , Z v j , t Z Z ˘ , w b g , w b w m ˘ v ,  
w c Z i v R , w c U w j , t c q i v , e U , e i ˘ j , e ˘ t n i v , e v e j , e v k , t e j , g v ˘ v i , t g n w M b , i A ˘ b , w i V v , w j P z  
k v j , w k g j , w k i , w k w i k , k ˘ v l o v , m g v w i , m ˘ y i x , t m ˘ b , n w i Z K x , w n R j B Z ˘ w ˘ |

**w e v f b a n k i I A b ˘ v ˘ K v t h ˘ e ˘ u z M Q**

- eroxNi t t m ˘ b , K o B , R v i j , m ˘ y i x , M v g v i , M R ˘ , P r c j v k , e B j v m ,  
t m v b v j y c m j , w k w i k , A v g , R v g , K v V j , w k i , Z v j B Z ˘ w ˘ |
- t V j v I M i a i M v o x t e v e j , w k i , m ˘ y i x , M R ˘ , w c Z i v R , k v j , R v g , K ˘ z , R v i j ,  
L t q i , b v t M k j , e ˘ t n i v , n w i Z K x , K o B , t ˘ e ˘ v i y e v k , B Z ˘ w ˘ |
- t b s K v t t m ˘ b , A v g , R v i j , t Z j m j , M v g v i , k v j , e v e j , K o B , w k i ,  
L t q i , P r a ˘ v , B Z ˘ w ˘ |
- K v l . h s ˘ c w Z t e v e j , R v g , w k i , K o B , K ˘ z , M v e , t Z Z ˘ , A v g , t j v n v K v V ,  
K ˘ z , k v j , R v i j , B Z ˘ w ˘ |
- c ˘ w k s e v t Q w Z g , w k g j , P r c j v k , A v g o v , A v g , Z b , P r a ˘ v , w w f U , i ˘ b ,  
g q b v , t m j t K v B , e v k , B Z ˘ w ˘ |
- w b D R i c U t t M I q v , e v k , b j L v M o v , B Z ˘ w ˘ |
- g ˘ v P e t w k g j , Q w Z g , w c U j x , b w i t K j , B Z ˘ w ˘ |
- h s ˘ ˘ x i n v Z j , e v U t w k i , e v e j , t m ˘ b , m ˘ y i x , M v g v i , K j , B Z ˘ w ˘ |
- e v ˘ h s ˘ t t m ˘ b , Z b , M v g v i , w k i , w k w i k , B Z ˘ w ˘ |
- t c w j t f Z g , Z b , w b g , w w f U , B Z ˘ w ˘ |
- Q v Z v i e v U , Q w I w e w e a
- K v t i w k i t w k i , K ˘ z , Z v j , b w i t K j , t e Z , e v k , t L R j , w k g j , g b v M w i ,  
M v g v i , K v A ˘ b , f Z g , t e j , A v g , w M b w i , K ˘ z U k j , B Z ˘ w ˘ |

**is D r c v ˘ b K v i x M Q**

i s I U ˘ w b b D r c v ˘ b K v i x M v t Q i g t a ˘ j U K b , L t q i , b x j , t e v K K i b , R v d i v b , K ˘ z g d ˘ z , e K g ,  
w w f , m g v w i , M v e , A v g j w k , e K ˘ z , e ˘ t n i v , n i Z K x B Z ˘ w ˘ D t j -L t h v M ˘ |

**ievi, Avv I iRb Drcv bKvixMq**

ievi, mtd`v, e`j U e`j, I qv- cvg, Kj v`qv I qv- cvg, Mvg te`vMgb, evej v, A`vKvmmq, Kwdj v, BZ`w` |

**Jlva Mq-Mqiv**

eimK, Kij tgn, Avcv½, nvo`Rvov, Kwdj v, Avg, Avgov, AvZv, kvi dv, QmZg, K`P, `cMÜ, tKvmmj v, AvK`, Abš`j, etk, tmvov, Mj Mj, Pij gMiv, mkgj, tevrmi, LicvZ, eKdž, Rq`š, K`R, Rj KigPv, mki, gv`vi, cvk, A`kvK, tZž, tevKkv, eüi j vM, Kv`Ab, eiY, e`niv, nvi ZKx, AR, Pj, Pij Zv, Mve, t`ti Üv, Avgj mK, Kkž vPZv, tZRcvZv, mRj, Rvij, vbg, eU, tMj vRvg, Kvgiv½v, Zvj, bvi tKj, msvmi, vj Pz eKž, tm`b, Mvgv | G Qvovl `j vRvZxq A`bK MvQ Jlva MvQifc e`eüZ nq |

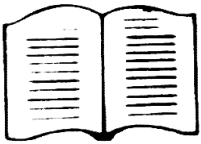
**e`bi Ae`b**

1992-93 A`eQti eb n`Z 81.22 j q NYdž KvV, 66.63 j q NYdž Rvj vmbKvV, 67 nrvvi tgvUK Ub tMj cvZv, 11.92 tKvU etk, 1.82 j q tgvUK Ub gayGes 36 nrvvi tgvUK Ub tgv cvl qv hvq | eb n`Z cÜB `e`v xi LvZqv vbtæ`qv n`j v |

`e`v xi bvg	1990-91	1991-92	1992-93
KvV (Ü000Ü NYdž)	8419	6600	8122
Rvj vmb KvV (Ü000Ü NYdž)	38241	13000	6663
tMj cvZv (Ü000Ü tg. Ub)	72	72	67
etk (Ü000Ü bvi`fi)	84240	80000	119206
tgv (tg. Ub)	-	44	36
gay(Ü000Ü tg. Ub)	-	-	182

t`tki tgvU Af`šixY Drcv`b (GDP) -Gi kZKiv cÜq cÜB fivM eb Gj vKv n`Z Avtm etj AbvgZ | t`tki tgvU mki kigtKi cÜq kZKiv 25 fivM eb mki vbtqvmRZ |

t`tki tgvU Af`šixY Drcv`b (GDP) -Gi kZKiv cÜq cÜB fivM eb Gj vKv n`Z Avtm etj AbvgZ | t`tki tgvU mki kigtKi cÜq kZKiv 25 fivM eb mki vbtqvmRZ |



**mvi gg®**  
 eb cvi tekZšj GKvU `ižcY`Drcv`v | ebR m`u` evsj v`tki RvZxq A`vMvZtZ me`kl Ae`v vL`Q | KvL.R ebrq`bi gva`tg ebrq b m`o Kiv m`e | N`ii Lvj, AvmevecĪ, Rvj vmb, tMvLv`, JIa, tšKv, tVj vMvov, KvMR, gv`Pev, KvL.hšcvmZ, ev`hšj BZ`w` `Zvi Ki`Z ebR m`u` i cÜqvRb | t`tki tgvU Af`šixY Drcv`b i 5% eb t`k Avtm |



**cĵVĚi gj-vq̄b 2.5**

mĵVK DĚti i cĵkĵUK wPý (✓) w̄ b|

- 1| eĵsj vĵ`tk cĵKZ.eb fĵgi cĵi gĵY KZ ?  
 K. 20 fĵM                      L. 18 fĵM                      M. 12 fĵMi bĵP                      N. 25 fĵM
- 2| Acĵi Kĵr Zfĵte MĵQcĵj v KĵUvi dtĵ etĵi`AAĵj Kx cĵi j wĵZ nĵ"Q ?  
 K. RxeRŠ'gĵiv hĵ"Q                      L. Rĵgi DePZĵ nĵm cĵ"Q  
 M. giĵiY i i yĵqĵQ                      N. cĵž eĵócvZ nĵ"Q
- 3| KvL R ebĵq̄b Pvi Y aviv ej ĵZ Argiv Kx eĵS ?  
 K. Kvôj Dĵ"ĵ` i mĵ\_ dĵĵj i Pvi  
 L. GKB mĵ\_ eüel Rĵie Kvôj Dĵ"ĵ`, cĵi I dĵĵj i Pvi  
 M. eü el Rĵie Kvôj Dĵ"ĵ` i mĵ\_ cĵi cĵj b  
 N. Kvôj Dĵ"ĵ` i mĵ\_ gĵ gĵMĵi Pvi |
- 4| w̄bDRĵcĒ ĵZixĵZ tKĵb MĵQ e`eüZ nq ?  
 K. tMĵ qv                      L. w̄ki                      M. tm\_b                      N. w̄bg
- 5| t`tki tgvU Af`ŠĵixY Drcv`ĵbi KZ fĵM eb nĵZ Avĵm ?  
 K. cĵq 10 fĵM                      L. cĵq 5 fĵM                      M. cĵq 7 fĵM                      N. cĵq 12 fĵM



**Povšl gj`vqb**

**msv`B I iPbigj-K ckae**

- 1| evsj v`tki vbR`nevfba`ci cvLi big vj Lj|
- 2| `enkó`mn tKvb RvZi gjm tKvb AĀtj cvl qv hvq Zvi weei Y w`b|
- 3| evsj v`tki nevfba`ci cvLi cwi msL`vb vj Lj|
- 4| D`vni Ymn nevfbaDbz RvZi Mi yGes QvMtj i RvZi big vj Lj|
- 5| kvxl qvj I j vj wUx RvZi Mi y eYv w`b |
- 6| e`vK teLj RvZi QvMtj i eYv w`b|
- 7| tnvqBU tj MnY`Avi AvB Avi I dvBl ug gjm m`fÜ mst`c vj Lj|
- 8| LwK K`v`f` nvtmi RvZi `enkó` Avtj vPbv Kij|
- 9| RvZxq A\_ÖmZtZ ci cvLi Ae`vb Avtj vPbv Kij |
- 10| mvgv`K Rj vkq mst`c eYv Kij |
- 11| tj vbv cvbi gvQ I ugVv cvbi gvQ ej tZ Kx e`Sb ?
- 12| Af`šlxY g` Rj vkq ej tZ Kx e`Sb ?
- 13| ugVv cvbtZ evm Kti Ggb 5wU gvQti tMtI i big mn bvg vj Lj|
- 14| iBvb thvM` grm` m`ut` i weei Y w`b |
- 15| evsj v`tki A\_ÖmZtZ grm` m`ut` i Ae`vb eYv Kij|
- 16| evsj v`tk ebR m`ut` i , i`Avtj vPbv Kij |
- 17| cwi te`ki Dci ebR m`ut` i cZwµqv eYv Kij |
- 18| Kul.R ebvq`bi nevfba`vi eYv w`b |
- 19| nevfba`k I Kvth`e`eüZ MvQ-cvj vi Zvuj Kv c`Z Kij |
- 20| evsj v`tki A\_ÖmZtZ ebR m`ut` i Ae`vb Dtj L Kij |
- 21| evsj v`tki nevfba`ci cvLi weei Y w`b |
- 22| Mi y nevfbaDbz RvZi eYv w`b |
- 23| nevfbaDbz RvZi ci cvLi Zvuj Kv c`Z Kij |
- 24| wmic`w RvZi nevfba`vQv big vj Lj |
- 25| ebR m`ut` i DcKvi Zv eYv Kij |



**DĒi gjuv**

**cW 2.1:**

1| M 2| N 3| K 4| L 5| L 6| N 7| N 8| K

**cW 2.2:**

1| M 2| N 3| L 4| M 5| M 6| L

**cW 2.3:**

1| L 2| K 3| L 4| N 5| L 6| N

**cW 2.4:**

1| L 2| M 3| K 4| M 5| N 6| K

**cW 2.5:**

1| M 2| M 3| L 4| K 5| L

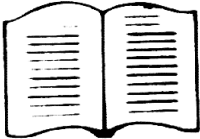


**cw 3.1 eisj v`tk Kul. hmsKxKiYi , iǝj**



G cw tk tI Avrb

- ◆ Kul. hms KxKiY Kx Zv ej tZ cvi teb |
- ◆ eisj v`tk Kul. hmsKxKiYi c0qvrBxqZv Dcj wä Ki tZ cvi teb |
- ◆ tKvb&tKvb&t¶¶t Kul. hmsKxKiY mæe Zv kbr³ Ki tZ cvi teb |



Af ktj, Af mgq, Af e`q I Awak `¶Zvi mt\_ Lvgvti KvR Ki tZ Kul. hmsKxKiY AZ`sl , iǝj cY¶ fvgKv i v t L |

Kul. Dbqtb Kul. hmsKxKiYi Ae`vb Ab`xKvh¶ Dbz wetkj weifbæ t`k Kul. hmsKxKiYi gva`tg Kul t¶¶t wecæ NuUtqtQ | tmme t`tk Kul. hmsKxKiY i`ayktg kw³ i jvNeB Ktiwb eis dmtji Drcv`b LiP Kugtq Zvi dj b I , bY euj vstk ewx Kti tQ | tm Zjbvq eisj v`k GLbl Kul. hmsKxKiYi t¶¶t c0ugK Ae`vq itq tMtQ | Af ktj, Af mgq, Af e`q I Awak `¶Zvi mt\_ Lvgvti KvR Ki tZ Kul. hmsKxKiY AZ`sl , iǝj cY¶ fvgKv i v t L |

RbmsL`vi µg ewxi dtj dmtji Rvgi cwigvY w`b w`b Ktg AvmtQ | GB µgea¶vb evowZ gǝLi Lvevi thvMvb w`tZ mwgZ RvgtZ c¶¶j Z km` Pvl imZ cwi eZ¶ Kti Drcv`b eaR km` Pvl imZ AbyriY Ki tZ nte | G¶¶t mdj Zv AR¶ Ki tZ ntj Kul. hmsKxKiYmn Dbz Pvlver` c¶¶j x Aek`B AbyriY Ki tZ nte | 1928 mb ntZ G Dcgnv`tk AvsukK Lvgvi hmsKxKiYi w elquw , iǝj cvq | 1928 m tbi 0ivRKxq Kul. Kugkb0, 1945 m tbi 0`¶¶¶ AbæÜvbx Kugkb0, 1951 m tbi 0cwmK`lv Kul. AbyriÜvbx Kugw0, 1960 m tbi 0Lv` I Kul. Kugkb0 Ges cieZ¶Z `vaxZv DEiKvtj 0Lvgvi hmsKxKiY Kugw0 t`tk fvg KI¶, tmP I km` msi ¶¶Y G wZb w elq wetkl fite hmsKxKiYi mgwii k Kti |

**Kul. hmsKxKiY Kx?**

Kul. t¶¶t ewæ nvti dmj Drcv`b, c¶¶qvRvZKiY, msi ¶¶Y c¶¶Z KvR hšj kw³ i e`envi tK Kul. hmsKxKiY etj |

Kul. t¶¶t ewæ nvti dmj Drcv`b, c¶¶qvRvZKiY, msi ¶¶Y c¶¶Z KvR hšj kw³ i e`envi tK Kul. hmsKxKiY etj | G¶¶t hšj kw³ ej tZ tgnkb Ges BwAb DfqtK tevSvq | hmsKxKiY `¶aitbi ntZ cvti cY¶ Ges AvsukK | Kul. t¶¶t mgvq Kv hLb hšj kw³ i gva`tg mæúbeKiv nq ZLb ZvtK cY¶ hmsKxKiY ej v nq | c¶¶všti dmj Drcv`tbi Rb` wetkl KZK , t j v KvR hšj mrvth` mæúbeKijt ZvtK AvsukK Kul. hmsKxKiY etj | eisj v`tki Avenlqv, KI tKi mvgwRK I A`¶wZK Ae`v Ges miKvtii mµq mnthmMzVq eZ¶v b GLv b AvsukK Kul. hmsKxKiY i iyntqtQ |

**Kul. hmsKxKiYi , iǝj**

Kul. hmsKxKiYi , iǝj Acwi mxg | mæav, Amæav Ges Av`¶mvgwRK Ae`v wetePbvq ti tL t`tk tKvb tKvb t¶¶t Kul. hmsKxKiYi c0qvrBxqZv ev , iǝj AvtQ Zv wbtæAvtj vPbv Kiv ntj v:

**exR Drcv`b Lvgvti i Rb`**

exR Kul. i Ab`Zg c¶¶v DcKiY | Drcv`b I c¶¶qvRvZKiYi mgq wæea Kvi tY extRi gvb Ktg thtZ cvti | Gme KvR mvdj `RbKfite Kul. hšj wZi mrvth` weifbæexR ea¶ Lvgvti Abvqtm Kiv thtZ cvti |

**Kul. MtelYmvi i Rb`**

nevfbaeKul. MtelYmvi Ges Kul. uk`vvi ve`'victV Aek`B nevfbaeKul. hšcwZi mieivn I e`envi \_vKtZ nte| Kul. Dbqtb Prv Dchy` c`hy` | Gme c`hy` D`'etbi Ges Kul. uk`vvi QvT`i ukw`Z Kti Z`z`Z MtelYmvi I ve`'victV Kul. hšcwZi mieivn Aek`B ubw`Z KtZ nte|

**KIK ch`q e`envi i Rb`**

KIK ch`q ub`nj uLZ t`q`T Kul. hšcwZ e`envi m`e:

**K. Riq Pvl**

evsj v`k eQt i wZberi Riq Pvl i e`'Imgtq j`q` Kiv hvq |

- gv`PP c`g mBvn n`Z Guc`j i uZxq mBvn |
- RjvBtqi ZZxq mBvn n`Z AvMtoi ZZxq mBvn |
- bt`f`ti i tkl mBvn n`Z ga` Rvbyix ch`S |

t`tk eZ`v`b Prtli  
ej`i Afve kZKiv 40  
fiv Ges eQt i e`'Imgtq  
G Afve `wvq 70 fivM|

t`tk eZ`v`b Prtli ej`i Afve kZKiv 40 fivM Ges Dctiv<sup>3</sup> e`'Imgtq G Afve `wvq 70 fivM| Mi`y fiv RvZ, Lv` I uPrKrmvi Afve, PriYfugi Afve Ges nevfbaemgtqi eb`vq Mew` cii gZi dtj Kul`t`q`T ci`kw<sup>3</sup>i Afve te`b Pj`q| ZvQvor th mKj Kl`Ki Prtli ej` Av`Q Zviv `q`m`j i ga`eZ`GZ Kg mg`q ZwoNwo Kti mivKfite Riq Pvl KtZ cv`ibv| dtj dm`j i dj`bl fiv nqbv| Gme Kvi`y t`tk cvl`qvi uLj`v`i Pvn`v te`b Pj`q| cvl`qvi uLj`v`i e`envi i dtj e`'Imgtq Riq Pvl KtZ tKvb Am`eav n`'Qbv eis Aí mg`q KIK te`k Mfxi Zvq Riq Pvl Kti te`k dj`b cv`'Q| t`tki nevfbae exR ea`b Lvqvi I MtelYv BbwiUDtu Ges ukQymsL`K abx KIK Zv`i Lvqvi nevfbae Ak`kw<sup>3</sup>i Uti c`vD e`envi KtQ Ges w`b w`b G`i e`envi te`b Pj`q|

**L. exR ecb**

exR ecb Kivi Rb` evsj v`k Kul. mekte`'ij q I evsj v`k Kul. MtelYv BbwiUDU n`Z exR ecb hš;Ame`vi Kiv n`q`Q hv MtelYmvi, exR ea`b Lvqvi Ges Kl`Ki gv`v e`euZ n`'Q| GgbwK Kl`Kiv GLb exR ecb hš;mi eiv`ni Rb` Av`e`b Rvrv`'Q|

**M. AvMqv`gb**

AvMqv`gb i nevfbaebvbx hš;thgb Rvcvbx avb ubovbix hš; Kl`Kiv GLb ub`R`i dmj`x Riq`Z e`vcK n`ti e`envi KtQ| n`v`ui`vK, Mv`W`b i`vK BZ`w` I AvRKij AvMqv`gb i Rb` uk`Pb Mv`W`b e`euZ n`'Q|

**N. tmP c`qvm**

dm`j i cvmbi Pvn`v tgUv`Z t`kxq tmP c`xwZ AvZwi<sup>3</sup> dmj` dj`v`bvi Rb` h`\_ó bq| ZvB hws`K c`xwZ`Z tmP c`qvm AvR t`tki cL`š`AAj ch`S ve`Z. n`q`Q| Kul. hws`KxKi`y`i t`q`T me`P`q te`k c`vri j`v`f Kti`Q nevfbaetmP hšcwZ| Gme hšcwZ w`tq Lvj, vej, b`x Ges f`Mf`n`Z cvmb Z`zj dm`j i Riq`Z t`qv n`'Q Ges tm`Pi Avl Zvq w`b w`b dmj`x Riqi cvigvY evot`Q| nevfbaetmP hšcwZ hv G`t`k e`euZ n`'Q tm`j`v n`j`v bj Kc, tU`Wj cv`u, cvl`qvi cv`u, AMfxi bj Kc Ges Mfxi bj Kc, BZ`w`| eZ`v`b evsj v`tki nevfbaeAA`j cvmbi `li ub`P tb`tg hvl`qvq Mfxi ev AMfxi bj Kc Zv`i uba`wi Z tm`Pi Avl Zv`f<sup>3</sup> Riq`Z tmP w`tZ cvit`Qbv| G t`q`T cvl`qvi cv`u `q`Zvi m`\_ b`x ev vej n`Z Riq`Z tmP w`tZ cvit`| tm`Pi Avl Zvq Riqi cvigvY w`b w`b ev`x cvl`qvq

Kul. hws`KxKi`y`i t`q`T  
me`P`q te`k c`vri j`v`f  
Kti`Q nevfbaetmP  
hšcwZ|

KiKiv tenk cwi gvY RiqZ avb Pvl KiQ | dtj iwe tgsmjg Abvb dmj wekI Kti Wvj I gkjv RvZiq dmtji Rigi cwi gvY Ktg hv"Q | GtZ hv I dmtji ubeoZv evotQ uKŠ Ab" dmtji NvUwZ t Lv w t"Q hvi dtj Gme dmj wek t tK Avg vnb Kti Pmn v ugUvZ n t"Q | t tki Lv mgm vi mgvavb KiZ n t j tenk cwi gvY Riq t m t Pi Avl Ziq AvbZ n t e | Avi ZvB tmP hšcwZi Pmn v Gt t k evotZB vKte | dmj Drcv t b tmP AZ šl i žc Գ DcKiY | AZGe Kul. hwišKxKiYi G DcKiYul wekI Kti dmj Drcv t b tmP hšcwZi i Zj Acwi mg |

**O. dmj msi ԳY**

AvMvQv, ti vM I tcvKiv-gvKtoi Avmgy n t Z Rigi dmj i Գvi Rb n Pmj Z I kw Pmj Z wef b e t u t vi e envi Kiv n t"Q | t t k G t i e envi w b w b t e t o P t j t Q | e Z Գ v t b Gme hšcwZ Avg v t i t t k B Zwi n t"Q | D e t m t Q J l a t e v i R b D P P v t c i t u t v i Zwi Kiv n t t Q h v t t k i D E i v A t j i A v g e v M t b e v c K f v t e e e u Z n t"Q | Z v Q v o r K u l . g š y j t q i D w m c m s i Գ Y w e f v M w e t y Գ j v K v q K u b i k K e v A v c b v k K c Գ v t M i R b t Q v U t Q v D t o r R v i R e e n v i K t i v t K |

**P. gvovB I c Գ v q K i Y**

AvDk I t e t i v a v b K v U v i c i e v o n t j A t b K m g q g v o v B K v t R i w e N a t U | c P m j Z g v o v B h š j ( P a d d l e t h r e s h e r ) G t Գ t t t e k i ž i c v t"Q | t t k i w e f b e t v t b G g v o v B h š j Z w i n t"Q | t h L v t b A v t M M i y v t q g v o v B K v R K i v n t Z v , M i y K t g h v l q v q G m e K v R G L b c P m j Z g v o v B h t š j m v r v t h K i v n q | i a y Z v b b q , M g g v o v B h t š j D m e t b i t P o v l t t k P j t Q | a v b , m v i l v I g k j v t h t j v t X u k u K s e v N v b i m v r v t h f v z v t b v n t Z v G L b G m e K v R t g u k t b i m v r v t h K i v n t"Q G e s e v s j v t t k i c Գ c Գ Z u M t g G L b G m e u g j P j y n t q t Q |

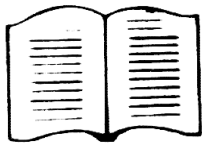
Kul. hwišKxKiYi eo mjev GB th Aí mg t q , Kg k i g K w t q , Գ Z v i m t , Kg L i t P A w a K d m j d j v t b v m e e | Kul. hwišKxKiYi Ab Zg c Գ v b m g m v n t"Q Kul. K v t R u b t q v R Z k i g t K i m e e t e K v i Z i | t t k i A t a Գ K i l t e n k k i g K K u l . u k t i u b t q v R Z | t t k K u l . t Գ t t c Գ h w i š K x K i Y n t j A w a K v s k k i g K t e K v i n t q c o t e | Z v B e Z Գ v b t c Գ v t U e v s j t t k A v s u k K h w i š K x K i Y B t k t |

t t k i c u i t e t k i K v w e t e P b v K t i t k i q c Գ v w t q D m e Z h š c w Z K u l . t Գ t t t e n k j v M m B n t e e t j w e t e P Z | Z v B K u l . h š c w Z m i e i v t n i e e v K i t Z n t e | i a y Z v b b q G m e h š c w Z i L Գ i v h š y s k t h b m n t R B n v t Z i K v t Q c v l q v h v q t m e v c v t i l m R v M u o i v L t Z n t e | Z v B t t k L Գ i v h š y s k D r c v t b i K v i L v b v K i t Z n t e b Z e v t h m e K u l .

hš cwZ wek n t Z A v g v n b K i v n q Z v t i L Գ i v h š y s k l t h b K I K m e m g q n v t Z i K v t Q c v q t m e e v i v L t Z n t e |

**Abj b (Activity):** evsj v t t k c Գ Kul. hwišKxKiYi c Գ v R b i q Z v I m e e m g m v m g r A v t j v P b v K i b |

Kul. hwišKxKiYi Ab Zg c Գ v b m g m v n t"Q Kul. K v t R u b t q v R Z k i g t K i m e e t e K v i Z i |



**mvi gg**  
dmj Drcv b, c Գ v q R i v Z K i Y , m s i Գ Y c f u Z . K v t R h š k w i e e n v i t K K u l . h w i š K x K i Y e t j | e v s j v t t k i t c Գ v t U K u l . t Գ t t A v s u k K h w i š K x K i Y m e e | e x R e a Գ L v g v i , K u l . M t e l Y v M v i I K I K c h e h t K v b t K v b t Գ t t h w i š K x K i Y K i v t h t Z c v t i | K u l . t Գ t t R i g P v l , e x R e c b , A v M v Q v g b , t m P c Գ v M , d m j m s i Գ Y G e s g v o v B I c Գ v q K i Y i K v t R u K O y u K O y h š c w Z e e n v i K i v n t"Q G e s G t i i ž j w b w b e v o t Q |



### cvfVĔi gj`vqb 3.1

mivK DEti i cvfkqUK wPy (v) w` b|

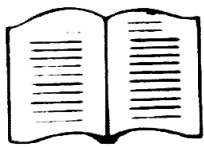
- 1| tKvb&mb ntZ Dcgnvt`tk Kwl.hmšKxKiYi mel qvU , i žj cvq ?  
K. 1928 L. 1945 M. 1951 N. 1960
- 2| ersj vt`tk tKvb ai tbi Kwl.hmšKxKiY DchĚ ?  
K. cYhmšKxKiY L. AvsukK hmšKxKiY  
M. Avav hmšKxKiY N. kb` hmšKxKiY
- 3| t`tk eZĚvfb Pvl i ej t`i Afve kZKiv KZ fivM ?  
K. 20 L. 30 M. 40 N. 50
- 4| Rivg Pvl tKvb Kwl.hšjtemk e`envi nt`Q ?  
K. Uti cvD L. wvMk cvD  
M. tivvUvfvUi N. cvl qvi vUj vi
- 5| Kwl.hmšKxKiY metPvq cthvi j vf Kti tQ tKvb tĚtĚ ?  
K. Rivg Pvl L. tmP cĚqvM  
M. AvMvQv`gb N. exR ecY
- 6| c` Pmvj Z gvovB hšjtKvb&dmj gvovBtqi Rb` e`eüZ nq ?  
K. avb L. Mg M. AvL N. mvi lv
- 7| MvfwĚ i`vK Kx KvfvR e`envi Kiv nq ?  
K. JIa vQUvfbv KvfvR L. tmvPi KvfvR  
M. vbovbx KvfvR N. gvovB KvfvR

**cvW 3.2 gw dmj , nwn-gjM, Mew`ci I grm` Lvgv`i e`eüZ hšçwZ |  
evsj v`tki weifba`mP I eb`v`vbqšç cK`i |**



G cvW tk`i Avci`b

- ◆ gw dmj Drcv`tb e`eüZ weifbahšçwZi big D`j L Ki`Z cvi`teb |
- ◆ nwn-gjM Lvgv`i e`eüZ hšçwZi kbv`³ Ki`Z cvi`teb |
- ◆ Mew`ci Lvgv`i e`eüZ hšçwZi cwi`PwZ jvf Ki`Z cvi`teb |
- ◆ grm` Lvgv`i e`eüZ hšçwZi big ej`Z cvi`teb |
- ◆ evsj v`tki weifba`mP I eb`v`vbqšç cK`i i eY`v`w`Z cvi`teb |



**gw dmj Drcv`tb e`eüZ hšçwZ**

Avgv`i t`tk Kwl. t`q`i`T e`eüZ weifbahšçwZi big vb`v`v`q`v`n`jv`t

**1| P`ti Rb` e`eüZ hšçwZ -**

- t`kx j v`j
- tgv`i tevW`j v`j
- cvl qvi wj vi
- U`z i cuD
  - wv`c cuD
  - n`v`i v
  - tiv`Uv`fUi
- Mi`j K`ta exavi Rb` tRvqvj
- tKv`vj (tKvb tKvb t`q`i`T )

**3| exR ectbi hšçwZ -**

- wv`w wv`j
- cvl qvi

**5| vbvbx` t` qvi hšçwZ -**

- vbv`o ev L`jnc
- Rvcw`bR i vBm DBWvi
- n`v`U` tnv ev vBj tnv

**7| Avc`bvkK e`env`i i hšçwZ -**

- tbc`tmK t`v`v`qvi
- cvl qvi t`v`v`qvi
- wv`w tW`v`vi
- G`i v`cb

**2. Rvq mgvb Kivi hšçwZ -**

- gB
- tiv`j vi
- n`v`i v
- gyi (wv`j v fiv`vi Rb`)

**4| Av`vov` t` qvi hšçwZ -**

- n`v`U` i`vK ev Mv`v`w`B i`vK
- wv`i i`vK ev we`v ev Av`vov`

**6| tmP hšçwZ -**

- tmDwZ
- t`vb
- SvSov
- wv`Del t`qj
- tU`v`w`j cv`v`ú
- cvl qvi cv`v`ú
- AMf`xi bj Kç
- Mf`xi bj Kç

**8| KZB, gıvıB, SıvıB BZ`wı hřřcwZ**

- Křř`ı
- tKř`vj
- tçřWj t\_řvi
- Nřb
- BřřzgıvıB Kj
- Křřv
- Pjı wı
- Wřj
- SıUı
- tMĚb Křřj ±ı
- KYřmj vi

**nř-gjıMi Lıgřı e`eüZ hřřcwZ**

nř-gjıMi Lıgřı th me çřqıRbıq mi Äıgıw` e`eüZ nq tm, tıv nıjv t

- gjıMřK Lıvı t`qı Rb` Lıvı çřř
- çıvı çřř
- wıg çıvı ev
- I Rb Kıvı e`ıřj Ý
- wıg tMĚs Gi hřř
- gjıM`ıvıřřıı LıBı
- wıg ıvLıvı çřř
- Lı`ııgkřıvıvı hřř
- nıBřMĚgUı
- \_ıřgıgUı
- KřřKı I ıSbıKı tLıvı ıvLıvı çřř
- t`üřı
- nıvı řKb evZ
- I Rb gıçıvı hřř
- tKř`vj
- Lııç
- evj ıZ
- tVıU Křřıvı hřřj

**Lıgřı wıg çřřıvıvı hřřcwZ**

- BııKDřıUı
- tRbıřıUı
- WıB evj ; I řqU evj ; \_ıřgıgUı
- wıg çıçřıvıvı evZ
- wıg gıçıvı e`ıřj Ý
- tUevj

**eřjıvı Lıgřıı hřřcwZ**

- eřıvı ev Zıçıřřıvıvı hřř
- ıPKMıw©

**Mewi` cii Lvgvfi e`euZ hšcwZ**

Mewi` cii Lvgvfi wbaaj wLZ hšcwZ \_vKv Avek`K t

- wgwés tcBj
- `g gvcvi evtKU
- `jai eo evtKU
- `g gvcvi e`vtj Y
- bvoB KvW
- Wtg ev `g cvI
- QvKvb
- `g t`vntbi hšj
- wi· v ev F`vbMvox
- wdiWIs tevZj
- úBj evtjv
- Btj KvUK Mm&Pics tgvkb
- `vbr Lv` wgvvtbvi hšj
- g`vbtaj Mm&Pics tgvkb
- mwrfm óKvi
- cvnb Zvc t`qvi wvUvi
- ÷vR cvvú
- NYqbgvb tµb
- tctWj t`mvi
- KYqmjvi
- Lv` entbi Uvj
- ci gvcvi hšj
- tnm cvBc
- cvmbi cvI
- Lv` gvcvi hšj

**tfovi tkqwis Kivi hšcwZ**

- cvl qvi WBtfb tkqwis tgvkb
- wKevi ev n`vU tkqvi

**tLvRv Kivi hšcwZ**

- evwvRim K`vt ÷ Ui
- avi vtj v PvKz
- i veri wi s

**MiyevtNvotK byj ev Rzv civtbi hšcwZ**

- evmc&
- WBS bvBd
- tUvBs bvBd

**wvnmvKivi hšcwZ**

- Btj KvUK wv nYq
- nYqkqvi

- WvBtj Ui
- di tmc
- ti Rvi

- nvZwi
- wPgUv
- evKvi

**grm` Lvgvfi e`euZ hšcwZ**

- tRbvfi Ui
- Av` tRb vglvi
- uc. GBP. vglvi
- Gqvfi Ui
- vclv/s tU<sup>a</sup>
- t`u<sup>a</sup>tgnkb
- vi tdt±vnglvi
- Gt. j cvu

**gvQi Kvl`g cRbtb e`euZ hšcwZ**

- BbtRkktbi vvvv Ä Ges vbWj
- cvótki Mvj v
- tvtgvvRbvBRvi
- tmvUtdDR

**grm` cRbb n`vPvi tZ e`euZ vevfbæ hšcwZ**

- 3 Bv<sup>Ä</sup> e`v`mi cvBch<sup>ÿ</sup> AMfvi bj Kz
- Btj KvUK cvu - 220 tfvë, 1.5 Akj kv<sup>3</sup>, 15 vglvi D`PZvq 120 vj Uvi cvb ZjtZ m`lg|
- Av` tRb Uvl qvi
- BbvKDtekb tevZj
- cvmbi U`v¼ ev Rj vavi
- cvmbi tPševPr
- nvcv

**gvQ aivi hšcwZ**

- teúv` Rij
- eovk
- fvmvb Rij
- SvK Rij
- tVj v Rij
- PvB
- vke Rij ev ag<sup>Q</sup>Rij |



**Ablyj b (Activity):** vbæ vj vlZ t`Îmgfn Avcbvi GjvKvq mPivPi e`euZ hšcwZmgfni bitgi Zvj Kv`Zvi Kily -

1. gvV dmj Drcv`tb e`euZ hšcwZ
2. nvn-gjvMi Lvgvfi e`euZ hšcwZ
3. gvQ aivi hšcwZ

**evsj v`tk wnfbo`tmP I eb`v ubqšy cKf**

evsj v`tki c`avb tmP I eb`v ubqšy cKf , tjv ntjv -

1. M½v-KtciZv`q cKf
2. KY@jx euglyx cKf
3. DEi e½ Mfxi bj Ke cKf
4. Prucy tmP cKf
5. DcK j xq eia cYefmb cKf
6. tMgZx cKf
7. XvKv-bvi vqYMA-tWgiv tmP cKf
8. wZ`i eva cKf
9. epcy eb`v wbi va eia cKf
10. ewi kvj tmP cKf |

**G cKf , tjv m`u`tk`b`ta`v`j`Pbv Kiv ntjv:**

**M½v-KtciZv`q cKf**

Kwqv tRjvi tfovgivi KvQ cUv b`x t`tk cmb Zj Lvtj i minvth` epEi Kwqv, htkvi I Ljybv tRj vngfni e`vcK AA`j tmP t`qvi Df`tk` M½v-KtciZv`q cKf `vcb Kiv ntqtQ| cKf i c`avb j`q` cmb tmP ntj I eb`v ubqšy I hvZvqvZ e`e`vi Dbqtbl wtkl figKv cvj b Ki`Q|

Kwqv tRjvi tfovgivi KvQ cUv b`x t`tk cmb Zj Lvtj i minvth` epEi Kwqv, htkvi I Ljybv tRj vngfni e`vcK AA`j tmP t`qvi Df`tk` G cKf `vcb Kiv ntqtQ| Gi dtj 84 nvrvi tguUK Ub AwZii<sup>3</sup> Lv` Drcv`bte | G cKf wU wZbvU BDwbU wef<sup>3</sup> | G cKf ev`evq`bi Df`tk` cUvZxti tfovgivi KvQ GKwU cv`u` tokb `vcb Kiv ntqtQ| GB cv`u` , tjv cwi Pjv bvi Rb` 8200 wKtj vl qvU qgZv m`ubw GKwU w`y` tK`<sup>a</sup> `wcz ntqtQ| G cKf i c`avb j`q` cmb tmP ntj I eb`v ubqšy I hvZvqvZ e`e`vi Dbqtbl wtkl figKv cvj b Ki`Q|

**KY@jx euglyx cKf**

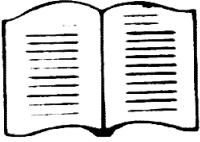
KY@jx euglyx cKf c`avbZ w`y` Drcv`b cKf ntj I Gi minvth` KY@jx b`xi wba`Aj i eb`v ubqšy, c`q 650 wKtj wUvi tbspj vPtj i mgy`e`v Ges 4 j`q` tn±i RwgZ tmP t`qvi hvq|

GwU GKwU euglyx cKf | GwU c`avbZ w`y` Drcv`b cKf ntj I Gi minvth` KY@jx b`xi wba`Aj i eb`v ubqšy, c`q 650 wKtj wUvi tbspj vPtj i mgy`e`v Ges 4 j`q` tn±i RwgZ tmP t`qvi hvq| cveZ` PAMog tRjvi KvBvBtq KY@jx b`xi Dci 46.6 wUvi DpZ 660 wUvi `xN` Ges 240 wUvi Pl ov GKwU eva w`tq G cKf `vcb Kiv ntqtQ| G Kwlg n` i cwb i minvth` i v½wq`v AA`j eQti eZ@v`b` wU dmj Drcv`b Kiv m`e` n`Q| G n` t`tk eZ@v`b cUz eQi 5 nvrvi Utbi I tenk gvQ cvl qv hv`Q|

**DEie½ Mfxi bj Kc cKf**

DEie½ Mfxi bj Kc cKf i cwi Kf bv Ablyvq` t`tki DEiv`Aj Pvi wU epEi tRjv - iscy, ivRkvn, e, ov I w`bvRc`j 360 wU Mfxi bj Kc Ges 760 wU cvl qvi cv`u`i minvth` gnv`v I evj b`xi cmb w`tq 1 j`q` tn±i RwgZ cwb i tm`Pi e`e`v Kiv ntqtQ| G AA`j evrmi K ewocvZ Kg Ges kvZKv`j b`xZ cmb Lg Kg cwi gvY`v`K | ZvB G GjvKvq tm`Pi Rb` Mfxi bj Ke Ges cvl qvi cv`u`B tenk KvRix | GQvovl 10,500 wKtj vl qvU w`y` Drcv`b qgZv wnkó GKwU w`y` tK`<sup>a</sup> I Pvl i RwgZ cmb mieivni Dc`hvMx bvj v, c`avb bvj v t`tk wdi bvj v Ges cU bvj v I G cKf i Ašf`|





**mvigg®**

gvV dmj Drcv`tb th mKj hšcwiZ e`eüZ nq tm,tjv nřjv Pıřl i Rb` e`eüZ hšcwiZ,  
Rııg mgvb Kivi hšcwiZ, exR ecb hšcwiZ, AvDov ř`qvi hšcwiZ, ıbwıo ř`qvi hšcwiZ,  
řmP I ıbw`ıktřbi hšcwiZ, Avc`bıkk e`enřři hšcwiZ, KZř, SıovB, gvovB BZ`ıw`  
KıřR e`eüZ hšcwiZ| gjıM Lıgvřı ıwıřbıhšcwiZi gřa` ıWg dıřřıvı Rb` BbıKDřııı  
e`eüZ nq| Mıyřřov, řNıov I grm` Lıgvřı ıwıřbıhšcwiZ e`enřı Kıv nq| evřj ř`řk  
cřıvb cřıvb řmP I eb`v ıbwqřř cřkř nřjv 10ııı|



### ciVvEi gj`vqb 3.2

mivK DEti i ciVvEi UK vPy (v) v b|

1| tbcvmK t`uqvi tKvb KvR e`euZ nq ?

K. vbovbx t`I qvi Rb`

M. tmP t`I qvi Rb`

L. gvovB KvRi Rb`

N. Avc`bvK e`eniv i Rb`

2| vWg dlvvvi Rb` tKvb hSje`eniv Kiv nq ?

K. nvBtMvUvi

M. \_vtgvUvi

L. BbvKDteUi

N. tRbv i Ui

3| tvWj t`mvi Kx KvR e`euZ nq ?

K. gvovB Kivi KvR

M. `y t`vntbi Rb`

L. Nvm KvUvi KvR

N. `y cixv Kivi KvR

4| grm` cRbb n`vPvi tZ tKvb hSje`euZ nq?

K. teUv` Rvj

M. tmvUtdDR

L. BbvKDtekb tevZj

N. v GBP vUvi

5| ersj vt`tk eb`v I tmP vqšy cKv Kqv ?

K. 10 vU

M. 15 vU

L. 12 vU

N. 9vU

6| Mv-KtciZv cKv tKvb b`x t`K cvb e`eniv Kti ?

K. KtciZv

M. tgNbv

L. cUv

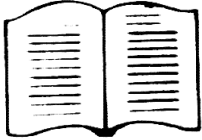
N. hgby

**cW 3.3 ejsj v`tki Lv`i eZgub Ae`v (Lv`km, gvQ, `y, Wlg I gvm)**

G cW tkI Avcb



- ♦ ejsj v`tki Lv` km`i eZgub Ae`v eYv KiZ cvi`eb|
- ♦ gvQ, gvm, Wlg, `y BZ`w` Drcv`tbi cwi gvY m`ut`K`Z` c`lvb KiZ cvi`eb|



ejsj v`tki gvbyl i c`vb tckv ntj v Kwl.thLv`b tgvU k`gkw`i 68.5% wbtqmRZ| t`tki Af`šli`xY Drcv`tbi c`q 35% Avtm KIRvZ `e` t`tk| Gt`tki Rwg DeP ntj I KIK `wi`q bZb bZb chy, Dbz` exR I Kwl.DcKiY e`envti c`v`c` \_vKvq c`Z GKK RvgtZ Drcv`b m`šv`RbK bq| avb, Mg, cvU, AvL, ZvkvK, Pv, `Zj exR, Wvj, km` Ges Avj yGt`tki c`vb dmj | w`fbaet`bi kvKmw` Ges gkv v RvZxq dmtj i Pvl I Gt`tk nq| ejsj v`tk eZgub Kx cwi gvY Lv` km` Drcv`b Zv wbt`e (QK - 1) t`qv ntj v:

ejsj v`tki gvbyl i c`vb tckv ntj v Kwl.thLv`b tgvU k`gkw`i 68.5% wbtqmRZ| t`tki Af`šli`xY Drcv`tbi c`q 35% Avtm KIRvZ `e` t`tk|

QK - 1: ejsj v`tk Drcv`Z w`fbaedmtj i cwi gvY|

dmj	Drcv`b (000 tg: Ub)		
	1991-92	1992-93	1993-94
avb	18255	18341	18302
Mg	1065	1176	1131
ewj	12	11	6
f`Ev	3	3	3
AvL	7446	7507	7111
Wvj dmj	519	503	536
%Zj exR	461	475	367
gkv v	322	302	330
tMvj Avj	1379	1384	1438
kvKmw`	1100	1198	1165

Dc`iv` QK ntZ t`Lv hvq th avb, Mg, Wvj dmj, gkv v RvZxq km`, tMvj Avj yGes kvKmw`i dj b 1991-92 m`bi Zjvq 1993-94 m`b tetotQ|

b`xgvZK.ejsj v`k grm` m`ut` mg`| w`KU AZt`ZI GLvbKvi Af`šli`xY Rj v`kq gv`Q ficj`Qj | t`tki grm`w`e m`ut`vq Af`šli`xY c`eb fvgtZ grm` AvniY Kti RweKv w`b`n KiZ| c`Kw`ZK I gvbyl i m`p w`fbaeKvi`Y Af`šli`xY g` Rj v`ktqi cwi gvY I tmLv`b Drcv`Z grm` m`u` MZ w`Zb `k`K gvi`vZK nwm t`ct`h`Q| mgj`t`tk grm` AvniY Ges eZgub DcKj`xq AA`tj w`Psv` Pvl ejsj v`tki A\_`v`Zt`Z Bw`ZevPK c`fve tdtj`Q| Af`šli`xb g` Rj v`ktq gv`Qi Drcv`b nwm t`ctj I m`g`v`K grm` I DcKj`xq AA`tj w`Psv` Pvl i gva`tg gv`Qi Drcv`b ew`xi m`tebv i`qtQ| eZgub w`fbaeRj R m`u` ntZ c`B grm` m`u`i` Drcv`b aiv ntq`Q c`q 12 j`q tgvUK Ub hv w`tai Q`K (QK - 2) t`Lv`bv ntj v:





**сүтүкү гж'иқб 3.3**

милК ДЭти и сүтүкүК Пү (√) и`б|

- 1| т`ткi тгvU кгkи³i КZfvM Күл.КүтR ибтqиRZ ?  
 K. 60.5 fvM            L. 66.5 fvM            M. 68.5 fvM            N. 72.7 fvM
- 2| артbi Drcv`b eZ@vrb KZ нvRvi тгvUК Ub ?  
 K. 18255            L. 18302            M. 18341            N. 18432
- 3| Af`šli xY gŷ Rj vktq гvтQi Drcv`b тKvb&Kvi tY KtqtQ ?  
 K. `RieK Kvi tY            L. тfšuzK Kvi tY  
 M. с0KuzK Kvi tY            N. с0KuzK I гvbтl i mр uewfbakvi tY|
- 4| тKvb&ai tbi Rj vktq гvQ теиK Drcbаnq ?  
 K. gŷ Rj vkq            L. ex Rj vkq  
 M. Avatj vbr cmbi Rj vkq    N. mvgŷ K Rj vkq|
- 5| тKvb&Rj vktqi AvqZb теиK ?  
 K. gŷ Rj vkq            L. Avatj vbr Rj vkq  
 M. mvgŷ K Rj vkq            N. ex Rj vkq|
- 6| eZ@vrb т`тк гvstmi Drcv`b KZ тгvUК Ub ?  
 K. 5,04,702            L. 3,98,000            M. 3,76,000            N. 5,47,205

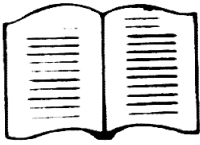
**cw 3.4 evsj v`k i Avg`wb I i BwbthM` Kul.cY`i Zwj Kv I cwi gvY**



G cvV tkfI Avciwb

- ◆ wef`k nZ tKvb tKvb cY` Avgv`i t`tk Avg`wb KiZ nq tm Z` cDvb KiZ cri`teb|
- ◆ evsj v`k nZ thme Kul.cY` wef`k i Bvb nq tm,tj vi big ej tZ cri`teb|
- ◆ tKvb cY` Kx cwi gvY Avg`wb ev i Bvb nq Zv ej tZ cri`teb|

**Avg`wbKZ cY`**



AZ`waK RbmsL`vi P`tc t`k AvR fvi v`v`š Ges th Lr`km` Drcb`nq Zv G evowZ RbmsL`vi Rb` h`ó bq| ZvB cDZ eQiB Avgv`i wef`k nZ Lr` Avg`wb Kti G NvUwZ cijY KiZ nq| wkt`i i KvDgij wntmte tek wKQycY` wef`k nZ Avg`wb KiZ nq| e`; wkt`i i Rb` cDZ eQiB Avgv`i Zjv Avg`wb KiZ nq| wki Lr` wntmte wef`k nZ cPZ cwi gvY` , av`g Avg`wb KiZ nq| cDvb cDvb Kul.cY` th,tjv wef`k nZ Avg`wb KiZ nq Zvi LwZqvb wbt`w(QK - 1) t`qv ntj v:

evsj v`k Kul.cDvb t`k| Gt`tki gwU I Rjevqydmj Drcv`tbi Rb` AZ`š Dc`thvMx| wKŠ AZ`waK RbmsL`vi P`tc t`k AvR fvi v`v`š Ges th Lr`km` Drcb`nq Zv G evowZ RbmsL`vi Rb` h`ó bq| ZvB cDZ eQiB Avgv`i wef`k nZ Lr` Avg`wb Kti G NvUwZ cijY KiZ nq| wkt`i i KvDgij wntmte tek wKQycY` wef`k nZ Avg`wb KiZ nq| e`; wkt`i i Rb` cDZ eQiB Avgv`i Zjv Avg`wb KiZ nq| wki Lr` wntmte wef`k nZ cPZ cwi gvY` , av`g Avg`wb KiZ nq| cDvb cDvb Kul.cY` th,tjv wef`k nZ Avg`wb KiZ nq Zvi LwZqvb wbt`w(QK - 1) t`qv ntj v:

OK - 1 t Avgv`wbKZ.cDvb cDvb Kul.cY`i Zwj Kv|

cY`i big	1990-91 (00000`KwR)	1991-92 (00000`KwR)	1992-93 (00000`KwR)
QwMj I tfovi gism	814	522	806
, av`g	60006	45281	37617
wN I gvLb RvZxq mvgM`	397	1101	456
Avj y	772	141	1060
wcqvR I imy	71423	118911	65335
wj wMDg RvZxq kvKmw`	95550	55669	63929
ev`vg	7742	5332	7828
tLRj, Avbvi m, Avg	1707	1358	3819
Kgj v tj ey	2745	2886	1050
Av`tcj , bvkcmwZ BZ`w`	2031	8383	6641
`vi yPib	1989	1719	1833
Rqdj , Gj vP, BZ`w`	693	802	1078
Mg	1606000	1475000	1033000
Pj	16000	18000	20000
MwQ-MwQov JIa I cDvabx wkt`i i Rb`	984	1445	1294
mqv`xb `Zj	194997	328148	195044

cvg`Zj	37263	96771	79880
uPib	13800	5000	73000
Zjv	3.650	4.245	7.638

(Drm: u.e.u.e.Gm. 1994)

**iBmbthvM` Kul.cY`**

t`tki`ef`uK gyt  
AR#bi msnfM Avtm cvU  
I Pr iBmb LvZ ntZ  
ZvQvor Avgiv iKbv I  
ingvqZ gvQ, Pvgov,  
ZvgvK I ZvgvK RvZ `e`  
BZ`w` mef`tk iBmb Kti  
\_uK/

Avgiv th`iaYkul.cY` mef`k ntZ Avg`vnb Kwi Zv bq, uKQymKQycY` Avgiv mef`tk iBmb I Kti \_uK/ GK mgq GKtPuuqv cvU iBmbKviK t`k intmte ersjv`tki bvg GK baf`i uQj | eZ@vrb I t`tki`ef`uK gyt AR#bi msnfM Avtm cvU I Pr iBmb LvZ ntZ | ZvQvor Avgiv iKbv I ingvqZ gvQ, Pvgov, ZvgvK I ZvgvK RvZ `e` BZ`w` mef`tk iBmb Kti \_uK/ c`avb c`avb Kul.cY` th`tjv Avgv`i t`k ntZ mef`tk iBmb Kiv nq Zv`i bvg I cwi gvY ubt`a(QK - 2) t`qv ntjv:

QK - 2 t cwi gvYmn iBmbthvM` c`avb c`avb ctY`i Zvjv Kv/

ctY`i bvg	1990-91 (00000tKwR)	1991-92 (00000tKwR)	1992-93 (00000tKwR)
ingvqZ gvQ	5395	4967	6418
iKbv, jeYv <sup>3</sup> I agvqZ gvQ	1263	1770	1260
kvKmwâ	117	203	310
Pv	26862	24990	29620
uPUv_o	7	6	--
%j	3030	7482	400
ZvgvK I ZvgvKRvZ `e`	1185	2427	1083
Pvgov	11496	13165	11966
cvU I cvURvZ `e`	435458	489814	432982

(Drm: u.e.u.e.Gm. 1994)

DcwiD<sup>3</sup> iBmb cY` Zvjv Kv i`tk j`qI` Kiti t`Lv hvq th uKQymKQyiBmb cY` thgb ingvqZ gvQ, Pv, Pvgov BZ`w` i iBmbi cwi gvY tetotQ/ cvU I cvURvZ `e` mef`Ptq tenk cwi gvY`ef`uK gyt AR# Kiti I Gi iBmbi cwi gvY 1992-93 mtb Ktg tM`tQ/ Af`silxy Drcv`b emotq Ges Dbz` gv`bi cvU I cvURvZ mvgMbi iBmb evRvi mjo`i gva`tg G NuUvZ ctY` Kiv m`e/ iBmb Avtqi tek GKUv fij Ask Avtm Pvgov t`tk hv ersjv`tki A`BvZtZ Dbq`bi avivewvKZv eRvq titL`tQ/ P`tqi Drcv`b w`b w`b evotQ Ges tm m`t/2 evotQ Gi iBmbi cwi gvY Ges t`tki iBmb Avq/ ingvqZ I iKbv gvQ iBmbi cwi gvYI μgvb`tg ep`x cit`Q/

eZ@vrb Avg`vmbi cwi gvY iBmbi Zjv`vq tenk/ RvZxq Avtqi weivU Ask e`q nq Lv` Avg`vmbi Rb`/ th eQi t`tk eb`v, Liv, ev Ab` tKvb c`uKvZK`#hM AvNvZ ntb`tm eQiB Lv`km` dj`bi Dci Gt`i weifc`c`fve`cto/ dtj`dj`b Ktg hvq Ges ZLbB mef`k ntZ

Lv`km` Avg`mb KiřZ nq| Kul.nbřřP evsj vř`ki mmeř Dbřřřbi jřřř` KulřKB cřvb`  
ıřřZ nře teřk| řřki Af`řřxY Pını`v ci-Y Kři Kul.RıZ cřY`i iBmbi cııgvY evotřZ  
cřıřj B ř`k A\_řřřřZK mqrřı cř\_ GıMřq hıře|



**mvi gg®**

evsj vř`k Kul.cřY`i Avg`mbi cııgvY iBmbi Zjybrq teřk| Avgv`mbKZ.cřvb cřvb  
Kul.cY` nřjv Mg, Pıj , ıPıb, \_cř`ř, mqııeb `Zj , cııú I řqj , meřřbřııřbi gkjv, Wıj ,  
dj Ges JIa I cřıvabı ıkrıı i KıPıgvj | meřřřq teřk Avg`mb KiřZ nq Mg, Pıj I  
řřıR` řZj | evsj vř`k nřZ th me cb` meř`k iBmb nq tm`řjvi gřa` Dj-LřıvM` nřjv  
ııngııqZ I iKřıv gıQ, Pı, Pıgov, cıU I cıURıZ `e` BZ`ıı` | meřřřq teřk eř`ıkrK gıř  
Avq nq cıU I cıURıZ `e` iBmb Kři |



**cvVvEi gj`iqb 3.4**

mivK DEti i cvtk;UK wPy (v) w`b|

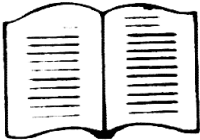
- 1| c0Z eQi wv`k nZ Avgv`i Kx Avg`mb Ki tZ nq ?  
K. Lv` L. Pv M. Pvgov N. cvURvZ `e`
- 2| Lv` ktm`i gta` tKvbU tenk cwi gvY Avgv`mb Ki tZ nq ?  
K. mqvxb `Zj L. Mg M. Prj N. Avj y
- 3| tKvb Kul.RvZ cb` i Bmb Kti evsj v`k metPtq tenk `et` ukK gyA Avq Kti ?  
K. Pv L. wngwqZ gvQ M. cvU I cvURvZ `e` N. Pvgov
- 4| evsj v`k nZ metPtq Kg Kx i Bmb nq ?  
K. wngwqZ gvQ L. kvK mwâ M. wPuv\_o N. `Lj
- 5| wbtai tKvb cY`wU i Bmbi cwi gvY wgvstq evotQ ?  
K. wngwqZ gvQ L. iKbv, jebv<sup>3</sup> I a gmqZ gvQ  
M. `Lj N. ZvgvK I ZvgvKRvZ `e`
- 6| wbtai tKvb cY`wU i Bmb Kti evsj v`tki A\_wvZK Dbqabi avivwvKZv eRvq  
ti tLQ ?  
K. cvU I cvURvZ `e` L. Pv M. Pvgov N. wngwqZ gvQ

**cW 3.5 evsj vř`tk cřqvřřbi Zjybq Kul.cřY`i Drcv`řbi cwiqvY**



G cvř tkřI Avcřb

- ◆ evsj vř`tki cřvb cřvb Kul.cřY`i bvg ej řZ cvřřeb|
- ◆ řKřb cY` Kř cwiqvřY Drcbřq Zř RřbřZ cvřřeb|
- ◆ řKřb cY` Kř cwiqvřY cřqvřřb Zř Dřj Ľ KiřZ cvřřeb|
- ◆ řKřb cY` cřqvřřbi Zřybq NřUřZ ev Dřřř; Zř kbr<sup>3</sup> KiřZ cvřřeb|



cW\_exi metřřq Rbeřj ř`k nřřmře evsj vř`tki Lv`km` Drcv`řbi nři evřřřbř cřqvřřb| Aři řmRb` cřqvřřb Dbřř cřřřř I mgq gZ KlřKi řbKU j řMmB cřřřř n`řřřř | Kulřřřřř bZř bZř cřřřř řhřM nřZ \_vřřj Kg mgřq `ř cwiři Aev`ř Rřřřř Ařak dñj dñj řř Ařak Drcv`b Kiv mře nřj| D`P dj bķj Rřřřř Přl I bZř bZř cřřřř e`evřřři dřj řeMZ KřřK ermři Ařakřsk dñřj iB Drcv`b AřřKřřřk eřřř řcřřřřř Křř RbmsL`v eřřřř i` K řeřřřřř Ařřřř Kul.cřY`i Drcv`b řm Zřybq evřřřb, Zřb G NřUřZ cřřřři Rb` Ařakřsk Kul.cY`B Ařřřř`i řeř`k nřZ Ařřř`řb KiřZ nq|

evsj vř`tk Kul.cřY`i Drcv`b cřqvřřbi Zjybq Ařakřsk řřřřř Kğ| cW\_exi metřřq Rbeřj ř`k nřřmře evsj vř`tki Lv`km` Drcv`řbi nři evřřřbř cřqvřřb| Aři řmRb` cřqvřřb Dbřř cřřřř I mgq gZ KlřKi řbKU j řMmB cřřřř n`řřřř | Kulřřřřř bZř bZř cřřřř řhřM nřZ \_vřřj Kg mgřq `ř cwiři Aev`ř Rřřřř Ařak dñj dñj řř Ařak Drcv`b Kiv mře nřj| D`P dj bķj Rřřřř Přl I bZř bZř cřřřř e`evřřři dřj řeMZ KřřK ermři Ařakřsk dñřj iB Drcv`b AřřKřřřk eřřř řcřřřřř Křř RbmsL`v eřřřř i` K řeřřřřř Ařřřř Kul.cřY`i Drcv`b řm Zřybq evřřřb, Zřb G NřUřZ cřřřři Rb` Ařakřsk Kul.cY`B Ařřřř`i řeř`k nřZ Ařřř`řb KiřZ nq|

cřqvřřbi Zjybq Ařřřř Kř cwiqvřY Kul.RřZ cY` Drcv`b Kři Ges KZUKřNřUřZ ev Dřřř; Zři cwiřsL`řb řbřřřř(QK - 1) ř`qv nřřřř:

QK - 1 t Kul.cřY`i cřqvřřb, Drcv`b I NřUřZ ev Dřřřř; cwiqvřY (1992-93) [řřřřř řKřř]

cřY`i bvg	cřqvřřb**	Drcv`b	NřUřZ (-) ev Dřřř; (+)	Ařř`řb/iřřb (%)
avř	1,83,71,000	1,8341,000	-30,000	0.16
Mğ	22,09,000	11,76,000	-10,33,000	46.76
řPřb	8,23,700	7,50,700	-73,000	8.86
Wřj *	5,76,000	5,19,000	-57,000	10.00
`Zj *	4,11,395	1,52,295	-2,59,100	62.98
gkj v	3,10,750	3,02,000	-8750	2.82
řMř Ařj y	13,85,060	13,84,000	-1060	0.80
Zřv	16,785	16,777	-8	0.05
křKřřř	12,61,929	11,98,000	-63,929	5.06
Př	21,180	50,800	+ 29,620	58.30
cvř	4,85,004	9,17,986	+4,32,982	47.17
ZřřřK	34,917	36,000	+1,083	3.00

(Drm: Kul.WřBři, 1996; ře.ře.Gm. 1994)

\* Wřj I `Zj i řřřřř 1991-92 mřbi cwiřsL`řb ř`qv nřřřřř|

\*\* cřqvřřb = Drcv`b + NřUřZ; řh cwiqvř cY` Ařř`řb ev iřřb Kiv nq Zřvřb NřUřZ ev Dřřř; ř`Lvřřř nřřřřř|

Dcti i QK ntZ t`Lv hrvq eivj vt`tk avb Drcbæq 183.41 j 97 Ub Ges c0qvRb 183.71 j 97 Ub| G intmte NvUwZi cwi gvY 30 nRvi Ub| Zte Lv` intmte avtbi (Prj) cwi etZ` Avgiv teik Kti Mg Avg`mb Kti \_wK| t`tk eZ9vrb 11.76 j 97 Ub Mg Drcbæq Ges wef`k ntZ Avg`mb Kiv nq 10.33 j 97 Ub hv tgvU c0qvRtbi 47 kZvsk| t`tk Mtgi tgvU c0qvRb 22.09 j 97 Ub| t`tk wPibi c0qvRb c0q 8.24 j 97 Ub Ges Drcbæq c0q 7.51 j 97 Ub| c0qvRbxq evKx 73 nRvi Ub wPib wef`k ntZ Avg`mb Kti Af`šli xY Pwn`v tgvUfZ nq A\_ŕ Pwn`vi c0q 81 kZvsk wPib Avgiv DrcbæKwi |

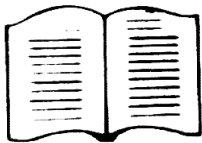
t`tk Wrtj i Drcv`b 5.19 j 97 Ub A\_P Avgv`i c0qvRb 5.76 j 97 Ub| eZ9vrb t`tk Wrtj i NvUwZ 57 nRvi Ub| G NvUwZ tgvU c0qvRtbi 10 kZvsk| `Zj exR ntZ Avgiv th `Zj cvB (`Zj exR 33% `Zj ati intmte Kiv ntq0) Gi cwi gvY c0q 1.53 j 97 Ub| wKŠ` Avgv`i c0qvRb Gi tPtq AtbK teik A\_ŕ c0q 4.12 j 97 Ub| `Ztj i NvUwZ 2.59 j 97 Ub hv Avgiv wef`k ntZ Avg`mb Kti \_wK Ges Gi cwi gvY c0qvRtbi c0q 63 kZvsk| Avgv`i c0qvRbxq Kul.cŕY`i gta` `Ztj i NvUwZB mefPtq teik|

gkjv, tMj Avj ykvKmwâ BZ`w`i c0qvRb h\_vµtg 3.12, 13.85 Ges 12.62 j 97 Ub Ges Avgv`i t`tk Gf`i Drcv`tbi cwi gvY h\_vµtg 3.02, 13.84 Ges 11.98 j 97 Ub| th mKj Kul.cY` Drcv`tbi NvUwZ AvtQ tm,tjv Avg`mb Kti t`tki Af`šli xY Pwn`v tgvUfZ nq| c0qvRtbi Zjybvq wefbaeKul.cŕY`i NvUwZi cwi gvY kZKiv 0.05–62.98 fVM|

Prtqi evrmi K Drcv`b 50.8 nRvi Ub| G Drcv`b t`tk Af`šli xY Pwn`v wgvUtg Avgiv 29.62 nRvi Ub wef`tk i Bmb Kti \_wK hv tgvU Drcv`tbi 58.3 kZvsk|

Avgv`i me Kul.cŕY`iB th Drcv`tbi NvUwZ itqtQ Zv bq eis tKvb tKvb cY` Avgiv c0qvRtbi Zjybvq AtbK teik DrcbæKti \_wK| G t97t1 Pr, cvU Ges Zvgv`Ki bvg DjtL Kiv thtZ cvti | Prtqi evrmi K Drcv`b 50.8 nRvi Ub| G Drcv`b t`tk Af`šli xY Pwn`v wgvUtg Avgiv 29.62 nRvi Ub wef`tk i Bmb Kti \_wK hv tgvU Drcv`tbi 58.3 kZvsk| t`tk cvtUi tgvU Drcv`b c0q 9.18 j 97 Ub Ges GLvb ntZ c0q 4.33 Ub wef`tk i Bmb Kiv ntq \_vtK Ges GUV tgvU Drcv`tbi 47.17 kZvsk| eZ9vrb t`tk c0qvRtbi tPtq 1 nRvi Ub teik Zvgv`K Drcbæq|

Zvgv`Ki tgvU Drcv`b 36.00 nRvi Ub Ges c0qvRb 34.92 nRvi Ub| Drcw`Z AwZwi<sup>3</sup> GK nRvi Ub Zvgv`K Avgiv wef`tk i Bmb Kti \_wK hv tgvU Drcv`tbi wZb kZvsk| Drcw`Z Kul.cŕY`i gta` kZKiv intmte Pr-B Avgiv teik i Bmb Kti \_wK| Af`šli xY Pwn`v wgvUtg eZ9vrb Pr, cvU I Zvgv`Ki t97t1 D0tEji cwi gvY h\_vµtg 58.3, 47.2 Ges 3 kZvsk |



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eivj vt`tki c0vb c0vb Kul.cY` ntjv avb, Mg, wPib, Wvj, `Zj RvZxq km` (`Zj), gkjv, tMj Avj yZjv, kvKmwâ, Pr, cvU Ges Zvgv`K| Pr, cvU I Zvgv`K e`Zix Ab` me,tjv cY`B Gf`tk c0qvRtbi Zjybvq Kg Drcbæq| Pr, cvU I Zvgv`K Drcv`tbi t97t1 D0tEji cwi gvY h\_vµtg 58.3, 47.2 Ges 3.0 kZvsk|





### Pavšl gj'iqb

#### msiŋB I iPbvqj-K cĕæ

- 1| Kul.hmšĕKxKiY ej ěZ Kx ejŠb ?
- 2| evsj vĕ ěk ěKvb aiěYi hmšĕKxKiY cĕqvRb Ges ěKb ?
- 3| evsj vĕ ěk Kul.i ěKvb ěKvb ěŋěě hmšĕKxKiY mæe ?
- 4| evsj vĕ ěk Kul.hmšĕKxKiěYi cĕqvRbvqZv Avěj vPbv Kiĵ|
- 5| gvV dmj Drcv ěb Pvl I Rvq mgvb Kivi newfbahšĕmZi bvg vj Lĵ |
- 6| nva-gjMi Lvgti vWg dĕĕĕbvi hšĕmZi Zvj Kv cĕZ Kiĵ|
- 7| grm Lvgti e'eüZ newfbahšĕmZi bvg vj Lĵ|
- 8| newfbatmP I eb'v vbqšĵ cĕĕěi i bvg vj Lĵ Ges M½v KĕcvZvŋ cĕĕěi eYĕv v' b|
- 9| Dĕi e½ Mfxi bj Kz cĕĕěi i weei Y v' b|
- 10| th mKj cY' vĕ ěk nĕZ Avg`vb Kiv nq Zvĕ' i GKvU Zvj Kv cĕZ Kiĵ|
- 11| 1992-93 mĕb evsj vĕ ěk cĕvb th cĕvU Kul.cY' Avg`vb Kĕĕĕ Zvi cwi gvY Dĕĵ ě Kiĵ|
- 12| cwi gvYmn 1992-93 mĕb i BvbKZ.cĕvb cĕvb cĕY'i bvg vj Lĵ |
- 13| evsj vĕ ěk Lv' ěkĕm'i Drcv`b mĕšĕl RbK bq ěKb?
- 14| evsj vĕ ěk Lv' ěk m' Drcv`ĕbi aviv Kx i Kg?
- 15| Af`šĕxY gŷ Rj vĕĕq gvĕQi cwi gvY Kĕg hvĕ'Q ěKb?
- 16| ě ěk gvsm, `ŷ I vWg Drcv`b evx'i Kivi Kx?
- 17| evsj vĕ ěki cĕvb cĕvb Kul.cĕY'i bvg vj Lĵ |
- 18| evsj vĕ ěk ěKvb&cY' Kx cwi gvY Drcbvq Zvi cwi gvY Dĕĵ ě Kiĵ|
- 19| evsj vĕ ěk ěKvb&cY' Kx cwi gvY cĕqvRb Zvi weei Y v' b|
- 20| evsj vĕ ěk ěKvb&cY' cĕqvRĕbi Zjybq KZ kZvsk NvUvZ ev Dĕĕ; Zvi Zvj Kv v' b|



**DĖi gij v**

**cW 3.1:**

1| K 2| L 3| M 4| N 5| L 6| K 7| M

**cW 3.2:**

1| L 2| L 3| K 4| L 5| K 6| L

**cW 3.3:**

1| M 2| L 3| N 4| K 5| M 6| K

**cW 3.4:**

1| K 2| L 3| M 4| M 5| N 6| M

**cW 3.5:**

1| L 2| M 3| K 4| L 5| N 6| N 7| K

**BDibU 1  
cwi tek I  
Btkumt ÷ g**

**BDibU 1 cwi tek I Btkumt ÷ g**

cw<sub>1</sub> extZ cōZiU Rxei Rxeb aritYi Rb<sup>o</sup> Piv chfß Lv<sup>o</sup>, Dchÿ eim<sup>o</sup>vb Ges<sup>o</sup> Q  
cwi cwiK<sup>o</sup>RZv/ mÿg I cwi igZ Lv<sup>o</sup> Qvov Rxeþi MuzgqZv thgb eRvq<sub>1</sub> vtK bv, tZgub  
Dchÿ Avtjv-evZvm cwi gUJZ Ges<sup>o</sup> r<sup>o</sup>m<sup>o</sup>ÿZ eim<sup>o</sup>vb Qvovl Rxeþi Av<sup>o</sup>Z; A<sub>1</sub>ñb/  
RxebþK mPj ivLvi Rb<sup>o</sup> Gme WQb cZ<sup>o</sup>¶ ev ctiv¶fite Rxei I ci uqvKxj | Avi G<sup>o</sup>i  
vbtqB Rxei cwi tek | mÿzivs mvari Yfvte cōZubqZ thme tFßZ i vmvqubK Ae<sup>o</sup>v RxeKj þK  
cf<sup>o</sup>meZ Ki tQ ZvB n<sup>o</sup>Q Rxei cwi tek |

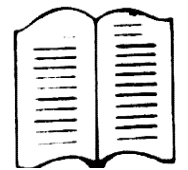
cōg mKj cōKuzK cwi tekþK D<sup>o</sup>¶ I cōYxþK GKw<sup>o</sup>fZ n<sup>o</sup>q eim Ki tZ t<sup>o</sup>Lv hvq | Awegk<sup>a</sup>  
Rxe wntmte eim Kivi cōYZv tbB ej þj B Pj | tKvb eim<sup>o</sup>vb wewfbæcRmZi Rxiemþni  
mgwōMZfvte Ae<sup>o</sup>vbþK Rxe-m<sup>o</sup>u<sup>o</sup>vq ej | GB Ae<sup>o</sup>vbþi gra<sup>o</sup>tg Rxe-RMZ cwi tekþK Ges  
cwi tek Rxe-RMZþK bvbvfvte cf<sup>o</sup>meZ Ki tQ | mÿzivs Rxe I cwi tekþi m<sup>o</sup>úK<sup>o</sup>AZ<sup>o</sup>š  
vboeo |

G BDibU cwi tek m<sup>o</sup>úK<sup>o</sup> avi Yv, cwi tekþi Dcv<sup>o</sup>vb, Btkumt ÷ tgi msÁv, D<sup>o</sup>¶, cōYx I  
Btkumt ÷ g, wewfbæaitþi Btkumt ÷ g, cwi tekþi Dci D<sup>o</sup>¶ I ebrqþbi cf<sup>o</sup>ve, evsj vt<sup>o</sup>þki  
cwi tek b<sup>o</sup>uz I cwi tekMZ Ae<sup>o</sup>v, Ges evsj vt<sup>o</sup>þki Kul. cwi tek AÁj mgþni cwi wPuz  
m<sup>o</sup>úK<sup>o</sup> e<sup>o</sup>ñwi Z Avtj vPbv Kiv n<sup>o</sup>q tQ |

**cw 1.1 cwi tek m<sup>o</sup>úK<sup>o</sup> avi Yv, cwi tekþi Dcv<sup>o</sup>vb**



- G cvl tkþl Avciob –
- ◆ cwi tek m<sup>o</sup>úK<sup>o</sup> ej tZ cvi teb |
  - ◆ cwi tek wéÁvþbi msÁv ej tZ I wj LtZ cvi teb |
  - ◆ cwi tekþi Dcv<sup>o</sup>vb m<sup>o</sup>úK<sup>o</sup> Avtj vPbv Ki tZ cvi teb |



wéÁvþbi th kvLv Rxei  
cwi cwiK<sup>o</sup>RZvi m<sup>o</sup>v<sub>1</sub> RxeKþj i  
cōZiU cvi<sup>o</sup>ñwi K uqv<sup>o</sup>-wew<sup>o</sup>qv<sup>o</sup>  
vbtq wék<sup>o</sup>fvte Avtj vPbv Kþi  
ZvB cwi tek wéÁvþ |

**cwi tekþi avi Yv**  
cwi tek K<sub>1</sub>uU euj fvte e<sup>o</sup>üZ, thgbt mgw<sup>o</sup>RK cwi tek, m<sup>o</sup>v<sup>o</sup>uzK cwi tek, w<sup>o</sup>¶v<sup>o</sup>þþi  
cwi tek, ivR<sup>o</sup>ñwZK cwi tek BZ<sup>o</sup>ñ<sup>o</sup> Avi I AtþK cwi tek | Zte cwi tek wéÁvþ Rxe  
wéÁvþbiB GKw<sup>o</sup> Atc<sup>o</sup>¶vKZ. bZb I Av<sup>o</sup>þKZg msKj b thLvþ Rxei m<sup>o</sup>v<sub>1</sub> Zvi  
cwi cwiK<sup>o</sup>RZv vbtq Avtj vPbv Kiv nq | wéÁvþbi th kvLv Rxei cwi cwiK<sup>o</sup>RZvi m<sup>o</sup>v<sub>1</sub> RxeKþj i  
cōZiU cvi<sup>o</sup>ñwi K uqv<sup>o</sup>-wew<sup>o</sup>qv<sup>o</sup> vbtq wék<sup>o</sup>fvte Avtj vPbv Kþi ZvB cwi tek wéÁvþ | cwi tekþi  
m<sup>o</sup>v<sub>1</sub> cōYxRMþZi m<sup>o</sup>úK<sup>o</sup> vbtq Avtj wPZ w<sup>o</sup>vtK BþKij wR (Ecology) ej v nq |

wewfbæmg<sup>o</sup>tg wewfbæcwi tek wéÁvþx cwi tekþi bvbwea msÁv w<sup>o</sup>tg<sup>o</sup>Qb | hvi Drcw<sup>o</sup>E I w<sup>o</sup>ñZ  
e<sup>o</sup>vck w<sup>o</sup>avq<sup>o</sup> t<sup>o</sup> cwi m<sup>o</sup>ñi Avtj vPbv m<sup>o</sup>e bq | Zte euj cōv<sup>o</sup>j Z I mgv<sup>o</sup>Z KtqKw<sup>o</sup> msÁv  
GLvþb t<sup>o</sup> I qv tMj |

**cwi tek wéÁvþbi msÁv**

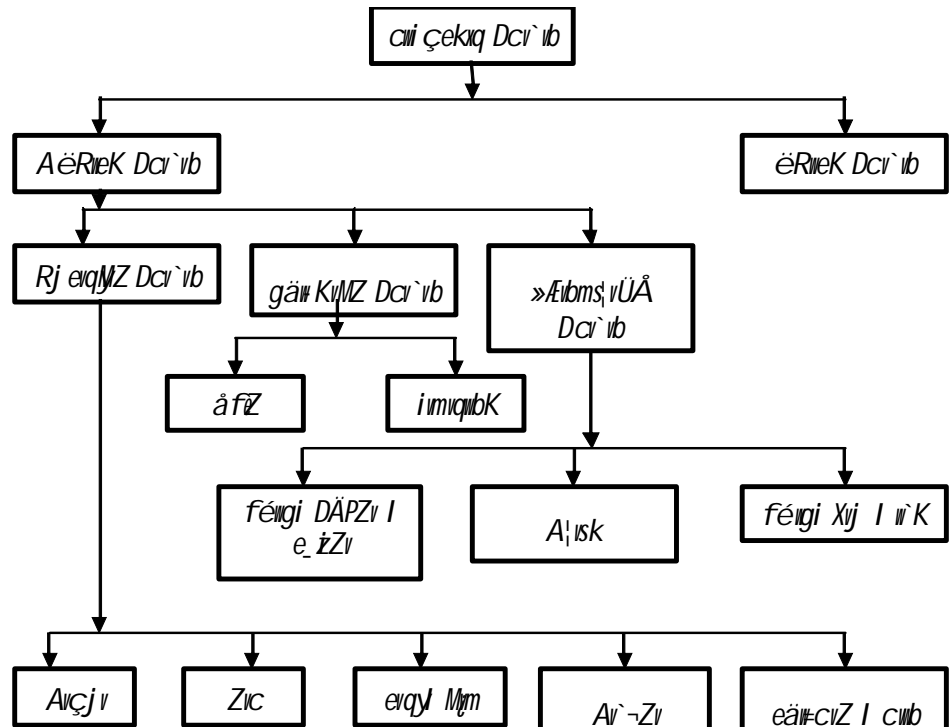
- (1) 'Re I A%Re cwi tetki mvt\_ c0Yxi Abwej m=úK#KB cwi tek weÁvb etj, — **tn#Kj, 1869** |
- (2) cwi tetki mvt\_ Rxei m=úK@btq th weÁvb AbyÜvb Pjy vq ZvB cwi tek weÁvb | GiU Ávtbi Ggb GKUW `k0 thLvfb RxeRMZ#K c0KwZK c0µqvi Avtj vtK e'vL'v Kiv nq — **DWewi, 1955** |
- (3) RxeK tji c0Pz® I we'li m=úuKZ mybw'ó MtelYvB cwi tek weÁvb — **GiÜqy\_®, 1961** |
- (4) cwi tek weÁvb nt"Q cwi tetki Avštµµqwi i Aa"qb hv Rxei we'li, Drcv`b c0Pz® Avfe"v³ ubqšy Kti Ges gljz mrvab Kti — **tcUWm, 1968** |
- (5) cKwzi MVb I Kvhfej x m=útK®Aa"qbB nt"Q cwi tek weÁvb — **I Wvg, 1971** |
- (6) Rxei c0Pz® eÈb ubYqKvi x Avštµµqwi i weÁvbwfiEK ch#j vPbvB nt"Q cwi tek weÁvb — **tµe, 1972** |

Avgt`i Pvi cvtk hv wKQ  
AvtQ Ges hv wKQ® Avgt`i  
RxebavtK cZ`¶ ev  
ctiv¶fite cfmEZ Kti ZvB  
Avgt`i cwi tek |

Dctiv³ msÁv\_ tji mvi mst¶c Kij hv `wvq Zv nt"Q, Avgt`i Pvi cvtk hv wKQyAvtQ Ges hv wKQ® Avgt`i RxebavtK cZ`¶ ev ctiv¶fite cfmEZ Kti ZvB Avgt`i cwi tek |

**cwi tetki Dcv`vb**

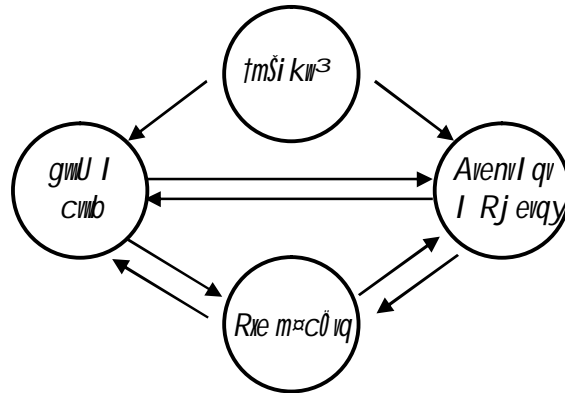
mvari Yfite cwi tek ejtZ Rxei cwi cvk# Ae`vtKB ešvq | Zte cwi tek Avtj GKU RvUj cxwZ hv eúnea Dcv`vtbi mgwó ubtq MwZ | eww`K th mKj e'`ev Dcv`vb Rxe#K wNti ti#L#Q Ges hv Rxe#K Zvi weKvk I we`ti cfmEZ Kti ZvB cwi tetki Dcv`vb | GB Dcv`vb\_ tji mRxe I Ro DfqweaB ntZ cvti | cwi tetki tgšij K Dcv`vbmgn#K cieZx` c0vq Q#K t`Lvfbv ntj v |



cwi tētki tKvb GKwU  
Dcr`vbi Zvi Zg` NUtj  
Ab` Dcr`vbi μμqvKvŪl  
ZvŪv v cŕveZ nq|

**cwi tētki Dcr`vbmgtjni Avštūμqv**

cŪKwZK cwi tētk mekI tKvb GKK Dcr`vbi tPtq Dcr`vbmgtjni mgwŪMZ cŕve Rktei Dci teik Ae`vb ivtL| Gi KviY GB th, Dcr`vb tjtj v ci`ūtii mŕt\_ I ZtŪZ fŕte mμū<sup>3</sup>| cwi tētki tKvb GKwU Dcr`vbi Zvi Zg` NUtj Ab` Dcr`vbi μμqvKvŪl ZvŪv v cŕveZ nq| cwi tēk meÁvbi fŕlvq hv Holocoenotic cŕve etj L`vZ| thgbt mhŕjt vŕKi cŪli Zv evotj Dŕmŕ`i cŪ`^b nvi epμ cvq| cŪ`^b nvi evotj mecvKxq KvR cŕveZ nq BZ`w`|



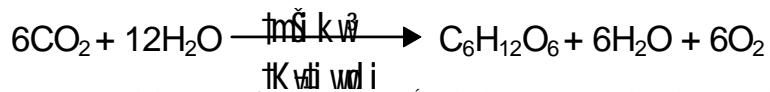
μPĪ- 1.1 -1: cwi tētki Dcr`vbmgtjni Avštūμqv

weŕfbœcwi tēk meÁvbx cwi tētki Dcr`vbmZ tkŪYweb`vm weŕfbœfŕte w`tq \_vKtj I Awakvstki gtZ Pvi Ūl fŕtMi Dci B cŪarb` t`qv ntq \_vŕK|

**1| Rj evqyZ Dcr`vb**

(K) **Avtj v t G** cvl exZ cŪ`ŕŕ ev ctivŕŕfŕte RiebŕK KŪhŕi ivLvi Rb` mKj kw<sup>3</sup>i Dŕm tmšī kw<sup>3</sup>| meŕ Dŕmŕ cŪ` tKŕi vŕdŕtj i mŕvŕth` th cŪμqv i gŕa`tg Avtj vKkw<sup>3</sup> tkvl Y Kŕi i vŕvqubK kw<sup>3</sup>tZ cwi YZ Kŕi Ges kKŕvRvZxq Lv` Drcr`b Kŕi ZŕtK mŕtj vK-mstkd Y etj |

meŕ Dŕmŕ cŪ`  
tKŕi vŕdŕtj i mŕvŕth` th  
cŪμqv i gŕa`tg Avtj vKkw<sup>3</sup>  
tkvl Y Kŕi i vŕvqubK kw<sup>3</sup>tZ  
cwi YZ Kŕi Ges kKŕvRvZxq  
Lv` Drcr`b Kŕi ZŕtK  
mŕtj vK-mstkd Y etj |



mŕtj vK-mstkd Y weŕRZ Dŕmŕ`i Av`Zi thgb Kŕi vŕ hŕq vŕ, tZgub Dŕmŕ Qvov Ab` cŪYxi Rieb avi Yl cŪq Amœ| Avi GmeB nt`Q Avtj vK kw<sup>3</sup>i cŕŕbqšŕY| mŕtj vK-mstkd-Y Qvovl Dŕmŕ`i MVb, AvKwZ, cŪweb`vm, cvZvi cŕyŕ; tKŕi vŕdŕtj i cwi gŕY, cŪ`^b, cŕŕvqub Ges Avi l eŪnea `RŕeK Kŕhŕej x Avtj v Ūv v msNŪZ ev cŕveZ nq| cvl exZ cvZZ Avtj vK i wŕŕi ZŕeZv l `vqxZ; FZŕf`, Aŕŕvsk, fŕgi Xvj l w`K, evqŕŪtj i `QZv, Av`Zv, Kŕvkv, tgN BZ`w` DcKi Y Ūv v cŕveZ nq| th mKj Dŕmŕ Zŕe<sup>3</sup> Avtj vZ fŕj Rŕbŕ (thgbt avb, cvŪ, Mg, Avg, Zj v BZ`w`) Zŕ`i tK **Avtj v cŪ`Kwi Dŕmŕ** ev **tnuj l dŕBU** etj | Aveŕi th mKj Dŕmŕ Qvqŕŕ `vŕb Rbŕŕbv cŪ` Kŕi (thgbt dvŕ<sup>3</sup>cvb, etŕi wœŕŕi i j Zv jŕ BZ`w`) Zŕ`i tK **Qvqv cŪ`Kwi Dŕmŕ** ev **mŕl dŕBum** etj |

tetP \_vKvi Rb" mKj  
 Dm"t`i GKUW mtePP kmY  
 (Maximum), cwiugZ  
 (Optimum) I mebb<sup>3</sup>  
 (Minimum) ZvcgvIv  
 itqtQ, hvfK **KuWbuj**  
**ZvcgvIv** ejv nq/

(L) **ZvcgvIv t Dm"t`i** ep<sup>x</sup> I meKvK ZvcgvIv AZ"sl, iZcy<sup>3</sup>figKv cij b Kti \_vtK| mKj mecvKxq Kvhpig, thgbt mvtj vK-mstkdY, kmb, cwi tkvLY, A<sup>1</sup>/<sub>2</sub>zi v Mg, c<sup>0</sup>-^b, Awfmeb BZ"ww cwi tekxq ZvcgvIv 0v v ubqwsZ| ZvcgvIv Kg ev teik ntj mecvKxq Kvhpig xi Dci Zvr<sup>3</sup>qWYK cZ<sup>3</sup>muqv t Lv t`q| tetP \_vKvi Rb" mKj Dm"t`i GKUW mtePP kmY (Maximum), cwiugZ (Optimum) I mebb<sup>3</sup> (Minimum) ZvcgvIv itqtQ, hvfK **KuWbuj ZvcgvIv** ejv nq| tKvb Avevm`tj Dm"t`i me`lz Zvi KuWbuj Zvc 0v v ubqwsZ| thgbt avb MtQi AwfthvRb mtePP 40° tm. Ges mebb<sup>3</sup> 5° tm. ZvcgvIvi gta" mvgv<sup>x</sup> wKs' cwiugZ ev Abkj ZvcgvIv 20-30° tm. Gi gta"| ZvB Dm"t`i tft<sup>3</sup>Muj K me`lz ZvcgvIvi Dci euj vstK wbfPkj| ZvcgvIvi Zvi Ztg`i Dci wbfP Kti Dm"t` mg ntK PviuW tkWytZ fivM Kiv hvq t

- (1) **tgMv<sup>3</sup>ug** th mKj Dm"t` AwZ D`P ZvcgvIv m<sup>3</sup>ub<sup>3</sup>AA`tj RbWq|
- (2) **tgtmv<sup>3</sup>ug**- Giv gj-Z Dò c<sup>3</sup>vb AA`tj i Dm"t`| Zte evrmiK FZzf` Atc<sup>3</sup>qvKZ.Kg DòZvI mn" Ki tZ cvti|
- (3) **gvBt<sup>3</sup>uv<sup>3</sup>ug**- Giv bwiZkvtZvò AA`tj i Dm"t` etj eQtii teiki fivM mgqB Atc<sup>3</sup>qvKZ Kg DòZvI mn" Ki tZ cvti|
- (4) **tnuKt<sup>3</sup>v<sup>3</sup>ug** Giv tgiyAA`tj i Dm"t`, mvi v eQi ub<sup>3</sup>reZvcgvIv mnbkxj|



**Abkxj b (Activity) t** Avtjv I ZvcgvIvi Dci wfmE Kti Dm"t`i t ktiWieb`vm Kily| Avcbri cwi wPZ Dm"t` tjt vtK Duj mLZ tkWieb`vfm wef<sup>3</sup> Kily|

evqjZ Aew`Z CO<sub>2</sub> M`im  
 Dm"t`i mvtj vK-mstkdY i  
 Rb" AwZ c<sup>3</sup>qvRbxq Dcv`vb|  
 Zte Gi gvIwZwi<sup>3</sup> ep<sup>x</sup> Mib  
 nivDR cZ<sup>3</sup>muqv NUvtbri Rb"  
 `vqx|

(M) **evqyt** evqyc<sup>3</sup>evn cZ"q I ctiv<sup>3</sup>qfite Dm"t`i ep<sup>x</sup> I me`lz c<sup>3</sup>fwieZ Kti| AtbK Dm"t`i exR GK`vb ntZ Ab"v`tb evqy0v v `vbs<sup>3</sup>ti Z ntq Dm"t`i esk me`li NUvq| eù Dm"t`i c<sup>3</sup>ivMiqY evqy gva`tg ntq \_vtK| g<sup>3</sup>evqjZ Dm"t`i c<sup>0</sup>-^b nri Kg| wKs' c<sup>3</sup>ej evqjZ Zv ep<sup>x</sup> tctq Dm"t`i cwiBi Pwv`v emotq tZvtj| c<sup>3</sup>ej evqy0v v msNuUZ RuUj Zvi gta" itqtQ Dm"t`i AvKuZMZ meKwZ, tft<sup>3</sup>/<sub>2</sub> cov, NI<sup>3</sup>P<sup>3</sup>RibZ qWZmvab, fig<sup>3</sup>q BZ"ww| G Qrov eù tivtMi RxeYevqy<sup>3</sup>mnZ ntq Dm"t`i c<sup>3</sup>0Yxi tivtMi KviY NUvq| evqjZ Aew`Z CO<sub>2</sub> M`im Dm"t`i mvtj vK-mstkdY i Rb" AwZ c<sup>3</sup>qvRbxq Dcv`vb| Zte Gi gvIwZwi<sup>3</sup> ep<sup>x</sup> Mib nivDR cZ<sup>3</sup>muqv NUvtbri Rb" `vqx|

(N) **evqy Av`Zv t** evqy Rj xq Av`ZvtK Avtcv<sup>3</sup>qK Av`Zv wntmte cKvk Kiv nq| tKvb evqjZ Aew`Z Rj xq-ev<sup>3</sup>ú i eZ<sup>3</sup>vb Ae`v Ges GKB evqym<sup>3</sup>ú<sup>3</sup> ntj KZUkzRj xq ev<sup>3</sup>ú aviY qWZv ivtL Zvi AbqvZtK Avtcv<sup>3</sup>qK Av`Zv etj| Avtcv<sup>3</sup>qK Av`Zv kZKiv wntmte cKvk Kiv nq| evqy0vtj i DòZv Kg-teiki mvt\_ Avtcv<sup>3</sup>qK Av`ZvI Kg-teik nq| DòZv evotj Avtcv<sup>3</sup>qK Av`Zv Ktg| Avevi DòZv Kgtj Avtcv<sup>3</sup>qK Av`Zv ep<sup>x</sup> cvq|

Avtcv<sup>3</sup>qK Av`Zv Dm"t`i  
 c<sup>0</sup>-^b nri ubqsy Kti etj  
 tKvb& AA`tj Kx aitbi Dm"t`  
 RbWte Zv tm AA`tj i Avtcv<sup>3</sup>qK  
 Av`Zvi I ci euj vstK  
 wbfPkj|

Avtcv<sup>3</sup>qK Av`Zv Dm"t`i c<sup>0</sup>-^b nri ubqsy Kti etj tKvb&AA`tj Kx aitbi Dm"t` RbWte Zv tm AA`tj i Avtcv<sup>3</sup>qK Av`Zvi Dci euj vstK wbfPkj| AtbK Dm"t` AvtQ hviv i<sup>3</sup> AveniI qvq mste`bkxj wKs' Av`<sup>3</sup>AveniI qvq mntRB RbWtZ cvti| Gt` itK **mBtMchBUM** etj| thgbt iv`te tXwKvK BZ"ww|

(0) **epocvZ I cwb t Dwt`c** Rxeft cwnbi , iZ; Acwixq | Dwt`c i kvixieFqx hveZixq KvhFq cwnbi gva`tgB msNiuZ nq | cwb mtvj vK-mstkdY c`uqv Ab`Zg Dcv`vb | cwnbi AeZgvtb Dwt`c i Lv` Drcv`b c`uqv Pj tZ cvti bv | Avi Lv` Drcv`b Qvov Dwt`c i tetP vKvi K\_vB fiev hvq bv | GKvi tYB cwi tekixq Ab`vb` Dcv`vb Atc`qv fct`o Dwt`c we`fti i t`q`T cwnbi Zvrch`A`bK tenk |

tKvb `vtb Dwt`c i aib, weKvk, we`lz, BZ`w` ubfP Kti tm AA`tj epocvZ I cwnbi clc`Zvi lci |

tKvb `vtb Dwt`c i aib, weKvk, we`lz, BZ`w` ubfP Kti tm AA`tj epocvZ I cwnbi clc`Zvi Dci | Avevi tKvb Gj vKvq epocvZi cwi gvY ubfP Kti A`bKuv D<sup>3</sup> Gj vKv mvti i KZUv ubKueZP, mvti t`tk fugi w`tk c`vwnZ evqj MvZavv, evqjZ Rjixq evt`ui c`P`Zv, A`qvsk BZ`w` i Dci | ubi`qv AA`tj epocvZi cwi gvY me`aK, c`qvsti tgi`A`tj i epocvZ me`b`p

Dwt`c evm`vtb epocvZi cwi gvY I cwnbi clc`Zvi Dci ubfP Kti Dwt`c tK PviuU c`vb tkiv`Z wef<sup>3</sup> Kiv hvq t

(1) **RjR Dwt`c (Hydrophytes)** t th mKj Dwt`c RjR cwi tetk AvsukK ev me mgq RweKv ubefn Kti Zvt`i`K **RjR Dwt`c** etj | Giv ubgvi`Z ev fvmgvb, g` ev t`v`ive`x n`Z cvti, thgt KP`zcvb, nvBm`v, tkIjv, kvcv BZ`w` | DfPi Dwt`c I RjR Dwt`c i tMv`T`B cto, thgt Kjgx kvK Gt`i gj-KvU m`v`vZ bq | Avf`m`b PvcI L`y Kg |

(2) **maviY Dwt`c (Mesophytes)** t th mKj Dwt`c gvUtZ cwi`gZ cwb vKv Ae`vq Rtb` Zvt`i`K **maviY Dwt`c** etj | Gt`i Rxeb avit`Yi Rb` c`P` epocvZ I bmvZkx`Zv` Rjevqj c`uqvRb | Gt`i Rb` Rjve`xZv I jeYv<sup>3</sup>Zv tKv`v`v mnbxq bq, thgt Mg, mvi Iv, Avg, Rvg, Kv`vj BZ`w` | Gt`i gj-, KvU, kvLv-c`kvLv m`v`vZ | Avf`thvRb Pvc `v`f`meK |

(3) **giR Dwt`c (Xerophytes)** t th mKj Dwt`c i`c gvUtZ A`ev L`y Kg epocvZ m`ub`e AA`tj Rtb` Zvt`i`K **giR Dwt`c** etj | Kg epocvZ m`ub`e GvKvq Rtb` etj Avakisk t`q`T`B Gt`i cvZv, KvU, gj-, Af`stixY I kvixieFqx t`q`T` c`P` i/cvsti n`q `vtK | Gt`i D`vniY n`q` - d`v`gbmv, K`vKvum, Ki`e, tLRj, SvD, N`Z Kgvix BZ`w` |

tRvqv fivv metaS`Z mgv ZxieZP G aitbi Dwt`c tK gvbtM`f Dwt`c etj, thgt ersj vt`ki `v`Yv`A`tj m`y`ietbi m`y`ix, Movb, tMI qv, tMj cvZv BZ`w` |

(4) **tjvov gvUj Dwt`c (Halophytes)** t th mKj Dwt`c jeYv<sup>3</sup> cwb ev gvUtZ Rtb` Zvt`i`K **tjvov gvUj Dwt`c** etj | G mKj Dwt`c i cvZv c`qB imvtjv Ges fMf`v` gj-t`tk gvUj Dcti Lvov`vte k`m-gj-t`Lv hvq | Avakisk t`q`T`B RivqjR-A`v`zi v`Mg NtU Ges D`P Avf`m`b Pvc we`gvb | tRvqv fivv metaS`Z mgv` ZxieZP G aitbi Dwt`c tK **gvbtM`f Dwt`c** etj, thgt ersj vt`ki `v`Yv`A`tj m`y`ietbi m`y`ix, Movb, tMI qv, tMj cvZv BZ`w` |



**Abyj b (Activity)** t cwnbi jet`Yi Dcv`wZ Abyqvx ersj vt`ki A`%omZKfite , i`az`c`v` Dwt`c mgn`K tkiv`web`vm Ki`ab |

2 | **gv`EKvMZ Dcv`vb**

cwi teta ki gwEKMZ Dcv`vbi gta` itqtQ gwLi tFSZ I imvqubK „Yvej x| gwLi Mvb, eby BZ`w` tFSZ „Yvej x Ges gwLi A=Z; ¶vi Z; jeYv<sup>3</sup>Zv, Lv` Dcv`vb BZ`w` imvqubK Dcv`vb Øviv Dw`m` i eaB, meKik I me`bz euj fite cfwmeZ| gwLi cwb avi Y¶gZv Zvi tFSZ „Yvej xi Dci wbf¶kxj | Acict¶¶ Dw`m` i Lv` mieivtni cwi gvY gwLi imvqubK „Yvej xi Dci wbf¶kxj | ZvB me gwUtZB me Dw`m` fij Rtb¶bv thgbt fwi gwU avb P¶tli Rb` Dc¶hMx, Aci w`tk nij Kv t`v-Atk gwU AvL, Mg, mwi Lv, BZ`w` P¶tli Rb` Dch¶ etj wetePZ|

3/ **vb mspvš/Dcv`vb**

vb mspvš/Dcv`vbi gta` itqtQ

(K) figi D`PZv I eÜZv

(L) A¶isk Ges

(M) figi Xij I w`K|

(K) **figi D`PZv I eÜZv t** mimi-cp t\_¶K fig KZ D`PZvq Aew`Z A\_ev figi Dcwi fvtMi eÜyZvi aib Dw`m` Rieb¶K cfwmeZ Kti | Kvi Y G Øviv Avtjv I cwb ctc`Zv Ges `vbxq Rj evqyeuj istk wbf¶kxj |

(L) **A¶isk t A¶istki** Ae`vb, `vbxq Rj evqyZvcgv¶v, epocvZ, Avtjvi cwi gvY BZ`w` Avenl qvMZ Dcv`vbi wbf`RK Ges Gme¶KQØviv B Dw`m` I cØYi me`li cfwmeZ nq| c¶\_exi wbaeA¶istki giyAAj D`P Zvc I cwb A fite Dw`m` I cØYi emevtmi Abg¶hMx| Averi D`P A¶istki tgiyAAj Zxe<sup>3</sup>kxZ I eidRwZ Kvi¶Y emevtmi Abg¶hMx|

(M) **figi Xij I w`K t** figi Xij I w`tki cfwme Dw`m` I cØYi Dci tewk Ab¶Z nq ga` I D`P A¶istk| wbaeA¶istk Gi tZgb tkvb cfwme cwi jw¶Z nq bv| Kvi Y mh¶mri v ermi B GLv¶b j`fvte wKi Y w`tq `vtK| figi Xvtj i gv¶v GLv¶b „i¶cy, Kvi Y Xvtj i cwi gvY tewk Lvov ntj cwb avi Y ¶gZv nwm cvq| dtj Zv Dw`m` Rb¶t¶vi Rb` Ab¶j-bq|

**RieK Dcv`vb**

RieKtj i gta` cvi `umi K m¶utK¶ cfwetKB `RieK Kvi Y etj | cwi tekxq `wotKvi t\_¶K mKj cØYiB cÜ`¶ ev ctiv¶fvte G¶K A¶bi Dci wbf¶kxj | me¶ Dw`m` Lv` cÜZ c¶µqv evqy th CO<sub>2</sub> MhY Kti Zv cØYi kmbRvZ| c¶vš¶ti cØYi wbtkt¶mi mv¶\_ th O<sub>2</sub> MhY Kti Zv Dw`m` i mv¶vK-mstK-IY c¶µqv DcRvZ| c¶wZtZ Dw`m` KZ¶ e`eüZ bivBtU¶RbNwZ Lv` e`vKtUwqv I bxjvf-me¶ `kevj Øviv gwUtZ avi YKZ| ZvQvov RieKtj i gta` itqtQ m¶ut`i Rb` cÜZthwMZv, wgt\_vRvexZv, ci RvexZv, civk¶vZv, BZ`w` i gtZv Avi I A¶bK ¶µqv Kg¶v Rie m¶utK¶ Dcv`vbi B Askw¶tK|

**cvtWÈi gj`vqb 1.1**

mivK DE¶i i cvtk wUK wPý (✓) w`b|



- 1/ cW\_eitZ mKj kwi<sup>3</sup> i Dm Kx?  
 K) tmsi kwi<sup>3</sup>  
 L) Zvc kwi<sup>3</sup>  
 M) we`yr kwi<sup>3</sup>  
 N) evqykwi<sup>3</sup>
  
- 2/ Dwi<sup>m</sup> th cW\_uqvq kK<sup>3</sup>RvZxq Lv` Drcv`b Kfi Zvi big Kx?  
 K) kmb  
 L) tkvIY  
 M) mtj vK-msfk-IY  
 N) Awfmèb
  
- 3/ th mKj Dwi<sup>m</sup> Zxe<sup>3</sup>Avtj vtZ RtbZvt` i Kx etj ?  
 K) nvBtMödvBUM  
 L) tnwj I dvBUM  
 M) tnj vdvBUM  
 N) mvBtqv dvBUM
  
- 4/ th mKj Dwi<sup>m</sup> D`P ZvcgvIvq RtbZvt` i Kx etj ?  
 K) tnwkt÷v\_vg<sup>©</sup>  
 L) gvBtµv\_vg<sup>©</sup>  
 M) tgtmv\_vg<sup>©</sup>  
 N) tglv\_vg<sup>©</sup>
  
- 5/ evqj DöZv evotj Av`Zvi Kx cwi eZ<sup>8</sup> nq?  
 K) nwm cvq  
 L) ewx cvq  
 M) tKvb cwi eZ<sup>8</sup> NtU bv  
 N) nwm ewx `öUvB NtU
  
- 6/ gi R Dwi<sup>m</sup> i D`vni Y tKvbU?  
 K) nvBwvj v  
 L) my ix  
 M) Avg  
 N) K`vKUvm
  
- 7/ D`P A<sup>3</sup>vtk Ritei emem cWZKj- nevi Kvi Y Kx?  
 K) D`P ZvcI cmbi Afie  
 L) Zxe<sup>3</sup>kxZ I eid  
 M) cPz ewöcvZ I eb`v  
 N) fugi eÜzZv I Xvj
  
- 8/ gwUj cmb avi Y ¶lgZv Kxtmi Dci nbffkxj ?  
 K) tfšZ ,Yvej.xi Dci  
 L) A<sup>3</sup>Zji Dci

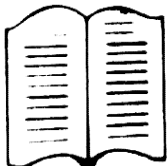
- M) i v m v q u b K ̄ Y v e j x i D c i
- N) D i r ̄ i L v ̄ m i e i v t n i D c i

**cV 1.2 B̄Kum̄ ÷ t̄gi ms̄Áv, D i r ̄, c Ū x I B̄Kum̄ ÷ g**



G c v t̄ k t̄ l A v c i b –

- ◆ B̄Kum̄ ÷ g K x Z v e j t̄ Z I u j L t̄ Z c v i t̄ e b |
- ◆ B̄Kum̄ ÷ t̄gi K v h e x u Z I D c v v b m a u t̄ K e Y b v K i t̄ Z c v i t̄ e b |
- ◆ L v ̄ - u k K j , L v ̄ - R v j I L v ̄ u c i u g W m a u t̄ K a v i Y v u t̄ Z c v i t̄ e b |
- ◆ B̄Kum̄ ÷ t̄gi i ̄ j Z t̄ j a i t̄ Z c v i t̄ e b |



t̄K v b R x e B c u e x t̄ Z A w e i g k a A e ̄ v q e v m K i t̄ Z c v t̄ i b v | c Ū g m K j R x e B G K u t̄ K Z v i c v i t̄ e k A b ̄ i r t̄ K A b ̄ v b R x t̄ e i m v t̄ m j o w e m a u t̄ K e R v q t i t̄ L P t̄ j | w e i f b a e R v t̄ Z i R x t̄ e i G i f c m g u o M Z e m e v m i u Z t̄ K **R x e - m a c Ū v q** (Community) e t̄ j | A v e r i R x e - m a u t̄ v q G e s A % R e c v i t̄ e t̄ k i g t̄ a A v s t̄ i u q v - w e i u q v o v i v G K u u A w e t̄ Q ̄ ̄ Z s̄ j e i k o m j o n q h v i b i g **B̄Kum̄ ÷ g** | G . u R . t U b m i j (1935) b v t̄ g G K R b e u k c v i t̄ e k w e Á v b x c Ū g G B k a i u e ̄ e n v i K t̄ i b | c t̄ i m k v t̄ P f b v g K G K R b i j c v i t̄ e k w e Á v b x G i e v L v c Ū v b K t̄ i b | B̄Kum̄ ÷ g n t̄ Q G K u u M u Z g q c x u Z t h L v t̄ b R x e I R o D c v v t̄ b i g t̄ a c Ū Z u b q Z u q v - w e i u q v i g v a t̄ g Z t̄ i M V b I K v t̄ h P c v i e Z b N U t̄ Q |

**B̄Kum̄ ÷ t̄gi ms̄Áv**

R x e I Z v i c v i t̄ e k u b t̄ R t̄ i g t̄ a G e s c i u t̄ i i g t̄ a u q v - w e i u q v i c x u Z t̄ K B̄Kum̄ ÷ g e t̄ j |

B. uc. I Wrtgi gtZ, Btkvmt÷g ejtZ Rxe, ckwZ I Zvt`i AvbywzK Dcv`vb,tjvi gta`  
cvi`úvi K meqvi gj- KihRi GKKtK eSvq| wKŠ, Gm. gv\_vfivb (1974) Gi gtZ, Rxe I  
Zvi cwi tek wtrt`i gta` Ges ci`úti i gta` wqv-wqv c×wZtK Btkvmt÷g etj |

**Btkvmt÷tgi Kihc×wZ**

Btkvmt÷tgi Dwtc, c0Yx I Zvt`i cwi tek i gta` c0ZwqZ m=ú` mjo I wewbgq NUtQ| GB  
c0wqitK m=ú` i **AveZB** (Cycling of materials) etj | GB AveZB c0wqv mKj kw<sup>3</sup>i  
Drm mh<sup>9</sup> GKgvI meR Dwtc tmsi kw<sup>3</sup>tK ivmqubK kw<sup>3</sup>tZ cwiYZ KitZ m9g| Gfite  
mwÁZ kw<sup>3</sup> Lv` wntmte GK Rxe t`tK Ab` Rxe`vbsli nq Ges tmLvb t`tK Avevi Ab`  
Rxe`vbsli Z ntZ vtK| c0Zw Lv` vbsli i arcTK Lv` **fi** (Trophic level) etj |  
GB vbsli c0wqv c0Zw **fi** B Aek` wQYw kw<sup>3</sup>i AcPq NtU| GB mgMlc×wZi bvg  
**kw<sup>3</sup>i c0m** (Flow of energy)| Btkvmt÷tgi Rxe I Rtoi gta` kw<sup>3</sup> c0m engvb vKvq  
GtK MwZkxj etj gtb Kiv nq|

**AfUwK** ev **tfvRx** hviv  
wtrt`i Lv` wtrivB  
DrcbæKitZ mg<sup>9</sup> thgbt  
meR Dwtc | Avevi  
Ab`w`tK AvtQ **wUtiwK**  
ev **ctfvRx** hviv Lv`  
Drcv`b KitZ cvti bv etj  
Lv`i Rb` cZ`9 ev  
ctiv9fite Dwtc`i I ci  
wfpkxj, thgbt gvbymn  
Ab`v` mKj c0Yx|

**Btkvmt÷tgi Dcv`vb**

Kvh0vuj i w`K wetePbvq Btkvmt÷tgi Dcv`vb mg ntK`9fvtM fVM Kiv ntq vtK| Gi  
GK w`tK itqtQ **AfUwK** ev **tfvRx** hviv wtrt`i Lv` wtrivB DrcbæKitZ mg<sup>9</sup> thgbt  
meR Dwtc | Avevi Ab`w`tK AvtQ **wUtiwK** ev **ctfvRx** hviv Lv` Drcv`b KitZ cvti bv  
etj Lv`i Rb` cZ`9 ev ctiv9fite Dwtc`i Dci wfpkxj, thgbt gvbymn Ab`v` mKj  
c0Yx| wKŠ MVBMZ w`K wetePbvq Btkvmt÷tgi Dcv`vb wj`tK Ro I`RweK Dcv`vb wntmte  
wetePbv KivB AwaK hv<sup>9</sup>h<sup>9</sup> |

1/ **Ro Dcv`vb** (Abiotic components)

Btkvmt÷tgi Ro Dcv`vb,tjvi mvaviYZ`9aitbi ntq vtK| Gi GKw`tK itqtQ  
gvlU, cwlb, Lv`, Kve0-WvB-A·vBW, vbBtUtrb, dmdivm, cfwZ. tgšij K I thšM  
`e`mgn Ges Ab`w`tK itqtQ Avtjv, Zvc BZ`w` kw<sup>3</sup>mgR| G<sub>vj</sub> Dwtc 0viv MpxZ  
nq Ges mh<sup>9</sup>vtKi mrvth` Lv` i fcvšli Z nq| Avevi 9z`9z` AYRxei mrvth`  
gZ Dwtc I c0Yxi t`n c0tbi dtj c9vq gvlU I evqšUjt wdti AvtM| GB  
c0wqitK **Rie-f<sub>v</sub>imqubK Pp** (Biogeochemical cycle) ejv nq| Zte c0Zw  
Dcv`vbiB wR`^ewkó` itqtQ Ges`vb-Kvj tft` cwi eZ0kij hv Rxei c0Ph`I  
w`iztK cfwZ Kti |

2/ **RweK Dcv`vb** (Biotic components)

cwi tek i`RweK Dcv`vbmgn<sup>9</sup>K Pviw c0vb Astk fVM Kiv hvq, Giv nt`Q Drcv`K,  
Lv`K, wetaRK I i fcvšli K |

(K) **Drcv`K** (Producers)

Giv mvavi Yfite wtrt`i Lv` wtrivB Drcv`b KitZ cvti | GRb` G`ti tK  
ejv nq **tfvRx** (Autotrophs) | meR Dwtc cT` tKviti wdtj i mrvth` tmsi  
kw<sup>3</sup>tK cwlb I Kve0-WvB-A·vBWthvtM ivmqubK kw<sup>3</sup>tZ cwiYZ Kti`Re  
Lv` Drcv`b Kti | GB Lv` Dwtc wtr e`eni Kti Ges Ab`t`i Lv`i

thwMib t`q| meR Dwmc Qvovl wKQyKtgvmbt\_wJK e`vKtUmi qv Ges te, ub is-Gi K`vti wUbh9 e`vKtUmi qv mh@jvK I thSMK c`vt\_P Dcw`wZtZ wbtRt`i Lv` wbtRiv cOZ KitZ cvti | GRb` Gt`itKI cO\_wgK Drcv`K wntmte wetePbv Kiv nq|

(L) **Lv`K (Consumers)**

th mKj Rxe wbtRt`i Lv` wbtRiv cOZ KitZ cvti br eis Lv`i Rb` cO`q ev ctiv`fite Drcv`tKi I ci wbfPkj Zvt`itK Lv`K etj |

th mKj Rxe wbtRt`i Lv` wbtRiv cOZ KitZ cvti br eis Lv`i Rb` cO`q ev ctiv`fite Drcv`tKi Dci wbfPkj Zvt`itK Lv`K etj | th mKj cOYx GKgvI Dwmc`tKB Lv` wntmte MhY Kti Zvt`itK **cO\_wgK Lv`K** etj | thgbt dnos, cRvcwZ, KxU-cZ½, Miy gwI, QwMj, tfoi, nwiY, Li`Mvk BZ`w | Avevi wKQycOYx AvtQ hviv miwmi Lv` wntmte Dwmc` MhY br Kti ZYt`fivRx cOYt`i Lv` wntmte MhY Kti Rxeb aviY Kti | tmBRb` Gt`itK **wZx ch@qi Lv`K** ev **tMSY Lv`K** wntmte wetePbv Kiv nq| thgbt e`vO, mvc, KivK, wPj BZ`w` cOYx| Avevi wKQyKQygvsmvKx cOYx AvtQ hviv Ab` cOYxKZR. Lv`i`fc MpxZ nq br| Gt`itK **mt@PP Lv`K** wntmte wetePbv Kiv nq, thgbt evN, wmsn, evRcmL, Kugi, ni½i BZ`w |

wKQyKQycOYx AvtQ hviv Aek` Dwmc` I cOYx DfqtKB Lv` wntmte MhY Kti Rxeb aviY Kti \_vtK| Gt`itK ejv nq **mePK cOYx (Omnivorous)**, thgbt gvby|

(M) **wetqvrK (Decomposers)**

th mKj AYRxe gZ Rxe`tn Aew`Z `Re c`v\_wj`tk avtc avtc tft½ mij c`vt\_@ifcvshi Z Kti Zvt`itK wetqvrK etj |

th mKj AYRxe gZ Rxe`tn Aew`Z `Re c`v\_wj`tk avtc avtc tft½ mij c`vt\_@ifcvshi Z Kti Zvt`itK wetqvrK etj | QIvK I e`vKtUmi qv wetqvrKtKi ch@fZ | Gt`i c`fiteB cOYt`tni `Re c`v\_wj` Dwmc`i MhY DcthwMx A`Re c`vt\_@ifcvshi Z nq| wetqvrKt`itK AtbK mgq Lv`K wntmteI wetePbv Kiv nq| tKbbv `Re c`v`fK mij c`vt\_`cwiYZ Kivi mgq Giv `Re c`v\_`q`tk kv³ mAq Kti \_vtK|

(N) **ifcvshiK (Transformers)**

th mKj e`vKtUmi qv cBtbi dtj Drcbæ`i I ci wqviv Øviv tm\_wj`tk `Re I A`Re c`vt\_@ifcvshi Z Kti Zvt`itK **ifcvshiK** ev **Uy`digvi** etj |

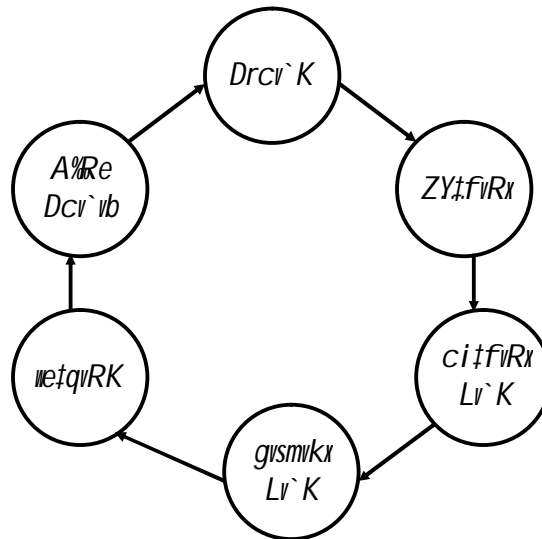
th mKj e`vKtUmi qv cBtbi dtj Drcbæ`i Dci wqviv Øviv tm\_wj`tk `Re I A`Re c`vt\_@ifcvshi Z Kti Zvt`itK **ifcvshiK** ev **Uy`digvi** etj | wetqvrK I Uy`digvi \_tjv BtKwmt`-tgi MwZgqZv eRiq ivLvi t`q`I AZ`sI \_i`y`c` fvgKv cij b Kti \_vtK| Gt`i wqviv-KtgP dtj B `Re I A`Re Dcv`vbmgr `Re-f\_i vmiqvibK P`µi gva`tg Aw` Ae`v`tb wdti hvq| Ab`\_vq, c`exi mKj BtKwmt`-gB gZ `Re Dcv`v`bi AwatK` emevtmi AthvM` ntq thZ|



**Abyj b (Activity)** t BtKwmt`-tgi Ro Dcv`vb I `RieK Dcv`v`bi cv`R`mgr wj wcx Kib|

**Lv`-wKj (Food chain)**

cKwZtZ GKgvI meR Dw<sup>m</sup>c B wbtRt`i Lv` wbtRiv`Zwi Kitz cvti A<sub>1</sub> Zviv`tfvRx| Ab`me RxeK Lv`i Rb` cL`q ev ctivqfvtc Dw<sup>m</sup>c i DciB wbfP Kitz nq| Dw<sup>m</sup>c th Lv` Zwi Kti Zvi wKQyAsk wbtRi cQvRtb e`q Kti, emK Ask Zvi t`tn mWAZ Kti ivtL| GB mWAZ Lv`B ZYtfvRx cOYxi Lv` wntmte e`euZ nq| Avevi gvsmvix cOYxi v ZYtfvRx cOYxt`i Lv` wntmte e`envi Kti | Gfvtc mKj Rxe Lv` I Lv`K m<sup>u</sup>K<sup>o</sup>vcb Kti BtKwmt`tg kw<sup>3</sup> cOYv AqjXei vL Ges Gi ga` w`tg Drcv`K I mtePP Lv`K chS<sup>i</sup> Lv`i th avivevnnKZv m<sup>u</sup>o nq Zvi bvg Lv`-wKj (Food chain)|



wP<sup>i</sup>- 1.2-1t Lv`-wKj

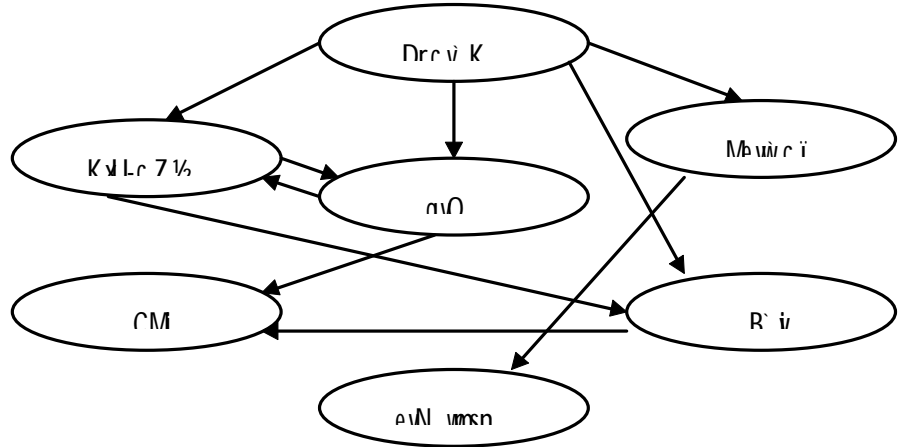
GKwU Lv`-wKjtj Drcv`tki m<sup>u</sup> KtqKwU chS<sup>i</sup> Lv`K`li vKtZ cvti, Zte mtePP Lv`KtK tKvb cOYx Lv` wntmte MhY Kti bvl cKwZtZ mvariYZ wZb aitbi Lv`-wKj t`Lv hvq-

- (1) **wKviRix wKj (Predator chain)** t GB Lv`-wKjtj Drcv`K t`K cL`tg tQvU cOYx, cti mgvstq eo cOYx h<sup>3</sup> nq| thgbt Nvm → dnos → e`v0 → mvc|
- (2) **ciRix wKj (Parasitic chain)** t GLv<sup>tb</sup> eo Rxe t`K mgvstq tQvU Rxei gta` Lv`-wKj Mto Dtv, thgbt gvby → gkv → g`vtj wi qvi RxeiYy
- (3) **gZRix wKj (Saprophytic chain)** t GLv<sup>tb</sup> Dw<sup>m</sup>c I cOYxi gZt`tni Dci wfiE Kti Lv`-wKj Mto I tv, thgbt gZt`n → Q<sup>i</sup>vK → tKtPv|

**Lv`-Rij (Food web)**

cKwZK BtKwmt`tg Lv`-wKj ,tjv mKj mgq mij ct\_ P<sup>tj</sup> bv A<sub>1</sub> cQvRbtevtc cOYxi Lv``fii cvi`uviK wewbgq NtU| thgbt GKwU KvK miwmi MtQi djtk Lv` wntmte MhY Kitz A<sub>1</sub>ev ZYtfvRx KxU-cZ<sup>1</sup>tk Lv` wntmte tetQ wbtZ A<sub>1</sub>ev KxU-cZ<sup>1</sup>tk Lv` wntmte MhYKvix Ab` tKvb cOYxtKI Zvi Lv`-mvgM<sup>i</sup> A<sup>3</sup> Kitz cvti | Gfvtc GKwU BtKwmt`tg wewfbelv`-wKjtj i gta` cvi`uviK wewbgq I msh<sup>3</sup>i gva`tg th RuUj m<sup>u</sup>K<sup>o</sup>Mto I tv Zvi bvg Lv`-Rij | mvariYZ Lv`-Rijtj Drcv`tki msLv` AwK vKtj I Lv`tki msLv` cL`z`fi mgvstq nvm tctq vK|

1.2-2 Lr''-Rvj

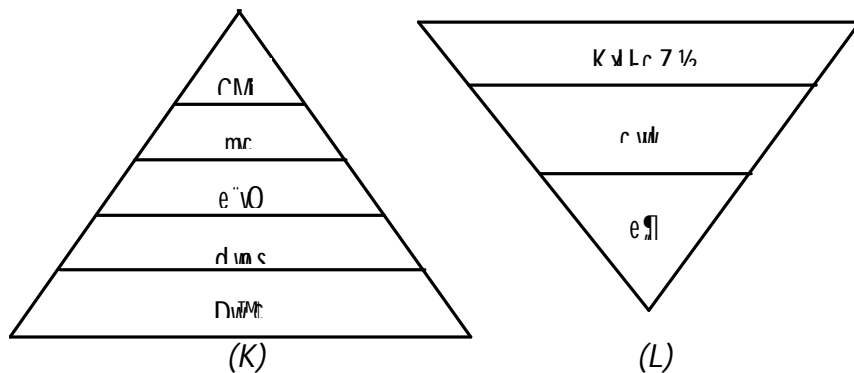


Btkvtj mRK'vj mciwgW, tj v  
 wZb aitbi ntq \_vtK (K)  
 msL'vi mciwgW, (L)  
 Rieftii mciwgW Ges (M)  
 kw³i mciwgW|

**Ablyj b** (Activity) t Avcbvi Gj vKvq thme Rxe i tqtQ Lr''Rvtj i gva'tg Zv cKvk Kily|

**Btkvtj mRK'vj mciwgW**

th tKvb Btkvtj mRK'vj mciwgW, tj v wZb aitbi ntq \_vtK (K) msL'vi mciwgW, (L) Rieftii mciwgW Ges (M) kw³i mciwgW| msL'vi mciwgW, (L) Rieftii mciwgW Ges (M) kw³i mciwgW| msL'vi mciwgW, (L) Rieftii mciwgW Ges (M) kw³i mciwgW| msL'vi mciwgW, (L) Rieftii mciwgW Ges (M) kw³i mciwgW| msL'vi mciwgW, (L) Rieftii mciwgW Ges (M) kw³i mciwgW|



1.2-3: msL'vi mciwgW (K) ZY.fvgtZ Lvov I (L) e'vO DvM mciwgW|



- K) AveZB NtU
- L) iayAcPq NtU
- M) iaym p nq
- N) w-i \_vtK

3/ Lv " -lbrstii mKj -fi kw<sup>3</sup>i Kx NtU?

- K) Acwi ewZ<sup>2</sup> \_vtK
- L) ewxc0B nq
- M) m<sup>u</sup>Y<sup>9</sup>ebó nq
- N) wKQyv AcPq NtU

4/ th mKj c0Yx Dv<sup>m</sup>c tfrRx c0YxK Lv " wntmte MhY Kfi Zvt`i tK Kx etj?

- K) c0\_wgK Lv`K
- L) w0Zxq -fi i Lv`K
- M) mePK
- N) mtePP Lv`K

5/ ifcisi tKi cfi te`Re I A%Re c`v\_9Kvb&Ae`vq wdti hviq?

- K) KwVb Ae`vq
- L) Zij Ae`vq
- M) Avw` Ae`vq
- N) evqexq Ae`vq

6/ Drcv`K I mtePP Lv`tKi gta` Lv`"i th avivevwnKZv m p nq Zvi big Kx?

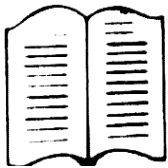
- K) Lv`"-wKj
- L) Lv`"-Rij
- M) Lv`"-wci wgvW
- N) kw<sup>3</sup>c0vvn

**cw 1.3 wvfbai tbi BtKwmt ÷g**

G cvV tk tI Avcub -



- ◆ c0KwZK I Kwlg BtKwmt ÷g Kx Zv ej tZ I wj LtZ cvi t e b |
- ◆ cKz, mvgyK, ebR, ZY.fwg, giR Ges Kul.R BtKwmt ÷g m<sup>u</sup>tK<sup>9</sup>eY<sup>9</sup>v Ki tZ cvi t e b |



Avtjv, evZvm, cvnb, gvU, Dv<sup>m</sup>c, c0Yx, AYRxe Ges Gt`i cvi`umi K wvqv-wvqv wtk-ltY tMuv cv\_exUvB GKwU wkvj BtKwmt ÷g | wKs' wtkdY qgZvi wvpti GZ e`vcK GKwU BtKwmt ÷g chfe qY ev chajvPbv Kiv LyB`in e`vcvi | tm KvifYB BtKwmt ÷gti tkwYeb`vm c0qvRb hvZ Kfi Atc qvKZ.tQvU GKwU GKK wntmte Zv chfe qY Kiv hvq | Gt`i gta` i tqtQ c0KwZK I Kwlg BtKwmt ÷g |

1/ **c0KwZK BtKwmt ÷g t c0KwZK BtKwmt ÷g**, t jv gvbt | i n`fjc QvovB c0KwZK cvi t e t k MvZgqZv eRvq ti tL P t j | emvzi (Habitat) c0KwZ Abjvqx Giv`gai tbi ntq \_vtK | thgbt

(K) **-j R BtKwmt ÷g t thgbt ebR BtKwmt ÷g**, ZY.f wgi BtKwmt ÷g, mrvfvb BtKwmt ÷g, giR BtKwmt ÷g BZ`w |

(L) **RjR BtKvmt÷g t** thgbt ckyz, b`x, Sibv, Lvj, n` BZ`w` `f`ycmbi BtKvmt÷g Ges mMi, gnvmMi, tgunbv BZ`w` tjvbi cmbi BtKvmt÷g|

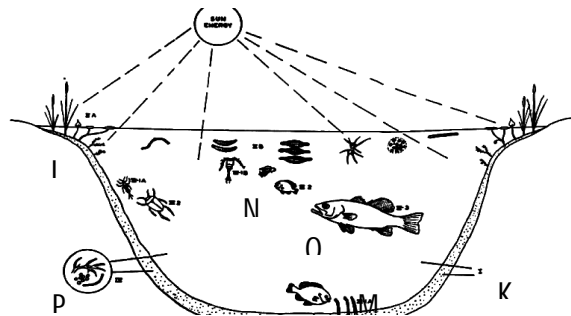
2/ **KulG BtKvmt÷g t** Gme BtKvmt÷gi tfsZ ivmivubK cwi tek euj vsfk gubyl i ubqstY t`tk cwi Pnj Z nq, thgbt KulR BtKvmt÷g| Dcr`vbi w`K wektatY cUzW BtKvmt÷gi aib cUq GKB iKg| KviY mKj t`f`f`B itqtQ `f`f`RrX I ci`f`f`RrX Dcr`vb| w`Ks` th mKj Rxe ubtq Dcr`vb, wj MvWZ Zv w`f`bz i| GLv`b KtqKwU c`vb BtKvmt÷gi eYb`v t`qv n`j |

1/ **ckyzi BtKvmt÷g t** ckyzi BtKvmt÷g GKwU `qsm`uY`c`x`w`Z| Gi Dcr`vb, wj ubaifc Dc`vcb Kiv hrv t

(K) **Ro Dcr`vb t** Ro e`i gta` c`vb `Re I A`Re th`m`K Dcr`vb, t`j`v`n`t`Q`-c`mb, KveB-WvB-A` vBW, A`w` tRb, K`ij`m`q`v`g, b`v`B`U`f`R`b, d`m`t`d`U, A`m`g`t`b`v` G`m`W, m`D`g`K` G`m`W` BZ`w`| G, t`j`v`i` A`w`K`v`k`B` ckyzi Zj`f`k Zj`v`b` m`t`m`te` R`g`v`\_`v`f`K` Ges` w`K`Q`y`c`w`i` g`v`Y` D`w`m`c` I` c`U`Y`x`f` t`n` `e`Y`x`q` A`e`\_`v`q`\_`v`f`K`|

(L) **cU`g`K` Drcr`b`Kvix t** ckyzi BtKvmt÷g `gaitbi cU`g`K` Drcr`b`Kvix cwi j`w`f`Z` nq| GKw`f`K` itqtQ` meR` D`w`m`c` I` w`K`Q`y`m`t`j`v`K`-m`st`k`d`Y`K`v`i`x` e`v`K`U`m`i`q`v, A`v`e`i` A`b`w`f`K` itqtQ` d`v`B`U`v`c`u`b`| g`m`U`i` m`t`1/2` m`sh`y` A`\_`e`v` f`v`m`g`v`b` meR` D`w`m`c`i` g`ta` itqtQ, k`v`c`j`v, k`v`j`k, K`P`z`c`v`b`v, t`U`v`c`v`b`v, f`f`y`c`v`b, n`v`B`w`f`v, B`t`j`w`w`q`v` BZ`w`| d`v`B`U`v`c`u`b`\_`w`j` m`v`a`v`i` Y`Z` t`Q`v`U` t`Q`v`U` g`y` f`v`m`g`v`b` u`b`=`k`i`Y`i` `k`e`j`R`v`Z`i`q` D`w`m`c` I` d`v`m`R`t`j`U`| ckyzi G`t`i` m`e`\_`l`z` m`v`a`v`i` Y`f`i`te` h`Z`-`M`f`v`i`Z`i`q` m`h`p` A`v`t`j`v` t`c`U`Q` Z`Z`-`t`-`c`h`S`| Z`te` ckyzi L`v` Drcr`b` c`U`m`q`i`q` G`i`v`\_`i`z`c`y`f`u`g`K`v` c`v`j` b` K`t`i`\_`v`f`K`|

ckyzi BtKvmt÷g `gaitbi cU`g`K` Drcr`b`Kvix cwi j`w`f`Z` nq| GKw`f`K` itqtQ` meR` D`w`m`c` I` w`K`Q`y`m`t`j`v`K`-m`st`k`d`Y`K`v`i`x` e`v`K`U`m`i`q`v, A`v`e`i` A`b`w`f`K` itqtQ` d`v`B`U`v`c`u`b`|



- K. A`Re Dcr`vb
- L. cU`g`K` Drcr`K
- M. cU`g`K` L`v`K
- N. w`Z`i`q` `t`i` L`v`K
- O. m`te`P`P` L`v`K
- P. w`et`q`v`R`K

w`P`I`- 1.3 - 1: GKwU ckyzi BtKvmtog

(M) **L`v`K (Consumers) t** ckyzi Zj`f`k eim Ges D`w`m`c` A`e`f`k`l`i` D`c`i` u`b`f`p`k`y`j` t`e`b`\_`u`b`K` R`x`e`f`M`v`o`x`i` g`ta` itqtQ` g`v`Q, K`x`U`-c`Z`1/2, w`S`b`k, k`v`g`k, m`v`f`÷`m`k`q`v`b` BZ`w`| Gme ZY`f`v`R`x` Q`v`o`v`l` itqtQ` t`M`S`Y`L`v`K, thgbt t`Q`v`U` g`v`Q` t`L`t`q` R`x`e`b` a`v`i`Y`K`v`i`x` e`o` g`v`Q` I` K`x`U`-c`Z`1/2, e`v`O, m`i`c` BZ`w` Ges i`u`d`v`i` R`v`Z`i`q` R`g`v`u`b`|

(N) **w`et`q`v`R`K (Decomposers) t** ckyzi w`et`q`v`R`K`i` g`ta` e`v`K`U`m`i`q`v, d`v`m`R`t`j`U`m` Ges Q`I`v`f`K`i` c`U`a`v`B` t`e`w`k`| G`i`v` m`g`-`l`c`kyzi` m`m`e`-`l`z`\_`v`K`t`j` I` K``g`v`3` `v`t`b`

Awak cwi givY we`gvb| GQovov cKzi uKQymsL`K UY`digri e`vKtUmi qvl  
\_vtK|

2/ **mgvYK BtKwmt÷g t** f;ctoi clq 70 fIM `vb Rto itqtQ mMi, gnvmMtii  
we`tz.| mMtii cimb j eYv<sup>3</sup> nI qri Kvi tY Gi i vmiqbK cwi tek Lg w`uZkxj |

(K) **Drcv`K t** mgvYK BtKwmt÷tgi c`vb Drcv`K n`Q dvBtUvcusUb| thgbt  
Diatom, Cereatium, Dinoflagellate, Goniolax, Gymnodinum, Ges meR,  
bxj vf-meR, tj wnZ Ges ami `kevJ Awak`B teik|

(L) **Lv`K t** cl`ugK ZYt`firRi Lv`tKi gta` muv÷`ukqvb, tgvj v- (kvjK, uSbK),  
kvKvKx gvQ BZ`w` c`vb| tMSY Lv`tKi gta` itqtQ Herring, Shark, Cod,  
Mackerel BZ`w` gismvKx gvQmgn|

(M) **vetqvRK t** mgj`gZ Rxtai vetqvRK wntmte e`vKtUmi qvi c`vb`B gly`|  
GQovov itqtQ uKQyQI`vK| mgj`i 1 wj Uvi cwbZ 5 j`q] chS e`vKtUmi qv  
\_vKtZ crti | Gme e`vKtUmi qv Rxtai eR`I gZt`tni Dci u`uqv-u`uqv Uvi  
Dw`i`i Rb` c`uqvRbxq A`Re c`v`mjo Kti |



thme AAjt evqzZ Rjxq  
evt`ui cwi givY teik uKs  
ZvcgvIv teik bq tmme `vrb  
ebfugi mjo nq| Avenl qvi  
ZviZtg`i I ci wfp` Kti  
c`u`exi wevfbe `vrb wevfbe  
aitbi ebvAtj i mjo ntqtQ|

**Ablyj b (Activity) t** cKz I mgvYK BtKwmt÷tgi cv`R`mgn Zj ai ab|

3/ **ebR BtKwmt÷g t** thme AAjt evqzZ Rjxq evt`ui cwi givY teik uKs`ZvcgvIv teik  
bq tmme `vrb ebfugi mjo nq| Avenl qvi ZviZtg`i Dci wfp` Kti c`u`exi wevfbe  
`vrb wevfbeaitbi ebvAtj i mjo ntqtQ| Gme ebvAtj i wba`i Z aitbi Dw`i`i I c`u`Yx  
wbq `Zs`i`enk` eRvq`vKtj I Kg`c`xwZ clq Awet`Q`

(K) **Drcv`K t** e`RvRvZxq Dw`i`B etbi gly` Drcv`K| Aek` ebvAtj i c`kuz  
Ablyvq e`Ri wRi wevfbeZv I `i`web`vrm cv`R` itqtQ| thgbt D`ogUjxq  
ebfug c`I`Siv c`kuzi nI qvq tmLvrb uKQyqv tclqK `j` (Sciophytic herbs)  
I exi`RvZxq MvQI Rtb` Avevi bwiZkxZv` AAjxq ebfugtZ c`I`Siv,  
u`Piniir, Kvbvvi aitbi AiY` mjo nq|

(L) **Lv`K t** cl`ugK Lv`K n`Q ZYt`firRi c`u`Yx, thgbt tcvKv-gvKo, nviY, ev`j,  
wevfbeaitbi cv`L, Kvweovj, Buj, nuz BZ`w`| Avevi tMSY Lv`tKi gta`  
itqtQ, mvc, cv`L, u`Mi u`u, ukqvj BZ`w` Ges Uvm`vvi Lv`tKi gta` itqtQ-  
uKQycv`L, evN, wmsn nvtqvb c`fuz|

(M) **vetqvRK t** ebR BtKwmt÷tgi vetqvRtKi gta` itqtQ QI`vK, e`vKtUmi qv,  
t`c`UvRvqv, tbgvUvW, Gt`wv Wv, ugvj t`cW, tmi`t`cW, d`i`UI qig` tKtPv,  
kvjK, u`ccov, DBt`cvKv BZ`w` |

4/ **ZYfugi BtKwmt÷g t** c`u`exi GK wev`Y`Gj vKv (clq 13 ugvj qb eM`gvBj) ZYUvi v  
Av`Qw` Z| GLvrb evrmi K ewocitZi cwi givY 25-75 tm. ug. hvi dtj c`Pz Nvm Rtb`  
Ges Gaitbi BtKwmt÷g Mto I tV| c`u`exi D`tj L`thvM` ZYfugi gta` KvbWvi wev`Y`  
mgZj fvg, h`y`ivo` Avt`R`E`bv, eM`Rj Ges `w`Y` Gukqv t`tK ga` Gukqv chS ZYfug  
itqtQ|

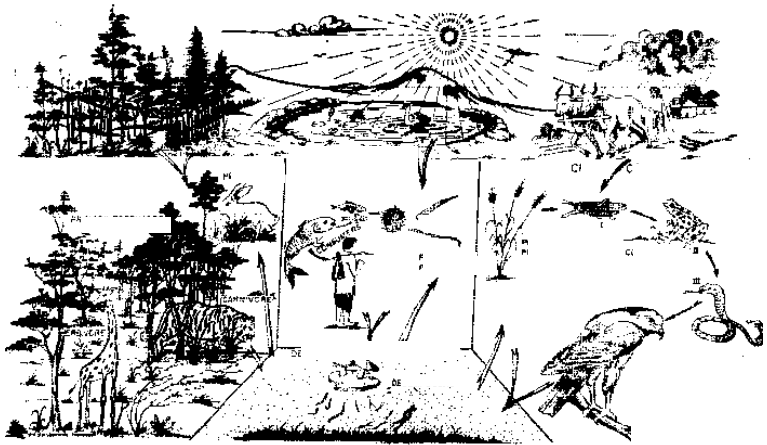
c`u`exi GK wev`Y`Gj vKv  
(clq 13 ugvj qb eM`gvBj)  
ZYUvi v Av`Qw` Z| GLvrb  
evrmi K ewocitZi cwi givY  
25-75 tm. ug. hvi dtj  
c`Pz Nvm Rtb` Ges Gaitbi  
BtKwmt÷g Mto I tV|

- (K) **c0\_ugK Drcv`K t** Gramineae I Cyperaceae cwiertii Dv`M`i c0avb`B teik | Zte wKQyKQy,j`I weiytKI c0\_ugK Drcv`K wntmte t`Lv hvq |
- (L) **Lv`K t** ZYtFvRx c0Yx wektl Kti `b`cvqx Rxe, cvML, tcvKv-gvKo I mixmç ZtYi Dci gE` Lv`K wntmte wbfPkxj | tMSY Lv`tKi gta` itqtQ wkqvj, mvc, e`vO, wUKwUK, cvML BZ`w` |
- (M) **wetqurRK t** weifbæi`tbi e`vKtUwiqv I tgvì, thgbt *Aspergillus, Rhizopus, Fusarium, Cladosporium* BZ`w` Dtj`-LthwM` |

evrmwi K ewpocvtZi cwi gvY thLv`tb Kg (mvari Yfite 25 tm.ug.-Gi wbtP) Ges thLv`tb Zvtci Awak` itqtQ tmLv`tb giR BtKwmt`÷g Mto I tV | cW\_exi tgvU AvqZtbi c0q 17 fVM Gj vKvB gi gq |

5/ **giR BtKwmt`÷g t** evrmwi K ewpocvtZi cwi gvY thLv`tb Kg (mvari Yfite 25 tm. ug.-Gi wbtP) Ges thLv`tb Zvtci Awak` itqtQ tmLv`tb giR BtKwmt`÷g Mto I tV | cW\_exi tgvU AvqZtbi c0q 17 fVM Gj vKvB gi gq |

- (K) **c0\_ugK Drcv`K t** c0avb Drcv`tKi gta` itqtQ .j` tSvc-Svo, K`vKUwm, gm, jvBtKb, wKQyNvm I e`I, bxj vf-meR `kevj BZ`w` | G mKj Dv`M`i gjj AmsL` kvLv ckvLvhç Ges gvUli mvgvb` wbp chSt`we`Z | dtj mvgvb` ewpocvZ ntj Lç mn`RB cvwb msMh Ki`Z cvti | c0`^tbi nvi Kgrt`bvi Rb` Gt` i cvZv, KvU I kvLv, tj v weifbævte ifcvsthi Z ntq`\_vtK |
- (L) **Lv`K t** GB BtKwmt`÷tg Drcv`b Kg nI qvi Kvi`Y Lv`tKi msL`vI Kg | giy Lv`tKi gta` mixmçRvZxq c0Yx I KxU-cZ½ c0avb | G0vov itqtQ giyRvovR etj L`vZ DU, tgl, gi ye`vO, B0y, tçEr, wUKwUK BZ`w` c0Yx |
- (M) **wetqurRK t** giR BtKwmt`÷tg Z`bvgyKfite wetqur`tKi msL`vI Lç mwgZ | dtj gZt`n ctP wDgvm `Zwi nevi cwi etZ`AZ`waK Zvtc Zv` i wKtq hvq | GKvi`YB tmLv`tb gvUli DePZv kw³ ewx cvq bv | ZeyZvc mn`Kvix wKQy msL`K QI`vK I e`vKtUwiqv tmLv`tb wetqurRK wntmte KvR Kti |



wP1 - 1.3-2: weifbæi`tbi BtKwmt`og

6/ **KulR BtKwmt`÷g t** GwU gvbe m0 GKwU Kul`g BtKwmt`÷g | GLv`tb gvby Zvi Pwn`v Ablyvqx wov`0 dmtj i mte`P Drcv`b eRvq ivLvi Rb` c0qurBvq mvi, KxUv`kK, tm`Pi e`e`v, AvMvQv Acmvi Y BZ`w` Kvhpçg Pij yivtL | dtj GLv`tb Drcv`bB gly` wv`l q |

- (K) **Ro Dcv`vb t`** vbxq RjevqygivEki aib I LubR c`vt`P cwi givY, e`euZ `Re I A%Re mvi BZ`w` wgtj B Kul.R Btkvmt`÷tgi Ro Dcv`vb|
- (L) **Drcv`K t** PvlKZ.Dw`c B km` t`qj`T i gly` Drcv`K| ZvQvov weifbæaitbi AvMvQv hv km` t`qj`T RtbY Zvivl Drcv`K wmwte weteiPZ|
- (M) **Lv`K t c0`igK`** ti Lv`tki gta` itqtQ weifbæaitbi tcvKv, kkk, Buj, cvl, Mew` ci, gvby BZ`w` | tMSY Lv`tki gta` itqtQ e`vO, mvc, weifbæaitbi cvl hviv tcvKv-gvKo tLtg Rieb avi Y Kti |
- (N) **wetqvrRK t** cãvb wetqvrRKvixiv n`Q e`vKtUwi qv, QÎvK I Actinomycetes. Gt`i cPbuvqvi dtj B gvltZ Drcv`tki Rb` c0`qvRbxq `Re c`v`gRZ`\_vtK|



**Ablyj b** (Activity) t ZY.fvg I Kul.R Btkvmt`÷tgi wj I Avj mgr`wPvY Z Ki ab|

**cvWËi gj`iqb 1.3**



mivK DËti i cvtk wUK wPý (✓) w`b|

- 1/ **ckzi** dvBtUvcãvsU`bi we`wZ. Kri fc?
  - K) ckzi i meP
  - L) ckzi i Zj t`tk
  - M) hZ`y chSf Avj v tcStQ
  - N) i aywKbri vq
- 2/ **ckzi** wetqvrRtki cwi givY metPtq tenk tkv`vq?
  - K) Kv`vq
  - L) cvbi Dcti
  - M) ga``ti
  - N) ckzi i wKbri vq
- 3/ **mivgy`K** Btkvmt`÷tgi cãvb Drcv`K tKvblU?
  - K) Rgãslb
  - L) dvBtUv cãslb
  - M) μv`ónkqv
  - N) e`vKtUwi qv

- 4/ mgj` 1 ij Uvi cmbtZ e`vKtUvi qvi cwi gvY c`q KZ?
  - K) 20 j`
  - L) 10 j`
  - M) 5 j`
  - N) 1 j`
  
- 5/ Diatom Ges Gymnodium tKvb&BtKvmt÷tgi Drcv`K?
  - K) ckz
  - L) ebR
  - M) giR
  - N) mivgYK
  
- 6/ cw\_eri enEg ZY.fug tKv\_vq Aev`Z?
  - K) h`ivó`I KvbWvq
  - L) fviZ I cwk`tb
  - M) h`ivR` I dtY
  - N) Pxb I Rvcvfb
  
- 7/ ZY.fugi Drcv`K\_vj tZ tKvb&cwi evti i c`vib` tenk?
  - K) Solanaceae I Malvaceae
  - L) Tiliaceae I Rutaceae
  - M) Gramineae I Cyperaceae
  - N) Citamineae I Papavaraceae

### cw 1.4 cwi`etki I ci Dv`m` I ebiq`bi c`ve



G cvV tk`I Avcib -

- ◆ Dv`m` i mvt\_ `vbxq Rjevqy evqgU`j i m`uK`Ztj aitZ cviteb/
- ◆ Dv`m` Kxfvte fug msi`Y e`e`v c`fwez Kti Zv ej tZ I vj LtZ cviteb/
- ◆ Dv`m` i mvt\_ kv` I Rvj vbi m`uK`bifcy Ki tZ cviteb/
- ◆ RbmsL`v evx I RxeRmtZ Zvi c`fve e`vL`v Ki tZ cviteb/



Avenl qvRvbZ Dcv`vb, gvU, cvb, RxeKj mevKQvntqB Avqv`i cwi`tek | RxeKtj i Ab`Zg Dcv`vb Dv`m`, hv GKgvI c`ugK Drcv`bKvix vntmte metenPZ | Avi Ab`me c`Yx cZ`Y ev c`iv`Y fite GB Dv`m` Ktj i DciB vbf`Kvj | m`z`ivis cwi`tek I c`vYRMtZi mvt\_ Dv`m` i i`qtQ vbmP`m`uK`

### meR Dv`m` I `vbxq Rjevqy

`vbxq Rjevqymsi`Y c`ZvU meR Dv`m` I MvQcvjvi GKvU fugKv i`qtQ, Zv tm Qvqv `vb KtiB tnvK A`ev evqyc`vtn c`ZeU`KZv m`v` KtiB tnvK | MvQcvj v euj vstk Av`v`j K Rjevqy c`fwez Kti | meR Dv`m` c`^b c`vqvii gva`tg c`Zv`b necj`y cwi`gvY Rjxq ev`u evqgU`j Z`vM Ki`tQ | GB Rjxq ev`u Dc`i D`v kvZj evqj`y ms`utk`Gtm Nbrf`etbi gva`tg tg`N cwi`YZ nq Ges ev`ocvZ NUvq | AvqvRvb Dc`Z`Kvi tgvU ev`ocv`Zi c`q A`taRB

KvL.cwi`vPvZ I cwi`tek

Dv`m` i cvZv I  
 cwi`cwk`RZvq th cwi`gvY  
 tmsi`kv` cwi`ZZ nq Zvc  
 kv`Z cwi`YZ nq Zvi  
 GKvU mevU AskB c`^b  
 c`vqvii gva`tg vbitmZ  
 nq | dtj Dv`m` I Zvi  
 cwi`tek Av`Zvi` Zv`ci  
 c`fvegy `vK | G Kvi`YB  
 Av`j vK D`j M`si` `v`j  
 gy` Gj`vKv Atc`v` e`Ztj  
 tenk kvZj Zv Ab`Z nq |

-vbxq Dm<sup>o</sup> i c<sup>o</sup>-^b c<sup>o</sup>uqvi dj k<sup>o</sup>ZtZ ntq -vtK| Avi GB epoi cwb<sup>o</sup>tZ CO<sub>2</sub> I b<sup>o</sup>BtUtRbh<sup>o</sup> ntq Avmvi dtj fugi De<sup>o</sup>Zvl ep<sup>o</sup> cvq|

Dm<sup>o</sup> i c<sup>o</sup>-^b c<sup>o</sup>uqvi Avti Kiu i z<sup>o</sup>cy<sup>o</sup> K nt<sup>o</sup>Q evqexq Zvc tkviY Kiv| GK M<sup>o</sup>g cwb ep<sup>o</sup>urfe<sup>o</sup>bi Rb<sup>o</sup> 580 K<sup>o</sup>vj<sup>o</sup> ki<sup>o</sup> c<sup>o</sup>uqRb| Dm<sup>o</sup> i cvZv I cwi cwk<sup>o</sup>RZvq th cwi gvY tmsi ki<sup>o</sup> c<sup>o</sup>ZZ ntq Zvc ki<sup>o</sup>z<sup>o</sup> cwiYZ nq Zvi GKiu wei<sup>o</sup>U AskB c<sup>o</sup>-^b c<sup>o</sup>uqvi gva<sup>o</sup>tg ubi tmZ nq| dtj Dm<sup>o</sup> I Zvi cwi tek AvZ<sup>o</sup> Zvtci c<sup>o</sup>fv<sup>o</sup>eg<sup>o</sup> -vtK| G Kvi tYB Avtj vK D<sup>o</sup>4j M<sup>o</sup>tsi<sup>o</sup> g<sup>o</sup>ji g<sup>o</sup> Gj vKv A<sup>o</sup>tc<sup>o</sup> e<sup>o</sup>z<sup>o</sup>Jtj temk kxZj Zv Ab<sup>o</sup>z<sup>o</sup> nq|

uk<sup>o</sup>i we<sup>o</sup>tei ci t<sup>o</sup>tk  
AwaKn<sup>o</sup>ti Ryj w<sup>o</sup>b f<sup>o</sup>  
nt<sup>o</sup>bi Kvi tYB evq<sup>o</sup>U<sup>o</sup>tj  
CO<sub>2</sub> Gi cwi gvY teto  
Ptj t<sup>o</sup>Q Ges Zv GLt<sup>o</sup>br  
Ae<sup>o</sup>v<sup>o</sup>nZ i t<sup>o</sup>qt<sup>o</sup>Q|

Rm<sup>o</sup>ZmstNi Lv<sup>o</sup> I Kul.  
ms<sup>o</sup>-vi (FAO) int<sup>o</sup>me gtZ,  
D<sup>o</sup>g<sup>o</sup>U<sup>o</sup>j xq AA<sup>o</sup>tj evr<sup>o</sup>mi K  
eb DRv<sup>o</sup>toi cwi gvY 11.4  
we<sup>o</sup>ij qb tn<sup>o</sup>i | wek<sup>o</sup>R<sup>o</sup>jo  
gvb<sup>o</sup>ji Kgr<sup>o</sup>vt<sup>o</sup>Ui Kvi tYB  
10 kZisk R<sup>o</sup>ig B<sup>o</sup>tZv<sup>o</sup>g<sup>o</sup>ta<sup>o</sup>B  
wei<sup>o</sup>v fig<sup>o</sup>tZ cwiYZ nt<sup>o</sup>qt<sup>o</sup>Q  
Ges Avi I 25 kZisk ug<sup>o</sup>w<sup>o</sup>Ki  
m<sup>o</sup>z<sup>o</sup>ab|

**me<sup>o</sup> Dm<sup>o</sup> I evq<sup>o</sup>U<sup>o</sup>j**

tet<sup>o</sup>P -vKvi Rb<sup>o</sup> c<sup>o</sup>Y<sup>o</sup>Kj- evq<sup>o</sup>U<sup>o</sup>j t<sup>o</sup>tk AZ<sup>o</sup>vek<sup>o</sup>K<sup>o</sup>xq Dcv<sup>o</sup>-vb int<sup>o</sup>me Av<sup>o</sup> tRb (O<sub>2</sub>) M<sup>o</sup>hY K<sup>o</sup>ti Ges Kve<sup>o</sup>B-W<sup>o</sup>B-A- v<sup>o</sup>BW (CO<sub>2</sub>) Z<sup>o</sup>vM K<sup>o</sup>ti | uk<sup>o</sup>S<sup>o</sup> Dm<sup>o</sup> c<sup>o</sup>u<sup>o</sup>YK<sup>o</sup>tj i eR<sup>o</sup>CO<sub>2</sub> M<sup>o</sup>hY K<sup>o</sup>ti m<sup>o</sup>tj vKms<sup>o</sup>t<sup>o</sup>kl<sup>o</sup>Y c<sup>o</sup>x<sup>o</sup>z<sup>o</sup>tZ Zv Av<sup>o</sup>Ex<sup>o</sup>KiY K<sup>o</sup>ti | Kve<sup>o</sup>B M<sup>o</sup>hYK<sup>o</sup>vi x M<sup>o</sup>v<sup>o</sup>Q<sup>o</sup>cvj vtK GKvi tYB O<sup>o</sup>Kve<sup>o</sup>B avi K<sup>o</sup> ej<sup>o</sup> v nq| G c<sup>o</sup>uqvi gva<sup>o</sup>tg c<sup>o</sup>z<sup>o</sup> b c<sup>o</sup>z<sup>o</sup> tn<sup>o</sup>i me<sup>o</sup>R fug t<sup>o</sup>tk Dm<sup>o</sup> c<sup>o</sup>q 900 t<sup>o</sup>K<sup>o</sup>R Kve<sup>o</sup>B Av<sup>o</sup>Ex<sup>o</sup>KiY Ki t<sup>o</sup>Q Ges eR<sup>o</sup>int<sup>o</sup>me c<sup>o</sup>q 650 t<sup>o</sup>K<sup>o</sup>R Av<sup>o</sup> tRb Z<sup>o</sup>vM Ki t<sup>o</sup>Q| eZ<sup>o</sup>g<sup>o</sup>tb evq<sup>o</sup>z CO<sub>2</sub> Gi cwi gvY c<sup>o</sup>q kZKiv 0.035 f<sup>o</sup>vM ev 350 w<sup>o</sup>c<sup>o</sup>gGg| uk<sup>o</sup>S<sup>o</sup> 1957 m<sup>o</sup>tj Zv w<sup>o</sup>Q 315 w<sup>o</sup>c<sup>o</sup>gGg| uk<sup>o</sup>i we<sup>o</sup>tei ci t<sup>o</sup>tk AwaKn<sup>o</sup>ti Ryj w<sup>o</sup>b f<sup>o</sup> nt<sup>o</sup>bi Kvi tYB evq<sup>o</sup>U<sup>o</sup>tj CO<sub>2</sub> Gi cwi gvY teto Ptj t<sup>o</sup>Q Ges Zv GLt<sup>o</sup>br Ae<sup>o</sup>v<sup>o</sup>nZ i t<sup>o</sup>qt<sup>o</sup>Q| Zv<sup>o</sup>ov gv<sup>o</sup>bt<sup>o</sup> i ewa<sup>o</sup>z P<sup>o</sup>vi<sup>o</sup> th<sup>o</sup>v<sup>o</sup>M<sup>o</sup>b w<sup>o</sup> tZ w<sup>o</sup>lt<sup>o</sup>q m<sup>o</sup>vi wek<sup>o</sup>! R<sup>o</sup>jo w<sup>o</sup>be<sup>o</sup>P<sup>o</sup>ti eb w<sup>o</sup>bab Pj t<sup>o</sup>Q| Gi dtj cwi tek GK<sup>o</sup> tK n<sup>o</sup>vi<sup>o</sup>Q Kve<sup>o</sup>B Av<sup>o</sup>Ex<sup>o</sup>Ki<sup>o</sup>Yi D<sup>o</sup>m Ges Ab<sup>o</sup> w<sup>o</sup> tK Av<sup>o</sup> tRb D<sup>o</sup>cv<sup>o</sup>-bK<sup>o</sup>vi x c<sup>o</sup>u<sup>o</sup>K<sup>o</sup>zK Kvi Lv<sup>o</sup>lv| Rm<sup>o</sup>ZmstNi Lv<sup>o</sup> I Kul.ms<sup>o</sup>-vi (FAO) int<sup>o</sup>me gtZ, D<sup>o</sup>g<sup>o</sup>U<sup>o</sup>j xq AA<sup>o</sup>tj evr<sup>o</sup>mi K eb DRv<sup>o</sup>toi cwi gvY 11.4 we<sup>o</sup>ij qb tn<sup>o</sup>i | wek<sup>o</sup>R<sup>o</sup>jo gv<sup>o</sup>bt<sup>o</sup> i Kgr<sup>o</sup>vt<sup>o</sup>Ui Kvi tYB 10 kZisk R<sup>o</sup>ig B<sup>o</sup>tZv<sup>o</sup>g<sup>o</sup>ta<sup>o</sup>B wei<sup>o</sup>v fig<sup>o</sup>tZ cwiYZ nt<sup>o</sup>qt<sup>o</sup>Q Ges Avi I 25 kZisk ug<sup>o</sup>w<sup>o</sup>Ki m<sup>o</sup>z<sup>o</sup>ab| eb DRv<sup>o</sup>oKi<sup>o</sup>Y Av<sup>o</sup>gt<sup>o</sup>-i t<sup>o</sup>kl w<sup>o</sup>c<sup>o</sup>U<sup>o</sup>q<sup>o</sup> tbB| f<sup>o</sup>vi Z we<sup>o</sup>f<sup>o</sup>vM<sup>o</sup>K<sup>o</sup>vtj 1947 m<sup>o</sup>tj G<sup>o</sup>t<sup>o</sup>tk eb fugi cwi gvY w<sup>o</sup>Q 24 kZisk uk<sup>o</sup>S<sup>o</sup> eZ<sup>o</sup>g<sup>o</sup>tb Zv K<sup>o</sup>tg w<sup>o</sup>lt<sup>o</sup>q c<sup>o</sup>q 6 kZisk w<sup>o</sup>ot<sup>o</sup>qt<sup>o</sup>Q| 1983 m<sup>o</sup>tj BZ<sup>o</sup>v<sup>o</sup>ji t<sup>o</sup>ivg t<sup>o</sup>tk c<sup>o</sup>u<sup>o</sup>w<sup>o</sup>zK O<sup>o</sup>R<sup>o</sup>ij w<sup>o</sup>bi Rb<sup>o</sup> Kv<sup>o</sup>U<sup>o</sup> k<sup>o</sup>l<sup>o</sup> c<sup>o</sup>z<sup>o</sup>te<sup>o</sup>-tb evs<sup>o</sup>j vt<sup>o</sup> t<sup>o</sup>tk i<sup>o</sup>azi e<sup>o</sup>z<sup>o</sup> ms<sup>o</sup>KU Z<sup>o</sup>w<sup>o</sup>z t<sup>o</sup> k int<sup>o</sup>me w<sup>o</sup>Py<sup>o</sup>Z Kiv nt<sup>o</sup>qt<sup>o</sup>Q|

wek<sup>o</sup>! R<sup>o</sup>jo G<sup>o</sup>f<sup>o</sup>ite eb w<sup>o</sup>bab K<sup>o</sup>h<sup>o</sup>Ae<sup>o</sup>v<sup>o</sup>nZ -vK<sup>o</sup>tj evq<sup>o</sup>U<sup>o</sup>tj CO<sub>2</sub> I O<sub>2</sub> Gi f<sup>o</sup>vi m<sup>o</sup>ig<sup>o</sup>Z<sup>o</sup>vi Avi I Av<sup>o</sup>-w<sup>o</sup>Z<sup>o</sup>k<sup>o</sup>xj ntq DV<sup>o</sup>te| dtj ewa<sup>o</sup>z CO<sub>2</sub> Gi Kvi tY teto h<sup>o</sup>te M<sup>o</sup>h<sup>o</sup> n<sup>o</sup>vDR c<sup>o</sup>z<sup>o</sup>u<sup>o</sup>q<sup>o</sup>| Avi Av<sup>o</sup>w<sup>o</sup>oZ<sup>o</sup> cwi Y<sup>o</sup>uzi w<sup>o</sup> tK G<sup>o</sup>w<sup>o</sup>lt<sup>o</sup>q h<sup>o</sup>te wek<sup>o</sup>! m<sup>o</sup>Kj c<sup>o</sup>Y<sup>o</sup>Kj | Zv<sup>o</sup>B CO<sub>2</sub> Gi Av<sup>o</sup>Ex<sup>o</sup>KiY c<sup>o</sup>uq<sup>o</sup> ev<sup>o</sup>vt<sup>o</sup>b<sup>o</sup>ri Rb<sup>o</sup> GK<sup>o</sup> tK th<sup>o</sup>gb eb DRv<sup>o</sup>oKiY t<sup>o</sup>iva Kiv c<sup>o</sup>uq<sup>o</sup>Rb, Ab<sup>o</sup> w<sup>o</sup> tK tZ<sup>o</sup>gv<sup>o</sup>b Avi eb<sup>o</sup>qv<sup>o</sup>b K<sup>o</sup>g<sup>o</sup>Pr<sup>o</sup> M<sup>o</sup>hY Kiv AZ<sup>o</sup>vek<sup>o</sup>K|

**Dm<sup>o</sup> I fug msi<sup>o</sup> q<sup>o</sup>Y**

fug msi<sup>o</sup> q<sup>o</sup>Y me<sup>o</sup> Dm<sup>o</sup> I eb<sup>o</sup>vt<sup>o</sup>bi f<sup>o</sup> ug<sup>o</sup>Kv AZ<sup>o</sup>-s<sup>o</sup> i z<sup>o</sup>cy<sup>o</sup> evq<sup>o</sup>l Rj<sup>o</sup>xq q<sup>o</sup>q<sup>o</sup>R<sup>o</sup>ubZ Kvi tY c<sup>o</sup>z eQi j q<sup>o</sup> j q<sup>o</sup> Ub g<sup>o</sup>w<sup>o</sup>U fugi Dci t<sup>o</sup>tk Ac<sup>o</sup>m<sup>o</sup>vi Z nq| G<sup>o</sup>tZ fugi D<sup>o</sup>cv<sup>o</sup>-b<sup>o</sup>k<sup>o</sup>xj Zv n<sup>o</sup>m cvq, g<sup>o</sup>w<sup>o</sup>U Ab<sup>o</sup>veZ ntq c<sup>o</sup>to Ges fugi Dci t<sup>o</sup>tk Dm<sup>o</sup> Av<sup>o</sup>Q<sup>o</sup>-b w<sup>o</sup>eb<sup>o</sup> nq| g<sup>o</sup>w<sup>o</sup>U t<sup>o</sup>tk Lv<sup>o</sup> e<sup>o</sup>-Ac<sup>o</sup>m<sup>o</sup>vi Z nevi Kvi tY A<sup>o</sup>-ev j ev<sup>o</sup>z<sup>o</sup>Zv ev Rj<sup>o</sup>ve<sup>o</sup>x<sup>o</sup>Zvi Kvi tY g<sup>o</sup>w<sup>o</sup>U Ab<sup>o</sup>z<sup>o</sup> ntq c<sup>o</sup>to| G<sup>o</sup>m<sup>o</sup>Kj D<sup>o</sup>cm<sup>o</sup>t<sup>o</sup>M<sup>o</sup>P<sup>o</sup> wei<sup>o</sup>z<sup>o</sup> Dm<sup>o</sup> I eb<sup>o</sup>qv<sup>o</sup>bB c<sup>o</sup>z<sup>o</sup>t<sup>o</sup>iva e<sup>o</sup>-v M<sup>o</sup>to Z<sup>o</sup>z<sup>o</sup>tZ c<sup>o</sup>ti | evq<sup>o</sup>yc<sup>o</sup>z<sup>o</sup>t<sup>o</sup>ivax e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb K<sup>o</sup>ti e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb D<sup>o</sup>z<sup>o</sup>vi 20<sup>o</sup> Y cwi<sup>o</sup>ngZ Rv<sup>o</sup>q<sup>o</sup>M<sup>o</sup> evq<sup>o</sup>q<sup>o</sup>R<sup>o</sup>ubZ c<sup>o</sup>fv<sup>o</sup> t<sup>o</sup>tk i q<sup>o</sup>lv Kiv m<sup>o</sup>z<sup>o</sup>ab| P<sup>o</sup>xtb e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb evq<sup>o</sup>yc<sup>o</sup>z<sup>o</sup>t<sup>o</sup>ivax Av<sup>o</sup>kt<sup>o</sup> ej q m<sup>o</sup>o K<sup>o</sup>ti km<sup>o</sup> D<sup>o</sup>cv<sup>o</sup>-b c<sup>o</sup>q w<sup>o</sup> Y Kiv m<sup>o</sup>z<sup>o</sup>ab nt<sup>o</sup>qt<sup>o</sup>Q| gi<sup>o</sup>t<sup>o</sup>vtZ e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb<sup>o</sup>Yi gva<sup>o</sup>tg ev<sup>o</sup>ij q<sup>o</sup>mo -v<sup>o</sup>bs<sup>o</sup>li c<sup>o</sup>z<sup>o</sup>znZ K<sup>o</sup>ti Kul. fug<sup>o</sup>tK i q<sup>o</sup>lv Kiv nq| Ae<sup>o</sup>-v<sup>o</sup>BMZ Kvi tY c<sup>o</sup>z<sup>o</sup>eQi G<sup>o</sup>t<sup>o</sup>tki D<sup>o</sup>cK<sup>o</sup>j<sup>o</sup>xq G<sup>o</sup>jv<sup>o</sup>K<sup>o</sup>q N<sup>o</sup>g<sup>o</sup>So I m<sup>o</sup>v<sup>o</sup>t<sup>o</sup>K<sup>o</sup>z<sup>o</sup>bi c<sup>o</sup>fv<sup>o</sup> t<sup>o</sup>tkB h<sup>o</sup>te| G Ae<sup>o</sup>-v<sup>o</sup> t<sup>o</sup>gv<sup>o</sup>K<sup>o</sup>te<sup>o</sup>v<sup>o</sup>q D<sup>o</sup>cK<sup>o</sup>j<sup>o</sup>xq eb<sup>o</sup>fug I g<sup>o</sup>v<sup>o</sup>bt<sup>o</sup>M<sup>o</sup>fv<sup>o</sup> eb<sup>o</sup>v<sup>o</sup>Aj ki<sup>o</sup>z<sup>o</sup>k<sup>o</sup>ij x c<sup>o</sup>z<sup>o</sup>eU<sup>o</sup>K int<sup>o</sup>me Kv<sup>o</sup>R Ki tZ cv<sup>o</sup>ti |

e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb K<sup>o</sup>ti e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb D<sup>o</sup>z<sup>o</sup>vi  
20<sup>o</sup> Y cwi<sup>o</sup>ngZ Rv<sup>o</sup>q<sup>o</sup>M<sup>o</sup>  
evq<sup>o</sup>q<sup>o</sup>R<sup>o</sup>ubZ c<sup>o</sup>fv<sup>o</sup> t<sup>o</sup>tk i q<sup>o</sup>lv  
Kiv m<sup>o</sup>z<sup>o</sup>ab| P<sup>o</sup>xtb e<sup>o</sup>z<sup>o</sup>g<sup>o</sup>tb evq<sup>o</sup>  
c<sup>o</sup>z<sup>o</sup>t<sup>o</sup>ivax Av<sup>o</sup>kt<sup>o</sup> ej q m<sup>o</sup>o K<sup>o</sup>ti  
km<sup>o</sup> D<sup>o</sup>cv<sup>o</sup>-b c<sup>o</sup>q w<sup>o</sup> Y Kiv  
m<sup>o</sup>z<sup>o</sup>ab nt<sup>o</sup>qt<sup>o</sup>Q|

meR Dirmc I ebfig epocvzi cfveRvBZ figq mngZ ivL, eb'vZvnoZ cvnb cbrtn clZeUKZv mpo Kti Ges figtK msNex titL qqtiva Kti | DpZxj yDcZ`Kvq Dirmc` i G aitbi cfve LyB , iZcYq KvhRix|

Avst-dmj (Inter cropping) | mv\_x-dmj (Alley cropping) | Pvl cxwZ AbyriY Kti ktm'i Drcr`b I figi DePZv DfqB eRvq ivLv nq|

Dirmc` i cvZv I eR<sup>3</sup>cPb uqv gva'tg figi indgvm I DePZv kv<sup>3</sup> ep` Kti | tKvb tKvb Dirmc` evqgU'tj i bvBtUtRb mivmwi gnuU'Z AveXKitYi gva'tg clKwZK mvi msMhKvii i figKv cij b Kti | Gmtei gta` Wvj RivZxq dmtj i g'j emevmKvix ugt\_vRwe e'vKtUwi qv 0viv Avnwi Z bvBtUtRtbi bvg meklfvte D'tj-L'thvM` | AtbK t'q't' Avst-dmj (Inter cropping) | mv\_xdmj (Alley cropping) | Pvl cxwZ AbyriY Kti ktm'i Drcr`b I figi DePZv DfqB eRvq ivLv nq|

**Dirmc I kv<sup>3</sup>**

th tKvb hshvb cwi Pvj bvi Rb` kv<sup>3</sup> i clqvRb| Nvwi KvUv Kbhij Z w`cS A\_ev e'vUvni'tz i'q'Z kv<sup>3</sup> LiP Kti mgq wbt`R Kti | Rxe'tKI Muzkxj ev Kvh'qg ivLvi Rb` kv<sup>3</sup> i clqvRb| Avi Rxei GB kv<sup>3</sup> Avtm Lv` MhY I Zv wecvtki gva'tg| wKs' GB Lv` i Rb` cwx\_i mKj clYx'KB clZ`q' ev ctiv'q'fvte Dirmc` i DctiB wbfP KitZ nq|

meR Dirmc I MvOcvjv cvZvi tKviti vdtj i mivith` tmsi kv<sup>3</sup>tK KvR j wMtq evqgU'tj i CO<sub>2</sub> I guEKv` cvmbi 0viv kK'vRivZxq Lv` `Zvi Kti | ZY'fvRx clYx' clZ`q'fvte Gme Dirmc` tK Lv` i f'c MhY Kti | Avevi gvsmvix clYxiv ZY'fvRx clYx'tK Lv` i f'c MhY Kti Rxeb aviy Kti | mZ'ivs Lv` i f'cx R'j vbi avik wmvte Dirmc` i tKvb weK' t'bb| G KvifY Dirmc` e'ZxZ cwx'extZ Rxe'tbi Av`ZB Ki'bv Kiv hvq bv|

**Dirmc I RbmsL`v ep`**

cwx\_i eZ'vB RbmsL`v clq 550 tKwU Ges clZ eQi clq 2% nvti Zv te'to P'tj tQ| RbmsL`v ep`i GB nvi Ae'vZ `vK'tj AvMvix 40 ermtii gta` cwx\_i RbmsL`v clq w'Y nte|

cwx\_i eZ'vB RbmsL`v clq 550 tKwU Ges clZ eQi clq 2% nvti Zv te'to P'tj tQ| RbmsL`v ep`i GB nvi Ae'vZ `vK'tj AvMvix 40 ermtii gta` cwx\_i RbmsL`v clq w'Y nte| cwx'extZ eZ'vB th Avev`thvM` Rvq AvtQ Zv w`tq GB ewaZ RbmsL`vi Lv` thvMvB t`qv hvte bv| dtj Dirmc`eb KitZ nte Avi I Avak DdkvRv'Zi dmj Ges Db'ZZi Drcr`b clYx' | Avi Gme wKQ'j mvt`\_B m'v'v' `v'tK cwi tek `t'Yi AvksKv|

Zte Lv` thvMvB cl'qv eu'j vstKB wbfP Kite Kx cwi gvY `q'Zvi mvt`\_ meR Dirmc` tmsi kv<sup>3</sup>tK e'envi thvM` Lv` kv<sup>3</sup>tZ igv'shi Z KitZ cvitQ Zvi Dci | GK mgv'q'vq t`Lv tMtQ cwx'extZ th cwi gvY tmsi kv<sup>3</sup> m'vj vK-mst'kd't'Yi gva'tg Lv` kv<sup>3</sup>tZ cwi YZ nq Zvi kZKiv 50-80 fvMB mvti msNvUZ nq| ZvB weK' Lv` wmvte clYx'tK fv'el` tZ mvti i w'tKB nq'tZv ZvKv'tZ nte| Zte mgq `vK'tZ RbmsL`v mngZ ivLvB DrKó.c'sv|

**meR Dirmc I R'j vbi**

mf`Zvi G h'tM R'j vbi c'vB Drm nt`Q KvV, Kqj v, w'v'tRj , t'ctU'tj , clKwZK M'vm BZ`v' | Gme\_tj vB clZ`q' ev ctiv'q'fvte Dirmc` Riv Dcr`vb| m'v'v' AZx'tZ gvUj wbfP P'vci c'to eo eo e'q' Kqj vq cwi YZ n'tq'tQ| f'M't'f'gRy' t'Zj I M'vm clKv'v's'ti Dirmc` I c'Yxi t`n t`\_tKB m'p c`v`\_P Kv'tRB eZ'vB hv's'K mf`Zv'tK Dirmc` B m'Pj titL'tQ| Zte Dirmc` Riv GmKj c`v`\_B cwi tek `t'Yi Ab`Zg KvifY n'tq `wotq'tQ| Avevi Dirmc` B Gi AtbKvsk Av'ixKi't'Yi gva'tg cwx'extZ Dcnvi w'tZ cv'ti wbg' cwi tek|

**Dw`c I RieRMZ**

gubly Zvi Lv`", e`i evm`vb, AvmevecI, kw`3 ev Rly vb Ges ``bw`b e`enih`Avi I eU DcKi`Yi Rb` cL`"q] ev ctiv`q]fivte Dw`c`i Dci wbf`Pkxj | GgbwK ti v`Mi JIa, t`bkiRvZ `e` GmeI Dw`c`i `vb| i`aygvbyB bq c`u`exi hveZxq c`OYxKj Dw`c`i Qvov Zit`i Aw`Zj eRvq ivL`Z cvti bvl | KviY me c`OYxB Lv`"i Rb` cL`"q] ev ctiv`q]fivte Dw`c`i Dci wbf`Pkxj |

c`OYxi wbtktmi mvt\_ MpxZ  
O<sub>2</sub> Dw`c`i mvtjvK-  
mstk`dY c`u`qvi DcRvZ|  
Avevi cktmi mvt\_ wbmZ  
CO<sub>2</sub> Dw`c`i mvtjvK-  
mstk`dY c`u`qvi AwZ Ri`yx  
Dcr`vb| m`zi`is evqg`U`ij  
CO<sub>2</sub> I O<sub>2</sub> Gi fivmvg`  
i`q]vq Dw`c`i I c`OYx  
I Zt`c`Zfivte RvovZ|

ZvB c`k`w`Z`Z Dw`c`, c`OYx I cwi`te`tki mvt\_ itq`Q wbmly m`u`K` c`OYxi wbtktmi mvt\_ MpxZ O<sub>2</sub> Dw`c`i mvtjvK-mstk`dY c`u`qvi DcRvZ| Avevi cktmi mvt\_ wbmZ CO<sub>2</sub> Dw`c`i mvtjvK- mstk`dY c`u`qvi AwZ Ri`yx Dcr`vb| m`zi`is evqg`U`ij CO<sub>2</sub> I O<sub>2</sub> Gi fivmvg` i`q]vq Dw`c`i I c`OYx I Zt`c`Zfivte RvovZ| GQvovI ev`ocivZ, evqg`U`ij i Zicgv`Iv, eR`evZ, Kj Kvi Lvvi t`axqv I k`a BZ`w` c`OZnZ Kti cwi`te`tkK `^Q ivL`Z Dw`c`i Ae`vb itq`Q|



**Ablyj b (Activity) t`** O`c`u`extZ gublymn Ab`vb` c`OYxi Aw`Zj meR Dw`c`i vRxi Dci wbf`Pkxj O- G Dw`3wIi h\_v`Zv c`OYV Ki`ly|

**cv`W`Ei gj`vqb 1.4**



mivK DE`ti i cv`tk wUK wPy (v) w`b|

- 1/ meR Dw`c`i tK Kve`B avi K ejv nq tKb?
  - K) Kve`B-WvB-A· vBW Z`wM Kti etj
  - L) Aw` tRb Z`wM Kti etj
  - M) Kve`B Av`ExKiY Kti etj
  - N) Aw` tRb Av`ExKiY Kti etj
  
- 2/ eZ`g`v`tb evqg`U`ij CO<sub>2</sub> Gi cwi`g`vY KZ?
  - K) 300 w`c`w`Gg
  - L) 315 w`c`w`Gg
  - M) 325 w`c`w`Gg
  - N) 350 w`c`w`Gg
  
- 3/ GK M`ig` c`w`b ev`u`rfetb KZ kw`3 i c`O`qvRb?
  - K) 380 K`vj w`i
  - L) 580 K`vj w`i
  - M) 680 K`vj w`i
  - N) 780 K`vj w`i
  
- 4/ eZ`g`v`tb evsj v`tk ebf`v`gi cwi`g`vY KZ?
  - K) c`O`q 25 kZvsk

- L) c0q 24 kZvsk
- M) c0q 15 kZvsk
- N) c0q 6 kZvsk

5/ GK tn±i Rng t\_+K Dm<sup>mc</sup> c0Zw b Kx cwi gvY CO<sub>2</sub> AvE<sup>x</sup>Ki Y Kti?

- K) c0q 650 tKwR
- L) c0q 850 tKwR
- N) c0q 1250 tKwR
- M) c0q 1050 tKwR

6/ e<sup>q</sup>ti vctYi gva`tg emj qmo c0Zti va e`e`v tKv\_vq Pij yAvtQ?

- K) ersj vt`tk
- L) fvi tZ
- M) gi t°vtZ
- N) ktj vavq

7/ c<sub>w</sub>\_exi RbmsL`v ew<sup>x</sup>i nvi (c0q) KZ?

- K) 1%
- L) 2%
- M) 3%
- N) 4%

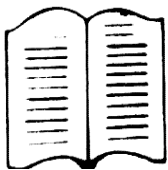
### cw 1.5 ersj vt`tki cwi tek bwi I cwi tekMZ Ae`v



G cvl tktl Avciob –

- ◆ cwi tek bwiZi tcl<sup>q</sup>Z I Dtik` eY<sup>0</sup>v Ki tZ cvi teb|
- ◆ cwi tek bwiZgij vi newfbaw` K m<sup>u</sup>tK<sup>a</sup>vi Yv w` tZ cvi teb|
- ◆ ersj vt`tki cwi tekMZ Ae`v Avtj vPbv Ki tZ cvi teb|

### cwi tek bwiZi tcl<sup>q</sup>Z



AvR mekRto cwi tek Ae<sup>q</sup>tiq i b`k0mgn m<sup>y</sup>u0 ntq DVtZ i i yKti tQ| tMwUv gvbe RwiZtK Avmbawech<sup>q</sup>i nVZ t\_+K i q<sup>l</sup>vi Rb` Zvb mek<sup>v</sup>cx Pj tQ wei vgnv c0P0v| gvbe m<sup>t</sup>PZbZv RwiMtq tZij vi Rb` c0ZeQi Aby0Z nt`Q mek<sup>v</sup> cwi tek w` em| GQrov Zt`i Av`vb-c0vb I fivel`Z Kg<sup>e</sup>xwZ uba<sup>f</sup>tYi Rb` Av<sup>A</sup>wj K I Av<sup>S</sup>RwZK ch<sup>q</sup>q Aby0Z nt`Q e<sup>u</sup> tmvgbvi I w<sup>t</sup>u<sup>m</sup>Rqvg|

mek<sup>v</sup>cx cwi tek wech<sup>q</sup>i  
 G m<sup>u</sup>s<sup>j</sup> tMe ersj vt`tki  
 Ae`v Avil Ki<sup>0</sup>l GLvtb  
 t`Lv w` t`Q Dch<sup>q</sup>mi eb`v,  
 Liv, Nw<sup>S</sup>o Rtjv`Qv<sup>t</sup>mi  
 gtZv c0KwZK` jh<sup>m</sup>|

mek<sup>v</sup>cx cwi tek wech<sup>q</sup>i G m<sup>u</sup>s<sup>j</sup> j tMeersj vt`tki Ae`v Avil Ki<sup>0</sup>l GLvtb t`Lv w` t`Q Dch<sup>q</sup>mi eb`v, Liv, Nw<sup>S</sup>o Rtjv`Qv<sup>t</sup>mi gtZv c0KwZK` jh<sup>m</sup>| t`tki DEiv<sup>A</sup>tj gig<sup>q</sup>Zvi c0<sup>v</sup>gK j q<sup>l</sup>Yw` BtZvgta`B Aby<sup>z</sup> nt`Q| b`-b`xi ubastk jeYv<sup>3</sup>Zii c0Kvc evotQ| fiv<sup>q</sup>lq, ebv<sup>A</sup>tj i`<sup>z</sup> Ae<sup>q</sup>lq, Rjevqyl Avenl qvi Av`i Zwmn Ab`vb` cwi tekMZ mgm`vl we`gvb i tqtQ| GB tcl<sup>q</sup>tZ cwi tek msi q<sup>l</sup>Y I Db<sup>q</sup>b m<sup>s</sup>mu<sup>s</sup>l Kv<sup>h</sup>qg mg<sup>s</sup>q Kivi Dtik` ersj vt`k mi Kti i cwi tek I eb g<sup>s</sup>y<sup>j</sup>q t`tki cwi tek` tY I Ae<sup>q</sup>lq m<sup>s</sup>mu<sup>s</sup>l mgm`w i Pw<sup>y</sup>Z Kti 1992 m<sup>t</sup>b cwi tek bwiZ c<sup>v</sup>qb Kti tQb|

### cwi tek bwiZi Dtik`mgn

- o cwi tek msi ̄Y I Dbq̄tbi gva ̄tg c̄K̄uZK fvi mvg eRvq i vLv|
- o t k̄tK c̄K̄uZK ̄t̄h̄Mi t̄Qvej t t̄K ḡ ̄ i vLv|
- o me ai t̄bi ̄jY I Ae ̄q̄q̄j-K KgR̄v̄U kbv̄KiY I ̄bq̄šY|
- o me ̄ti cwi tek m̄šZ Dbq̄b c̄x̄wz Abyi Y Kiv|
- o mKj RvZiq m̄ú̄t̄ i j vMmB, ̄x̄N̄gq̄r̄x Ges cwi tek m̄šZ e ̄envi ̄b̄w̄Z Kiv|
- o cwi tek m̄šZ Av̄šR̄uZK D̄t̄ ̄v̄Mi m̄t̄½ h\_v̄m̄e m̄uq̄f̄ite R̄w̄Z \_vKv|

**cwi tek b̄w̄Zgvj v**

eisj v̄t̄ k mi Kiv̄i i eb I cwi tek ḡšYj q KZR. 1992 m̄tb c̄Yx cwi tek b̄w̄Z m̄šY ̄B AvKiv̄i ̄b̄t̄m̄c̄D̄ E n̄t̄j v t

- 1/ **Kul. b̄w̄Z t Kul. Dbq̄tbi mKj c̄P̄ov I c̄h̄ȳ cwi tek m̄šZ f̄ite KiY| Kul. m̄ú̄t̄ i w̄f̄iE msi ̄Y I ̄x̄N̄gq̄r̄x e ̄envi ̄b̄w̄Z KiY| gvb̄y I c̄Yxi Dci ̄ȲuZKi c̄f̄ie i v̄L Ggb me Kul. DcKi t̄Yi e ̄envi ̄bq̄šY Kiv| cwi tek Ab̄ȳj c̄K̄uZK Z̄š thḡbt cv̄U I cv̄URvZ ̄ē̄w̄ i e ̄envi Drm̄v̄nZKiY|**
- 2/ **̄w̄k̄i m̄šZ b̄w̄Z t cwi tek ̄t̄Y K̄ti Ggb cY ̄Drcv̄ bKvix ̄w̄k̄i ̄v̄cb ̄b̄w̄l x̄KiY, ̄w̄cZ ̄w̄k̄i m̄ḡr̄ ch̄f̄q̄m̄tg ēŪKiY Ges G mKj ̄w̄k̄i c̄Z̄oib KĒR̄ Drcw̄i Z c̄f̄Y i cwi tek m̄šZ ̄w̄k̄i cY ̄D̄m̄eb| c̄P̄j̄t̄bi gva ̄tg H mKj c̄f̄Y i e ̄envi ̄b̄i s̄m̄v̄nZKiY| cwi tek m̄šZ j vMmB c̄h̄ȳ ̄D̄m̄eb̄t̄bi M̄t̄el Yv I m̄ú̄m̄vi Y Kiv̄f̄ig t̄Rvi ̄vi KiY|**
- 3/ **̄v̄r̄ I ̄v̄r̄ m̄šZ b̄w̄Z t mKj t̄q̄t̄ Rb̄ ̄t̄ ̄vi Rb̄ ̄ȲuZKi KgR̄v̄U c̄Z̄t̄iva Kiv| ̄v̄r̄ ̄w̄k̄i ̄f̄iq̄ cwi tek w̄elqK K̄w̄i K̄žvg Āšf̄̄KiY| kni I M̄ḡv̄Āt̄j mKt̄j i Rb̄ cwi tek m̄šZ Aveim I Kḡt̄j i e ̄e ̄v̄KiY|**
- 4/ **R̄j̄v̄b b̄w̄Z t cwi tek ̄t̄YKvix R̄j̄v̄b̄m̄ḡ t̄ni e ̄envi ̄b̄i s̄m̄v̄nZKiY| Kg ̄ȲuZKvi K I ̄w̄k̄i R̄j̄v̄bi e ̄envi Drm̄v̄nZKiY| R̄j̄v̄b̄ m̄v̄k̄t̄Kvix Db̄z̄ c̄h̄ȳ ̄D̄m̄eb I m̄ú̄m̄vi YKiY| gR̄ž I bev̄q̄b̄t̄h̄M̄ R̄j̄v̄b̄ msi ̄Y Ges GZ ̄m̄šZ b̄Z̄b̄ c̄K̄i M̄h̄t̄Yi c̄t̄ēcwi tek M̄Z c̄f̄ie ̄b̄w̄Z KiY|**
- 5/ **c̄w̄b̄ m̄ú̄ I eb̄v̄ ̄bq̄šY t c̄w̄b̄ m̄ú̄ Dbq̄b I t̄m̄P̄ e ̄e ̄v̄cb̄v̄q̄ cwi tek m̄šZ e ̄envi ̄b̄w̄Z KiY| c̄w̄b̄ m̄ú̄ Dbq̄t̄b̄ B̄t̄Ziḡt̄a ̄M̄px̄Z e ̄e ̄vi ̄Āȳ ̄j̄x̄KiY Ges mKj R̄j̄v̄k̄q̄t̄K ̄t̄Yḡ ̄i v̄Lv̄i e ̄e ̄v̄ M̄h̄Y| f̄; M̄f̄̄ I f̄; Dcwi ̄v̄c̄w̄bi e ̄envi I e ̄e ̄v̄cb̄v̄ w̄ēÁv̄b̄w̄f̄iĒK, t̄UKm̄B I cwi tek m̄šZ KiY|**
- 6/ **f̄iḡ e ̄e ̄v̄cb̄v̄ t cwi t̄t̄ki f̄vi mvḡ i ̄Ȳv̄Kvix f̄iḡ e ̄envi cwi K̄iv̄ M̄h̄Y| f̄igi ̄Ȳq̄t̄iva, DēP̄Zv̄ msi ̄Y I ēx̄, f̄iḡ c̄b̄i x̄vi I w̄ērf̄b̄w̄B̄t̄K̄w̄m̄t̄ ÷ t̄gi m̄t̄½ m̄s̄w̄Z c̄Y ̄f̄iḡ e ̄e ̄v̄cb̄v̄ t̄Rvi ̄vi KiY| R̄iḡi j̄ ēȲv̄Zv̄ I ̄Ȳv̄ix̄ c̄f̄ie t̄iva KiY|**
- 7/ **eb̄R̄ m̄ú̄ m̄šZ b̄w̄Z t cwi t̄t̄ki f̄vi mvḡ I Av̄ ̄f̄vḡw̄RK c̄Q̄q̄v̄R̄t̄bi t̄c̄f̄t̄Z eb I ēq̄w̄ msi ̄Y Ges b̄Z̄b̄ K̄ti ebv̄q̄b| eb̄R̄ m̄ú̄ i ̄w̄k̄i ̄D̄m̄eb I Zv̄ e ̄en̄t̄i Drm̄v̄n c̄v̄b| eb̄ c̄Yx̄ I R̄ie ̄ēw̄P̄I msi ̄Y Ges GZ ̄m̄šZ M̄t̄el Yv I Áv̄b̄ w̄e ̄t̄i m̄v̄q̄Zv̄ c̄v̄b|**
- 8/ **gr̄m̄ I c̄īm̄ú̄ t gr̄m̄ m̄ú̄ Dbq̄bK̄t̄i R̄j̄v̄f̄iḡi m̄s̄v̄i I m̄t̄K̄v̄P̄b t̄iva KiY| gr̄m̄ I c̄īm̄ú̄ i Dbq̄b Kḡm̄P̄t̄Z ḡv̄b̄t̄M̄f̄ ebv̄Āj I Ab̄v̄b̄ B̄t̄K̄w̄m̄t̄ ÷ ḡ h̄t̄Z**

eb̄R̄ m̄ú̄ i ̄w̄k̄i ̄D̄m̄eb I Zv̄ e ̄en̄t̄i Drm̄v̄n c̄v̄b| eb̄ c̄Yx̄ I R̄ie ̄ēw̄P̄I msi ̄Y Ges GZ ̄m̄šZ M̄t̄el Yv I Áv̄b̄ w̄e ̄t̄i m̄v̄q̄Zv̄ c̄v̄b|

úgwKi mɛ̃nb bv nq Zv ubwǾZKiY| grm̃ mɛ̃úɛ̃ i Rb̃ ʲjwZKviK cwb Dbq̃b, eb̃v ubq̃šʲ I t̃mP cKí mg̃ni cB̃gʲvq̃b Ges gvQ Pɛ̃I i ɛKí ẽẽ ʲv M̃hY|

9| **Lṽ b̃wZ t** Lṽ Drcṽb, msi ʲjY, c̃q̃uqvRvZKiY I ẽEb̃ ẽẽ ʲv ʲṽ I cwi tek mɛ̃Z fiṽte ubwǾZKiY| ɛebó Lṽ cwi tek mɛ̃Z fiṽte ub̃úw̃EKiY Ges ʲṽ ʲṽ i Rb̃ úgwK ʲṽc Lṽ ʲṽ ʲṽ Avg̃ vb̃ ubw̃ xKiY|

10| **DcKj xq I mvg̃yK cwi tek t** DcKj xq I mvg̃yK B̃tKw̃m̃t ÷ t̃gi cwi tek mɛ̃Z msi ʲjY I Dbq̃b ubwǾZKiY Ges GZ̃ Dc j̃ʲ M̃telYv Kvh̃ɛ̃g tRvĩviKiY| DcKj xq I mvg̃yK G̃jvKvq me ai t̃bi Af̃š̃li xY I ʲẽf̃ ɛ̃kK ʲṽYg̃j-K KgR̃ṽú c̃ǾZ̃ti vaKiY| m̃s̃k-ó G̃jvKvq g̃Z gṽt̃Qi cwi gvY m̃nbk̃j gṽI vq̃ i vLvi ẽẽ ʲvKiY|

11| **thw̃thw̃ I cwi enb t** ʲj, tij, ɛegvb I t̃b̃š̃\_ cwi tek ʲṽYg̃ ʲṽLvi eṽé c̃ ʲj̃c M̃hY| Af̃š̃li xY t̃b̃š̃-ẽ ʲṽ i W̃KBq̃w̃m̃g̃r̃ KZ̃R̃ cwb I ʲj fiṽMi ʲṽYKṽh̃ ubq̃šʲKiY|

12| **M̃p I b̃Mivq̃b t** M̃p I b̃Mivq̃bi mKj cwi Kí bv I M̃telvq̃ cwi tek MZ ɛ̃P̃š̃ m̃ú̃<sup>3</sup>KiY| kni I M̃g̃ṽÁ̃t̃j i AveñmK G̃jvKvq ch̃q̃m̃t̃g cwi tek mɛ̃Z m̃j̃h̃M- m̃ỹẽaw̃ m̃ú̃ṽiY Ges ubq̃šʲ| b̃M̃ixi t̃m̃š̃ h̃ẽãf̃b R̃jṽk̃t̃q̃i Dci ʲṽ i ãz̃; c̃ú̃ vb̃|

13| **RbmsL̃v m̃s̃ṽš̃l̃ b̃wZ t** Rbkw̃<sup>3</sup> i mg̃ṽš̃Z, mg̃ṽi Kw̃i Z I cwi tek mɛ̃Z ẽeñvi ubwǾZKiY| Dbq̃bg̃j-K Kṽt̃R g̃ṽj ʲṽ i m̃ú̃<sup>3</sup>KiY Ges ʲẽKvi Rbkw̃<sup>3</sup> ẽeñvi Drm̃ṽnZKiY|

14| **ɛ̃kʲv I MY-m̃t̃PZbZv t** ʲṽ ʲṽ ʲṽ m̃w̃ẽR Dbq̃t̃bi Rb̃ ubi ʲj̃i Zṽ ʲṽ K̃ti ɛ̃kʲṽt̃Zi nvi ʲṽ ʲṽ ɛ̃w̃xKiY| cwi tek msi ʲjY I Dbq̃t̃bi ẽṽc̃t̃i ẽṽcK MY-m̃t̃PZbZv m̃j̃óKiY| c̃ǾZ̃óvbK I A-c̃ǾZ̃óvbK mKj ɛ̃kʲṽ Kvh̃ɛ̃t̃g cwi tek m̃s̃ṽš̃l̃ ɛ̃l̃q̃ Aš̃f̃<sup>3</sup>KiY| mi Kṽix, t̃emi Kṽix I ɛ̃kí c̃ǾZ̃óṽt̃b ub̃t̃q̃ṽRZ Kg̃R̃Z̃P̃, Kg̃P̃w̃i I k̃g̃k̃t̃ i c̃k̃ʲY Kg̃m̃P̃t̃Z cwi tek m̃s̃ṽš̃l̃ ɛ̃l̃q̃ Aš̃f̃<sup>3</sup>R̃iY|

15| **ɛ̃ẽÁvb I c̃h̃ỹ M̃telYv t** RvZxq ɛ̃ẽÁvb I c̃h̃ỹ b̃w̃Zi Aṽl Zvq Dbq̃t̃bi mKj ʲj̃ʲt̃ cwi tek ʲṽY Z̃ṽiK I ubq̃šʲ ʲṽi ẽẽ ʲṽ Aṽt̃ṽcKiY| RvZxq m̃ú̃ ʲṽ i j̃ṽM̃B, ʲṽÑ<sup>3</sup>ṽq̃x Ges cwi tek mɛ̃Z ẽeñvi ubwǾZKi ʲṽi j̃ʲʲ c̃ǾqṽRb̃xq M̃telYv I c̃h̃ỹ D̃m̃ṽeb Drm̃ṽnZKiY|

ʲṽ ʲṽ ʲṽ m̃w̃ẽR Dbq̃t̃bi Rb̃ ubi ʲj̃i Zṽ ʲṽ K̃ti ɛ̃kʲṽt̃Zi nvi ʲṽ ʲṽ ɛ̃w̃xKiY| cwi tek msi ʲjY I Dbq̃t̃bi ẽṽc̃t̃i ẽṽcK MY-m̃t̃PZbZv m̃j̃óKiY|



**Ablyj b (Activity) t** ersj vɛ̃ ʲṽ ʲṽ ʲṽ cwi tek b̃w̃Z KZUṽ t̃g̃t̃b P̃jṽ ñt̃<sup>3</sup>Q| cwi tek b̃w̃Z eṽ ʲṽ ʲṽ ʲṽ Aṽc̃b̃ri c̃Ǿ̃l̃em̃g̃r̃ Z̃ʲj̃ ai ab̃|

**ersj vɛ̃ ʲṽ ʲṽ ʲṽ cwi tek MZ Aẽ ʲṽ**

tKṽb ʲṽ ʲṽ ʲṽ cwi tek MZ Aẽ ʲṽ ub̃f̃P̃ K̃ti Zvi t̃f̃š̃M̃j̃K Aẽ ʲṽ, Aveñl̃qvi Zvi Zg̃, eb̃Rm̃ú̃ ʲṽ i cwi gvY, g̃ṽŨi c̃K̃w̃Z, Aṽ\_ ʲṽm̃g̃ṽm̃RK Aẽ ʲṽ, RbmsL̃v, ɛ̃kʲṽi nvi, ɛ̃k̃t̃i i AM̃h̃i Zṽ BZ̃ṽ ʲṽ i Dci | Z̃ẽ ersj vɛ̃ ʲṽ ʲṽ ʲṽ cwi tek Aẽ ʲṽ t̃q̃i c̃Ǿvb̃ Kṽi Y, ʲj̃ṽ ñt̃<sup>3</sup>Q t

1| **RbmsL̃ṽi Aw̃ẽK̃**

c̃Ǿ̃ GK j̃ ʲj̃ P̃g̃ṽj̃-k ñṽRvi ẽM̃<sup>3</sup> ʲṽK̃t̃j̃ ɛ̃g̃Ũvi Rṽq̃M̃ṽ ub̃t̃q̃ ersj vɛ̃ ʲṽ ʲṽ ʲṽ Aẽ ʲṽ| Gi RbmsL̃ṽ ẽZ̃g̃ṽt̃b c̃Ǿ̃ 12 t̃K̃w̃Ũ Ges eir̃m̃ĩK ɛ̃w̃x̃i nvi 2.1 f̃ṽM̃| m̃x̃g̃Z Rṽq̃M̃ṽ ɛ̃ec̃j̃ R̃b̃t̃M̃ṽxi Aẽ ʲṽ, Z̃ṽt̃ ʲṽ i ʲṽ ʲṽ ʲṽ Aw̃ẽK̃ṽ, c̃Ǿ̃ ʲj̃ I c̃t̃iṽʲj̃f̃iṽte ersj vɛ̃ ʲṽ ʲṽ ʲṽ cwi tek ʲṽ i Dci P̃ic̃ m̃j̃ó Ki ʲṽ|

2/ **tfŠMuj K Ae`ib I cÜKuzK`jha**

ersj vt`k cÜv, tgnbv, hgbv cÜvZ. b`x metašZ cu\_xi Ab`Zg epr e-0ix t`k| DEi  
I ceĀtj mngZ cvnmoqv D`Pfig eif` cĵi v t`kÜvB GK vekij mgfug| t`tki gvS  
w`tq KK0µmšl tiLv AwZµg Kivq G t`k µvštq AĀj fZ| Zte mMi mmba`  
nlqg Ges tšmgy evqy cĵite GLvfb kvZ I MĀt`šj ZxeZv cĶU bq| gvbe mō  
KviY Qvovl wekkl tfŠMuj K Ae`vbi Rb` ersj vt`tki cwi tek Avi thme KviY  
¶wZMĪInq Zv nt`Q t

eĵzvcmmĪi mō AwaKisk  
NwYSoB ersj vt`tki DcKj  
AvNvZ nvtb| ersj vt`tki wekkl  
aitbi tgvPvKuzi DcKj tiLv  
\_vKvi KviYB GgbwU ntq \_vtK|

(K) **NwSo t** eĵzvcmmĪi mō AwaKisk NwYSoB ersj vt`tki DcKj AvNvZ nvtb|  
ersj vt`tki wekkl aitbi tgvPvKuzi DcKj tiLv \_vKvi KviYB GgbwU ntq  
\_vtK| cĵj NwYSo I Rĵj`v`Qvĵmi KviY cĶZ cÜYnmb I mæut`i Ae¶q  
NĵU| Avev` RvĵZ tj vbr cmb XĶK DePZv webó Kĵi, dtj `vfimeK cwi tek  
webó nq|

(L) **eb`v t** cÜv, tgnbv, hgbv mn tQvU eo eü b`x ersj vt`tki Dci w`tq engvb|  
cĶq me\_wj b`xiB DrcwĒ`j ersj vt`tki evBti| elP tšmĵg Gme b`x cĶZ  
cmb I cuj enb Kĵi gvV NvU Qmctq Zĵj| Gi mvt\_ thwM nq tšmgy  
ewöcvZ| dtj mgfugZ t`Lv t`q eb`v| tšmgytĵt` eb`vi cĶKvc LqB  
ZxeZi nq| dtj tĵm hvq gvV, NvU, kni, e`i, Ges MĶg-Rbc`| wecy  
¶q¶wZ NĵU gvV dmtj i Ges emo Nĵi i| cÜYnmb NĵU gvb, Mew`ci I  
Ab`vb` cÜYxi| `wZ ntq cto cmbmn cwi teĵki Ab`vb` Dcv`vb| dtj  
cĶ`vĵe NĵU Kĵj iv, UvBdtqW, Avĵkqmn cÜYvZx eü ti vtMi |

(M) **Kvj`ekvLx I Utb¶wv t** cÜZeQiB `PĪ`-ekvL gvĵm i`ĵivĵi AvNvZ nvtb  
Kvj`ekvLx| tšmgy-ce`FZž Ggb ŠtovejZvm cĶvbZ DEi cwiĶg w`K t`ĶK  
cĶvvnZ nq| GB Štoi mĵePP telM 60 t`ĶK 130 wK. wĵ. Gi gĵa` mĵgve`  
\_vtK| GB Štoi mvt\_ cĶZ ewöcvZ Ges KLtbr KLtbr eRĵm kvj v ewöcvZ  
NĵU| Kvj`ekvLxi eR`ĵgN KLtbr KLtbr kv<sup>3</sup> mĀq Kĵi gvivZK AvKvi avi Y  
Kĵi Ges nvnZi i`toi AvKuz. m`k tgn figi w`ĶK tbtg Avĵm| Gi brg  
Utb¶wv| `f mgtqi gĵa` tKvb `vbi evqy Pvc `Z Kĵg 25 wĵj evĵi i wĵP  
tbtg Avĵtj fquen Utb¶wvi Avk`v \_vtK| Utb¶wvi i`toi Avl Zvq \_vtK cĶÜ  
NwY` th GjvKvi Dci w`tq G So cĶvvnZ nq tmLvfb Niemo, MvQ-cij v PY<sup>o</sup>  
wePY`ntq hvq| cÜY nri vq AmsL` cÜYx| AĵbK mgq gvĵvi dmj chŠl Rĵj  
cĵo hvq|

3/ **Rjvwb I ebm`u`**

`Z MvZtZ evotQ ersj vt`tki RbmsL`v| GB RbmsL`vi Rb` cÜqvRb eim`vb,  
AimevecĪ, Rjvwb BZ`w` DcKiY| Avi Gmĵei wmsn fivMB AvĵtQ ebm`u` t`ĶK|  
dtj t`tki mngZ ebm`u` i Dci µgvMZ Pvc evotQ| eZĶvfb ersj vt`tki ebfigi  
cwi gvY cĶq 6 kZvsk| mZivs eb DRwvKiĵYi dtj cwi teĵki fvi mvg` webó nt`Q |  
fig ¶q ZjwšZ nt`Q, b`xi fivzb I ew`x cvt`Q | cĵve cotQ Avenl qvi Dci  
evotQ So Rĵj`v`Qvĵmi ZxeZv| Avev`j mskwPZ nlqg wectbie gĵLvgy eü  
eb`cÜYx|

4/ **AcwKwZ bMivqb**



Kul.1 cju Dbq b ǵ

- L) bMxi Rj vktqi tmš` h`eµxKi Y
- M) cwi tekmašZ Mp-ubgP
- N) AvevmK Gj vKvq cwi tekmašZ mšhvM maúhvi Y

5/ ešvcvMš i mP AwaKvsk NwSo evsj v`k DcKtj AvNvZ nrbri gj- Kvi Y Kx?

- K) evsj v`k DcKj xq t`k weavq
- L) µvštq AĀtj i t`k etj
- M) e-θxcxq t`k nl qvq
- N) wełki tgvPvKvZi DcKj ti Lvi Rb

6/ evsj v`k kxZ I Mšt`ši ZxeZv Kg nl qvi Kvi Y Kx?

- K) mivMi mivbæ I tgšmgx evqy
- L) KKθ µvšti mivbæ
- M) DĒi -ceĀj xq D`Pfvq
- N) b`x wełšZ eθxc

### cw 1.6 evsj v`tki Kul.cwi tek AĀj mgtni cwi vPvZ



G cvV tkłI Avci b –

- ◆ evsj v`tki Kul.cwi tek AĀj mg tni big ej tZ I wj LtZ cvi teb|
- ◆ tKvb&Kul.cwi tek AĀj tKv\_vq Aew`Z Zv ej tZ I wj LtZ cvi teb|
- ◆ Kul.cwi tek AĀj mg tni cāv b`eukó` kbr<sup>3</sup> Ki tZ cvi teb|
- ◆ tKvb&cwi tek AĀtj Kx ai tbi dmj Rtbž Zv wj LtZ cvi teb|



weÁvbmšZ Kul.e`e`v cwi Pvj vri Rb` Kul.cwi tek AĀj maútk`ev`é Ávb\_vKv evĀYxq| ZvB G cvtV evsj v`tki Kul.cwi tek AĀj mgtni msvŕŕB cwi vPvZ Zžj aivi cĀPón tbgv ntqtQ| mšhvŕRZ gvbwPŕĪ evsj v`tki 30wU Kul.cwi tek AĀtj i Ae`vb t`Lv tbn ntqtQ|

#### Kul.cwi tek AĀj - 1 t cjuZb ingyj q cv` fvg

cĀMo I VvKžMvi tRjvi AwaKvsk `vb Ges w`bvRcy tRjvi DĒi cwiŕgvĀj vbtq G Gj vKv MvWZ| GLvbKvi AwaKvsk fvg DĒz(58%) ev gvSmi DĒz(34%), emZemo I Rj vfvqgi cwi gvY 7 fivM| gvU tetj -t`vAvka t`\_tK t`vAvka| `Re c`v`Kg, pH gv b 4.5 t`\_tK 5.5| iwe tgšmg meŕR, tMvj Avj yMg, tevŕi varb, AvL cāv b dmj | Lwi c - 1 tgšmg AvDk aiv I cvU Ges Lwi c - 2 tgšmg ti vcv Avgtbi Pvl nq|

#### Kul.cwi tek AĀj - 2 t mµµq vZ`v cieb fvg

vbj dvgvix, iscj, jvj gvbi nŕU, KwoMŕg I MvBevŪv tRjvi vZ`v, aijv I `šKgvv b`xi wełšZ Zxi eZx`mi yGj vKv vbtq G AĀj MvWZ| G AĀj gvSmi DĒz(72%) ai tbi fvg vbtq

MWZ| gnuU tetj -t`vAvka t\_#K t`vAvka| pH gvb 6.0 t\_#K 6.5 chS| iue tgsmjg Abiev` | Lwi c - 1 tgsmjg tevbr AvDk Ges Lwi c - 2 tgsmjg Avgb cãvb dmj |

**Kul.cwi#tek AAj - 3 t vZ`-v mic# cieb fig**

epEi iscj tRjvi AwaKvsk `vb, cAMtoi ce#Aj, w`bvRcj, e,ori DEivAj Ges RqcjnuU, bI Mv I ivRkvnx tRjvi Askv#tkl nbtq G AAj MWZ| AwaKvsk fig gvSmi D#z (51%) t\_#K D#z(35%)| gnuU mvari YZ t`vAvka| `Re c`vt`P cwi gvY Kg| pH gvb 5.4 t\_vK 6.5 chS| iue tgsmjg gj-Z Wvj RvZxq dmtj i Aver` nq| Lwi c - 1 tgsmjg tevbr AvDk Ges Lwi c - 2 tgsmjg Abiev` \_vtK|

**Kul.cwi#tek AAj - 4 t Ki#Zvqv ev#j x c-veb fig**

e,ori c e#Aj i Aa#k Ges imivRMÄ tRjvi AwaKvsk `vb G AA#tj i Aš f#| fig cãvbZ gvSmi D#z(44%) Ges D#z(23%) ai#bi | emZemo I Rj vfigi cwi gvY 14 f#M| gnuUi Mvb c#j -t`vAvka t\_#K c#j MWZ Kv#v-t`vAvka| pH gvb 5.4 t\_#K 5.7 chS | iue tgsmjg cãvb dmj gvmKj vB I gi`i | Lwi c - 1 tgsmjg tevbr AvDk Ges Lwi c - 2 tgsmjg tivcv Avgb|

**Kul.cwi#tek AAj - 5 t vb#Av#vB teimb**

G AA#tj i AwaKvsk `vb bI Mul bvtUvi tRj vq Aev`Z| wKQyv #z`Ask ivRkvnx, e,or I imivRMÄ tRjv chS we` Z| GLvbKvi fig g j Z gvSmi vb#ai#bi (86%)| emZemo I Rj vfigi cwi gvY kZKiv 4 f#M| gnuU K`#v# | `Re Dcr`v#bi cwi gvY ga`g| pH gvb 4.8 t\_#K 6.0 chS| iue tgsmjg Abiev` | Lwi c - 1 tgsmjg tevbr Avgb Drcb#nq Ges Lwi c - 2 Abiev` \_vtK|

**Kul.cwi#tek AAj - 6 t vb#eY#ev cieb fig**

bI MutRjvi c#Dg c#š i Askv#tkl Ges bevemÄ tRjvi me#DEi c#š i Askv#tkl nbtq G AAj MWZ| AwaKvsk `vb vb#Aj (60%) Ges wKQyGjvKv gvSmi vb#Aj (10%) ai#bi | emZemo I Rj vfigi cwi gvY kZKiv 30 f#M| gnuU K`#v# I `Re Dcr`v#bi cwi gvY ga`g ai#bi | pH gvb 4.5| iue tgsmjg tev#v#bi Pvl n#q \_vtK| Lwi c tgsmjg Rvq c#ZZ \_vtK|

**Kul.cwi#tek AAj - 7 t m#q e#cy I hg#v cieb fig**

KwM#g tRjvi c e#Aj, MvBevÜv, e,or, imivRMÄ Ges ciev# tRjv, tkic#j i c#DgvAj, Rvgj cy, Uv#vBj I gvbKMA tRjv nbtq G AAj MWZ| GQvov XvKv, gvYMA, bvi vqYMA Ges Pv#cy tRjvmg #ni Askv#tkl G AA#tj i Aš f# | gvSmi D#zRvq i cwi gvY 37 kZvsk, gvSmi vbPzRvq 20 kZvsk Ges emZemo I Rj v# vq 30 kZvsk| gnuU i e#U g j Z tetj/c#j gnuU mg# | pH gvb 7.5 t\_#K 7.9| gvSmi D#zRvq#Z iue tgsmjg Abiev` A\_ev Mg, Avj yP#v# ev`vg, Lwi c - 1 tgsmjg cvU I tevbr AvDk Ges Lwi c - 2 mg#q tivcv Av#bi Pvl A\_ev c#ZZ \_vtK|

**Kul.cwi#tek AAj - 8 t bZ# e#cy I hg#v cieb fig**

tkicy, Rvgij cy I Uv1vBj tRj vmg tni cuDgvAaj, gmbKMA, XvKv, gvYMA, bviqYMA I MvRxcy tRj vmg tni Askuekl Ges cjuZb epcy b` msj Mægggbmsn, KtkviMA I biims`x tRj vi Askuekl ubtq G AAj MvZ| fig gvSmi DEz(42%), DEz(18%) Ges gvSmi ubPz(19%) ai tbi | emmo I Rjvkq 12 fivM| gvu t`vAvk| pH gvb 5.5 t\_tK 6.8| iue tgsmtg DEzRig cuZZ \_vtK, KŠ'gvSmi DEzai tbi Rig tZ tMj Avj ymvi Iv, gvmKj vB I Avtgi Pvl nq| Lwi c - 1 tgsmtg DEz gvSmi DEzRig tZ tevvi/tivcv AvDk Ges cvtUi Pvl nh| Lwi c - 2 tgsmtg ubPzRig cuZZ Ges gvSmi I DEzRig tZ tivcv Avg tbi Pvl nq|

**Kul. cuit tek AAj - 9 t cjuZb epcy cieb fig**

tkicy, Rvgij cy, Uv1vBj, gqgbmsn, tbTtKivv, KtkviMA, biims`x I bviqYMA tRj vmg tni ue` xYAAj Ges XvKv I MvRxcy tRj vi Kq`sk ubtq G AAj MvZ| GLvbKvi fig DEz(28%), gvSmi DEz(35%), gvSmi ubPz(20%) Ges ubPz(7%) ai tbi | emZemo I Rjvfugi cuigvY kZKiv 10 fivM| gvu cuj -t`vAvk, Re c`v\_Kg | pH gvb 4.5 t\_tK 4.9 chS | DEz gvSvi x DEzRig tZ iue tgsmtg Mg, mvi Iv I Wj RvZiq km" Pvl nq| Lwi c - 1 tgsmtg AvDk I KQycvtUi Pvl nq Ges Lwi c - 2 tgsmtg tivcv Avg tbi Pvl nq|

**Kul. cuit tek AAj - 10 t mpuq Mzv cieb fig**

beveMA I ivRkivx tRj vi Mzv me tashZ AAj t\_tK ewi kij I j Rxcy tRj vi tgNbv chS G GjvKv ue` Z| kZKiv 33 fivM gvSmi DEzRig Ges 18 fivM gvSmi ubPzF ig ubtq G GjvKv MvZ| emZemo I Rjvfugi cuigvY 33 fivM| gvu t`vAvk, Re c`v\_Kg, pH gvb 6.9 t\_tK 7.9| cavb Drcbædmj iue tgsmtg tLmvi, gvmKj vB, mvi Iv I tev tvi| Lwi c - 1 tgsmtg AvDk, cuU, Ges Lwi c - 2 tgsmg Abvev` \_vtK|



uP1 1.6.1 t ersj v`tki Kul.cwi tek AAj mg n

**Kul.cwi tek AAj - 11 t D'P M'v c'eb fig**

beveMÄ, ivRkivnx, cvebvi `vYisk, K'öqv, tgtni c'j, P'qvWv'v, uSbvB`n, gv, iv, h'kvi Ges Lj'bv I mvZ'xi vi DEivÄj, Ges bl Mul boiBj tRj vi m'gub` Gj vKv G AA'tj i Aš'f`| GLv'tb kZKiv 43 fivM DE'fig, 32 fivM gvSvii DE'fig, 11 fivM emZewo I Rj v'fig Ges evK uba'fig| gvuU cij -t`vAvk, `Re c`v`Kg, pH gvb 6.1 t`tK 7.9| i ne tgšm'g cävZ Wj RvZxq dmj, Mg, mvi Iv, tMj Avj yAv'g BZ`v` f'ij R'tb'j Lvi c - 1 tgšm'g tev'v aib I civ Ges Lvi c - 2 tgšm'g ti vcv Avg'tbi P'vI nq|

**Kul.cwi tek AAj - 12 t uba'v'v c'eb fig**

bv'tUvi, cvebvi, tM'qvj`>, dvi`c'j, gv`vix'j, tM'cvj MÄ, kvi qZc'j, K'öqv, gv, iv I boiBj tRj vi c evsk, Lj'bv I ev'tMiv'tUi DEi-c evsk, emi kv'tj i DEivsk, Ges gvbKMÄ, XvKv I g'v'M'tÄi `vY-c'v'g'v'Äj v'tq G Gj vKv MvZ| GLv'tb kZKiv 13 fivM DE'fig, 29 fivM gvSvii DE'fig, 31 fivM gvSvii uba'fig, 14 fivM uba'fig Ges evK'Uv emZewo I Rj v'fig| gvuU cij -t`vAvk t`tK Kv`v-t`vAvk| `Re c`v`g'a`g, pH gvb 6.2 t`tK 7.7 ch'š| i ne tgšm'g cävZ Wj RvZxq km` Ges mvi Ivi Avev`nq| Lvi c - 1 tgšm'g tev'v AvDk I civ, AvDk + Avgb Ges Lvi c - 2 tgšm'g ti vcv Avgb, tev'v Avgb A\_ev c'vZZ `v'tK|

**Kul. cūtek AĀj - 13 t Mz tRqvī cieb fīg**

emi kvj , Sij KwW, ūctīvRcj, cUqvLvj x, ei \_bv Ges mȳ i ebmn evtMi nvU, Ljybv I mvZŹxi v tRj v ūbtq G AĀj MvZ | GLvbKvi AwaKvsk fīg (78%) gvSmi Dēzai tbi | emZemo I Rj v fīg cūi gvY 18 fivM | gūU t`v-Avka, `Re c`v\_`ga`g | pH gvb 6.5 t\_ tK 7.0 chŠ | i me tgšmȳg cāvb dmj gūm I gMk j vB | Lwi c - 1 tgšmȳg AvDk Ges Lwi c - 2 tgšmȳg tivcv Avgtbi Pvl nq |

**Kul. cūtek AĀj - 14 t tMcvj MĀ Ljybv Rj v fīg**

gv`vi xcy, tMcvj MĀ, bovBj , htkvi , evtMi nvU I Ljybv tRj vi ūevŹB ūbaĀj ūbtq G Gj vKv MvZ | G Gj vKvi AwaKvsk fīg gvSmi ūPz(41%) t\_ tK ūPz(28%) ai tbi | gūU K`g v<sup>3</sup> I t`vAvka ai tbi | pH gvb 6.5 t\_ tK 7.0 chŠ | i me tgšmȳg cāvbZ Mg, mwi Iv I tQvj v RvZxq dmj fvj RtbŹ | Lwi c - 1 tgšmȳg AwaKvsk Gj vKv Abvev` A\_ev AvDk RtbŹ | Lwi c - 2 tgšmȳg tivcv Avgb cāvb dmj |

**Kul. cūtek AĀj - 15 t Awiqvj ūej**

gvY MĀ I XvKv tRj vi ūej vĀj ūbtq G Gj vKv MvZ | GLvbKvi AwaKvsk fīgB (73%) ūPz emKūv gvSmi Dēzai tbi | emZemo I Rj v fīg cūi gvY kZKiv 14 fivM | gūU Kv vqg, `Re c`v\_`ga`g Ges pH gvb 5.4 | i me tgšmȳg tev tīv I ūKQyWvj RvZxq dmj RtbŹ | ūKŠ`Lwi c - 1 I 2 Abvev` \_v tK |

**Kul. cūtek AĀj - 16 t ga` tgNbv cieb fīg**

ūKtkvi MĀ, eŹbYemoqv, Kvgj -v, Pūcȳ, bi ūms`x I bvi vqY MĀ tRj vmg tni AskūetkI ūbtq G AĀj MvZ | GLvbKvi AwaKvsk fīg gvSmi ūba (29%) Ges ūba (25%) ai tbi | emZemo I Rj v fīg cūi gvY kZKiv 27 fivM | gūU t`vAvka, `Re c`v\_`Kg, pH gvb 4.9 t\_ tK 5.5 chŠ | i me tgšmȳg cāvb dmj tev tīv, mwi Iv I Wj RvZxq km` | Lwi c - 1 tgšmȳg AvDk, AvDk + Avgb Ges Lwi c - 2 cūZZ \_v tK |

**Kul. cūtek AĀj - 17 t ūba tgnbv cieb fīg**

Pūcȳ, j Źxȳ I tbi vqLvj x tRj v ūbtq G AĀj MvZ | G Gj vKvq ūZb ai tbi fīg i tqtQ: Dēz(14%), gvSmi Dēz(28%) Ges gvSmi ūPz(31%) | emZemo I Rj v fīg cūi gvY kZKiv 27 fivM | gūU cūj -t`vAvka, `Re c`v\_`ga`g, pH gvb 5.0 t\_ tK 6.0 | Dēz gvSmi DēzRūgtZ i me tgšmȳg mwi Iv, ūcqvR, gūi P BZ`w` dmj RtbŹ A\_ev Abvev` \_v tK | gvSmi ūPzRūgtZ tev tīv, Mg, mwi Iv BZ`w` cāvb dmj | Lwi c - 1 tgšmȳg cūq me ai tbi RūgtZ AvDk (tebv/tivcv) Ges Lwi c - 2 tgšmȳg tivcv Avgb cāvb dmj |

**Kul. cūtek AĀj - 18 t bZb tgnbv tgnbv cieb fīg**

PĒMg, tdbx, tbi vqLvj x, j Źxȳ, t fiv v, emi kvj , cUqvLvj x I ei \_bv G AĀtj i AŠ f<sup>3</sup> | fīg gvSmi Dēz(45%) ai tbi | emZemo I Rj v fīg cūi gvY 48 fivM | gūU cūj -t`vAvka, `Re c`v\_`ga`g, pH gvb 6.1 t\_ tK 6.8 chŠ | i me tgšmȳg tLmwi , mwi Iv, I tev tīv cāvb dmj | Lwi c - 1 tgšmȳg cūqB Abvev` A\_ev tm tPi gva`tg tev tīv Pvl nq | Lwi c - 2 tgšmȳg me P` tivcv Avgb nq \_v tK |

**Kul.cwi tek AAj - 19 t cjuZb tgnbv tgnbv cieb fig**

uKtkviMÄ, nneMÄ, eipYemoqv, Kugj-v, tbvqvLijx, j`jxcj, biims`x, bvi vqYMA, XvKv, kvizCjy, gv`vixcj, tMicyjMÄ, ewikvj tRjv ubtq G GjvKv MmVZ | gnuU gvSwii DpZ (24%), gvSwii ubPz(33%) Ges ubPz(21%) aitbi | emZemo I Rjvfugi cwi gvY 17 fivM | gnuU cij -t`vAvka, t`vAvka I Kv`vgq | `Re c`v`ga`g, pH gvb 5.0 t`tK 6.5 chS | iue tgSmjg teftiv, mwi Iv cäv dmj | Lwi c - 1 tgSmjg, AvDk, cvU Ges Lwi c - 2 tgSmjg ti vcv ev tevbn Avgb cäv dmj |

**Kul.cwi tek AAj - 20 t ceMjgv Kvkqviv cieb fig**

umtj U, tgj fievRvi, mbyvMÄ I nneMÄ tRjv ubtq AAj MmVZ | GLvrb itqt0 gvSwii DpZ Rng (25%), gvSwii ubPzRng (20%) Ges ubPzRng (36%) | emZemo I Rjvfugi cwi gvY 14 fivM | gnuU cij -t`vAvka I Kv`vgq, `Re c`v`ga`g, pH gvb 4.7 t`tK 6.9 chS | iue tgSmjg teftiv A\_ev Abvew` | Lwi c - 1 tgSmjg AvDk, AvDk + Avgb A\_ev Abvew` Ges Lwi c - 2 tgSmjg ti vcv Avgb A\_ev Abvew` |

**Kul.cwi tek AAj - 21 t umtj U teimb**

mbyvMÄ, nneMÄ, tbTtkvbn, uKtkviMÄ Ges ue. emovvi epEi GjvKv ubtq G AAj MmVZ | GLvrbKvi Avakisk figB ubPz(43%) emKuv gvSwii ubPz(19%) Ges AvZ ubPz(23%) | emZemo I Rjvfugi cwi gvY 11 fivM | gnuU t`vAvka t`tK GtUj, `Re c`v`D`P, pH gvb 4.7 t`tK 4.9 chS | iue tgSmjg cäv dmj teftiv avb | Lwi c - 1 tgSmjg tevbn Avgb A\_ev Abvew` | Lwi c - 2 tgSmjg ti vcv Avgb A\_ev Abvew` |

**Kul.cwi tek AAj - 22 t DEi I ceCv fig**

tkicj, tbTtkvYv, mbyvMÄ, umtj U, tgj fievRvi, ue.emoqv I Kugj-v tRjv ubtq G GjvKv MmVZ | GLvrb itqt0 cävZ DpZRng (33%), gvSwii DpZRng (31%) Ges gvSwii ubPzRng (23%) | emZemo I Rjvfugi cwi gvY 10 fivM | gnuU tetj -t`vAvka, t`vAvka Ges cij -t`vAvka | `Re c`v`ga`g, pH gvb 4.5 t`tK 5.8 | iue tgSmjg g jv, gvmKij vB, mwi Iv I teftiv A\_ev Abvew` | Lwi c - 1 tgSmjg AvDk (tebv/ti vcv), tevbn Avgb A\_ev Abvew` Ges Lwi c - 2 tgSmjg ti vcv Avgb/Abvew` |

**Kul.cwi tek AAj - 23 t PÄMg Dckj mgZj fig**

tcbx, PÄMg Ges K· evRvi Dckj msj MxGjvKv ubtq G AAj MmVZ | GLvrbKvi fig cävZ gvSwii DpZ(43%), DpZ(17%) Ges gvSwii ubPz(13%) | emZemo I Rjvfugi cwi gvY 27 fivM | gnuU cij -t`vAvka, `Re c`v`Kg Ges pH gvb 5.6 | iue tgSmjg wevfbaai tbi mewR, Lwi c - 1 tgSmjg tevbn/ti vcv AvDk Ges Lwi c - 2 tgSmjg ti vcv Avgb |

**Kul.cwi tek AAj - 24 t tmEgUj tKvij 0xc**

tmEgUj tKvij 0xc ubtq G GjvKv MmVZ | GLvrbKvi fig gvSwii DpZ(63%) t`tK DpZ (33%) aitbi | emZemo I Rjvfugi cwi gvY 2 fivM | gnuU tetj t`tK tetj -t`vAvka, `Re c`v`Kg, pH gvb 7.0 t`tK 7.5 | iue tgSmjg cäv dmj gkjv, wcvR, i mby/Abvew` | Lwi c - 1 tgSmjg Abvew` Ges Lwi c - 2 tgSmjg Abvew` /ti vcv Avgb |

**Kul.cwi tek AAj - 25 t mgZj eti`AAj**

Kul. I c j n Dbq b t z

w b v R c j , M v B e v U v , R q c j n v U , e , o v , b l M u m i v R M A Ges b i t U v i t R j v i b t q G A A j  
M v Z | f i g g j Z g v S w i D P z ( 5 5 % ) t \_ t K D P z ( 3 0 % ) | e m Z e m o I R j v f i g i c w i g v Y 9  
f v M | g n U t v A v k , Re c v K g , p H g v b 5 . 0 t \_ t K 5 . 7 | i e t g S m t g A b v e w / A v g , t M j  
A v j y u c q v R , M g , m i i l v | L w i c - 1 t g S m t g A b v e w / A v D k ( t e v b / t i v c v ) G e s L w i c - 2  
t g S m t g t i v c v A v g b |

**Kul. cwi tek AAj - 26 t D'P eti' AAj**

i v R k v n x , b e v e M A I b l M u G j v K v i b t q M v Z | g j Z D ' P f i g ( 9 3 % ) | e m Z e m o I  
R j v k t q i c w i g v Y 6 f v M | g n U t v A v k , Re c v K g , p H g v b 4 . 8 t \_ t K 5 . 9 | i e t g S m t g  
A b v e w / t e v t i v , A v L , M g , W j R v Z x q d m j | L w i c - 1 t g S m t g g j Z A b v e w A \_ e v t e v b  
A v D k G e s L w i c - 2 t g S m t g t i v c v A v g b |

**Kul. cwi tek AAj - 27 t DEi-ce'eti' AAj**

w b v R c j , i s c j , M v B e v U v , R q c j n v U , e , o v G j v K v i b t q M v Z | f i g c a v b Z g v S w i D P z  
( 5 6 % ) t \_ t K D P z ( 3 6 % ) e m Z e m o I R j v f i g i c w i g v Y 7 f v M | g n U t v A v k , Re c v K g , p H  
g v b 4 . 8 t \_ t K 5 . 6 | i e t g S m t g t e v t i v , m i i l v , g u m K v j v B , m e i R , A v L | L w i c - 1  
t g S m t g A v D k , t g v c v U G e s L w i c - 2 t g S m t g t i v c v A v g b / A b v e w |

**Kul. cwi tek AAj - 28 t gajyMo AAj**

X i v K v , M v R i c j , b i m s x , b v i v q Y M A , U v z v B j , g q g b i m s n G e s u K t k v i M A t R j v i A s k w e t k l  
i b t q M v Z | f i g c a v b Z D P z ( 5 3 % ) I g v S w i D P z ( 1 8 % ) , g n U t v A v k , Re c v K g , p H  
g v b 4 . 8 t \_ t K 5 . 5 | i e t g S m t g m i i l v , M g , A v L , t e v t i v | L w i c - 1 t g S m t g A v D k  
( t i v c v / t e v b ) / A b v e w G e s L w i c - 2 t g S m t g t i v c v A v g b / A b v e w |

**Kul. cwi tek AAj - 29 t DEi ce'cnvox AAj**

c a v b Z L v M o i Q u o , e v i e b , P A E M g , K e v R v i , t g S j f i x e v R v i t R j v i c v n n o A A j G e s  
t k i c j , g q g b i m s n , m b v g M A , w e . e m o q v , K u g j - v I t d b x t R j v i u l j i m g x A A j | c a v b Z  
D P z f i g ( 9 2 % ) | e m Z e m o I R j v f i g i c w i g v Y 5 f v M | g n U t v A v k , Re c v K g , p H g v b  
4 . 8 t \_ t K 5 . 5 | i e t g S m t g w e f b e a i t b i m e i R , u g u o A v j y A v L B Z w i P v l n q | L w i c - 1  
t g S m t g m e i R , A v D k A \_ e v A b v e w G e s L w i c - 2 t g S m t g t i v c v A v g t b i P v l n q |

**Kul. cwi tek AAj - 30 t AvLiDiv tmcvob**

w e . e m o q v G e s n w e M t A i t j y G j v K v i b t q G A A j M v Z | f i g c a v b Z D P z ( 5 5 % ) G e s g v S w i  
D P z ( 1 1 % ) | e m Z e m o I R j v f i g i c w i g v Y 6 f v M | g n U t v A v k , Re c v K g , p H g v b 5 . 5  
t \_ t K 6 . 5 | i e t g S m t g i c a v b d m j A v g , K j v , M g , m i i l v | L w i c - 1 t g S m t g t i v c v A v D k ,  
c v U , n j y G e s L w i c - 2 t g S m t g t i v c v A v g b A \_ e v A b v e w |

**cvfVei gj'vqb 1.6**

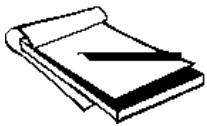
m i i W K D E t i i c v t k u K i P y ( v ) w b |



- 1/ tKvb&tRj v cjuZb ingvj q cv` figi Aš f, bq?  
 K) iscj  
 L) ir`bvRcj  
 M) cÂMo  
 N) ViKžMvU
- 2/ mμq uZ` v c-veb figtZ figi aib Kx?  
 K) DĒz  
 L) ubPz  
 M) gvSwi DĒz  
 N) gvSwi ubPz
- 3/ bI MutRj vi DĒi cĀš tKvb&Kul.cwi tek AĀtj i Aš f,?  
 K) ubæAvT vB teimb  
 L) ubæc YFev **ceeb** fig  
 M) mμq uZ` v **ceeb** fig  
 N) Ki tZvqv evžvj x **ceeb** fig
- 4/ Mžv tRvqi c-veb figtZ Lwi c tgštg cāvb dmj Kx Kx?  
 K) mwi Iv I Avg  
 L) meivR I Avg  
 M) AvDk I cvU  
 N) gvm I gMKj vB
- 5/ Avni qvj vej tKv\_vq Aew`Z?  
 K) Lj'bv I htkvti  
 L) XivKv I ggyMtĀ  
 M) cvebv I imi vRMtĀ  
 N) ewi kv'tj
- 6/ wntj U tewntbi gwU ai b tKgb?  
 K) t`vAvka t`\_tK GtUj  
 L) tej -t`vAvka  
 M) GtUj  
 N) tej
- 7/ gazj Mo AĀtj i gwU tKgb?  
 K) ųvi xq  
 L) A=μq  
 M) jeYv<sup>3</sup>  
 N) ubi t c ų

8/ eti>`AAtj 56 fM tKib&ai#bi Rig?

- K) ubPzRig
- L) gvSwii ubPzRig
- M) DPeRig
- N) gvSwii DPeRig



**Pgršigj`iqb**

**msiŋB I iPbugj-K ckae**

- 1/ Zicgvŋvi Zvi Ztg`i Dci ubfP Kti DvM` i tkŋYieb`im mg n eYŋv Kiŋj|
- 2/ DvM` Rxeŋb cmbi fvgKv m=útk`Avtj iPbv Kiŋj|
- 3/ DvM` cŋ`^b cŋµqvi cwiŋekiq Zvrch`eŋStq ejŋj|
- 4/ AvZvi<sup>3</sup> eb ubatbi dtj evqgŪtj CO<sub>2</sub> I O<sub>2</sub> Gi fvi mg` Kxfite webó nq Zv e`vL`v Kiŋj|

- 5/ cwi tek bwi Zi DfIk` I cAvb bwi Z,tj vi bvg Dc`vcb Ki ly|
- 6/ Kij tevtkLx So I UfYWv mbtq Avtj vPbv Ki ly|
- 7/ cwi tek meAvb ej tZ Kx tevSvq Avtj vPbv Ki ly|
- 8/ Holocoenotic ej tZ Kx tevSvq e`vL`v Ki ly|
- 9/ Dw`c Rxejb cmbi Zvrch`egstq ej ly|
- 10/ `RweK Dcv`vb m`utK`hv Rv`bb Dc`vcb Ki ly|
- 11/ Lv`-`kKj I Lv`-Rvtj i cv`R` egstq ej ly|
- 12/ BtKvj wRK`vj wciwgW Kx? D`vni Ymn GKwU Lvov BtKvj wRK`vj wciwgW eYDv w`b|
- 13/ mKj BtKvmt`÷g m`z`tk`Avbj vf Kiv Avek`K tkb Zv egstq ej ly|
- 14/ c`kuzK I Kwlg BtKvmt`÷g ej tZ Kx tevSvq e`vLv Ki ly|
- 15/ ebR I ZY.fvgi c`ugK Drcv`Kmg tni bvg Dfj-L Ki ly|
- 16/ giR I Rj R BtKvmt`÷tgi gta` Zj bvg j K wek-IY w`b|
- 17/ meR Dw`c Kxfvte`vbxq Rj evqycfveZ Kti Zv eYDv Ki ly|
- 18/ gwUj qqtivta e`qji fvgKv eYDv Ki ly|
- 19/ cwi tek bwi Zi g L` DfIk`mg n Dc`vcb Ki ly|
- 20/ tkvb t`tki cwi tekMZ Ae`v wKtmi Dci wbfP Kti egstq ej ly|
- 21/ grm` I ci m`u` bwi Zi cAvb w`K,tj v Dfj-L Ki ly|
- 22/ Kij wkvLx I UfbWvi msu`jB weeiY w`b|
- 23/ A`fvevcbwKwL.cwi tek AAj mg tni bvg Zvt`i pH gvbmN Dfj-L Ki ly|
- 24/ `Re c`v`qt\_ó we`gvb Ggb KwL.cwi tek,tj vi bvg Dfj-L Ki ly|
- 25/ mefPtq AvqZtb eo KwL.cwi tekki bvg Gj vKvmn Dc`vcb Ki ly|



### DĒigjv

#### cW - 1.1

- 1. K    2. M    3. L    4. N    5. K    6. N    7. L    8. K

#### cW - 1.2

- 1. M    2. K    3. N    4. L    5. M    6. K

*Kv.1.1 cju Dbqb ž*

**cW - 1.3**

1. M 2. K 3. L 4. M 5. L 6. K 7. M

**cW - 1.4**

1. M 2. M 3. L 4. N 5. K 6. M 7. L

**cW - 1.5**

1. M 2. N 3. L 4. K 5. N 6. K

**cW - 1.6**

1. K 2. M 3. L 4. N 5. L 6. K 7. L 8. L





mjo Kti | Aek` AtbK mgq Gme Dcv`vb cwi tetki Ab`vb` Dcv`vbi mit\_ ugfk  
AvZvi` neluqvrl `Zvi Kti |

- (L) `Re ubabthvM` `HK (Biodegradable pollutants) t thgbt Mpcvij Z ci ev mivmRK  
c0Yxi eR`hv c0KwZKfite ev c0uqvRvZKiYi gra`tg `Z cPbkxj | G,tjv  
c0KwZtZ PmuKviti AveZ0thvM | dtj cPbmuqv tkl ntj Gt`i melv`KiY qJgZv  
tjvc cvq | Aek` cwi tetk `HK c`vt`P gvIv AZ`waK ntj A`P `Re ubab qJgZv  
Qvvo`q tMtj `Re ubabthvM` `FYI mgm`vi mjo Kitz cvti |

### cvfVei gj`iqb 2.1



mivK DEti i cvfk uUK uPy (✓) w`b |

1/ Avb weAvtbi DrKI Zvi mit\_ mit\_ Kx NU0?

- K) cwi tetki DrKI`nvab ntZ0
- L) gvb`i `tL `yRv evot0
- M) gvb`i Avig Avtqk I cwi tetki ` IY evot0
- N) m`zt` i weKvk NU0

2/ cwi tetki ` IY KLB c0KUZv jvf Kti?

- K) mjo i Av` Kij t`tk
- L) c0`li hM t`tk
- M) eZ0vb mgq t`tk
- N) Av`tbi e`envi I Kj Kvi Lvbv Movi ci t`tk

3/ `IKwfinEK ` I`Yi tkwweb`v`mi DcvE Kx Kx?

- K) ``r, cvi`, CO2 BZ`w`
- L) evqycmb, gmU
- M) Kj Kvi Lvbv, D`ovRvrvR, h`shvb BZ`w` i ka
- N) Kvi Lvbv, AvbweK P`z` BZ`w` t`tk ubtmZ Zvc

4/ %Re ubabthvM` `w`Z c`vt`P Kx nq?

- K) mivvi Yfite qJqc0B nq bv
- L) axi MuztZ qJqc0B nq
- M) mivvi Yfite ev c0uqvRvZi gra`tg qJqc0B nq
- N) c0KwZtZ PmuKviti AveZ0 AthvM`

5/ AvbabthvM` `FYxq c`vt`P Kx nq?

- K) c0KwZtZ PmuKviti AveZ0bi gra`tg cwi tetk wdti Avtm
- L) Rxe-f; i vmbK Pmu ev Lv`wkKtj c0ek Kti
- M) c0bmuqv tkl ntj melv`Zv tjvc cvq
- N) tKvb `RweK mgm`v mjo Kti bv



6/ **Gti vtmj m t** Gti vtmj mRvZxq mvgM0 t\_#K mvari YZ Kivb I Zij Dfquea Dcv`vbB evqjZ fvmgub \_vtK| G mKj `te` wR¼, `v, Zivq, tjvrv, BZ`w` MwZ uel v³ thSMK Dcv`vb me`gub \_vKvq Zv evqjZ `tY NUvq| Gme `te`i gta` DtjLthvM` n`Q cñvab mvgM0, KxU I RievYvK, kvZvZc ubqšjY e`eüz CFCs, ev tkvtiv-tdvtiv-KveB BZ`w` |

7/ **Riek` tY t** cKwZtZ A#bK` Riek Dcv`vb itqtQ hv`i Dcv`wZi Kvi tY evqy` wZ nq, thgbt e`vKtUvi qv I QIvtKi ti Yy(Spores), Ci vMti Yy(Pollen grains) BZ`w` |

**evqy` tYi cñvab ev`iz.**

thtnZevqycñqB w`Zve`vq \_vtK bv tm Kvi tY evqy` tY I w`Zve`vq uel vR Kti bv| `tYi me`iz. mvari Yfite Avenl qvi Ae`v, evqy` MwZteM, `tY Dcv`vtbi i vmqubK `pZv (w`Zve`v) Ges Zvt`i AYj AvKwZi Dci wbfPkvj |

evqy` tYi mtePP gviv mvari Yfite `tYi Dm Gj vKvq t`Lv hvq Ges GuU NtU mvari Yfite i wI Kvj xb mgq hLb fvgmsj MeevqyEaYvKviki evqyAtc¶v kvZj Zi \_vtK| wKš` bMixi tarqv, kv³ Drcv`b tkv`a Ges BtUi fivUv t\_#K DvI Z mj dvi-WvB-A· vBW M`vm, nvBtWvKveB t\_#K m0 I tRvb I bMixi tarqv t\_#K wbtmZ bvBtUtRb A· vBW Dm`j t\_#K kZ kZ wKtj wguvi `ieZP`vte evqy` tYi Kvi Y nZ t`Lv hvq |

**evqy` tYi cñve**

`vbxq I AvAwj K chq evqy` tYxq c`v\_°tm Gj vKvi tgN, epociZ, Ziv cñv BZ`w` tZ cñveZB NUvtZ . iZcy°fvgKv i vLtZ cñvi | GuU meRb `xKZ.th, bMi Dm t\_#K wbtmZ A#bK evqexq `tYe` bMixi evqyKtqK wvM0 tmj wmqv chšI DEBKi tY m¶g Ges bMi tKw`K G aitbi DEvc cvkPZ°evqyUtj Qwotq cotZ cñvi |

**gube` tñi I ci avZe e`i cñve**

evqyUtj Dcv`Z wvfbvavZvgñi KYv gvbe`tn ti vM mpo`i Rb` `vqx| fivi avZe KYv GRgv, Kvk, dædm Ges Mjvi Ab`vb` ti vMi Rb` `vqx| mxmv eq° gvbjmi `tveK Kvhejxi e`vNvZ NUvq Ges gw`° meKj Kti gZžchšI NUvtZ cñvi | K`wvqvg D`P i³Pvc Ges ü`ti vM mpo`tZ mrvqZv Kti |

**M`vmaq c`v`\_P cñve**

gvby I cñvi Rb` co2 GKwU klmñivax M`vm| evqyUtj co2 Gi cñviYv epv tctj M0b nvdM cñZm qvi Kvi tY cñvexi Zivgviv teo hvte| dtj Rj evqjZ NUvte e`vcK cñveZB| tgiyAAjt i eid Mtj mivMti cñvi D`PZv teo hvte| Ziv tq hvte cñvexi eü wvAj | evqjZ co Gi Awak` Ges bvBtUtRtbi A· vBwmgv i t³i Av tRb enb ¶gZv nvm Kti | dtj gvvaiv. `pñvZv, Ges Zj tctU e`v AvjZ nq| evqjZ so2 Gi Awak` nvcibx, ešKvBilUm, cñvZ. dædm mspvšI ti vMi Rb t`q| evZv tm teb tRvcvBiv b nvBtWvKvešbi Dcv`wZ K`vYvi mpo`i Rb` `vqx| evqy` Riek Dcv`vb NUvZ `tY, h`vt e`vKtUvi qv, QIvK, ci vMti YyBZ`w` G`vj wRvBZ ti vMi (thgbt nvcibx, ešKvBilUm BZ`w`) Ab`Zg Kvi Y wñtme wetePZ |

evqyUtj Dcv`Z wvfbv avZvgñi KYv gvbe`tn ti vM mpo`i Rb` `vqx| fivi avZe KYv GRgv, Kvk, dædm Ges Mjvi Ab`vb` ti vMi Rb` `vqx|

**GmW epj**

weirfbae A- vBW weikl Kti  
bvBtUtRb I muj dvi RvZiq  
A- vBtWi M'im epi cwi  
mvt\_ iguj Z ntq bvBtUK I  
muj dvi K GmW cwi YZ  
nq hv OGmW epob bvtg  
cwi wPZ |

weirfbae A- vBW weikl Kti bvBtUtRb I muj dvi RvZiq A- vBtWi M'im epi cwi mvt\_ iguj Z ntq bvBtUK I muj dvi K GmW cwi YZ nq hv OGmW epob bvtg cwi wPZ | GmW epob gnu I cwi p<sup>H</sup> nwm Kti | dtj msukob GjvKv Dm<sup>c</sup> I cOYxKtji emevtmi AthvM<sup>i</sup> ntq cto | GmW epi dtj gvtQi goK t<sup>-</sup> Lv t<sup>-</sup> q Ges cRbb cO<sup>u</sup>qv weirfbae nq | eZgib c<sub>w</sub> extZ uk<sup>t</sup> vbz t<sup>-</sup> tk GmW epob GKul cKU mgm<sup>v</sup> wntmte t<sup>-</sup> Lv w<sup>t</sup> q<sup>t</sup>Q | firiZi g<sub>y</sub>q Aew<sup>-</sup> Z uk<sup>t</sup> -Kvi Lvbv t<sup>-</sup> tk wbtmZ weirfbae M'im I GmW epi Kvi t<sup>-</sup> Y AvM<sup>oi</sup> ZvRgnj Zvi D<sup>3</sup>/<sub>4</sub> j Zv nvi t<sup>-</sup> Q |

**Dm<sup>c</sup> i I ci evqy H<sup>Y</sup>i c<sup>ve</sup>**

evqexq `HY meR Dm<sup>c</sup> I km<sup>-</sup> Drcv<sup>-</sup> t<sup>-</sup> bi Rb<sup>-</sup> I q<sup>u</sup>ZKi | big cvZih<sup>9</sup> Dm<sup>c</sup>, thgbt gj-v, MvRi, tj Uza Ges weirfbae uel R<sup>ix</sup>ex mc<sup>9</sup>uk Dm<sup>c</sup> i Drcv<sup>-</sup> bkxj Zv `w<sup>-</sup> Z evqy Kvi t<sup>-</sup> Y e<sup>-</sup> vnZ nq | evZv<sup>t</sup>m LubR `te<sup>-</sup> i atj vevij Awak<sup>-</sup> ntj Dm<sup>c</sup> i R<sup>ue</sup>K w<sup>u</sup>qv-K<sup>t</sup>g<sup>o</sup> e<sup>-</sup> vnZ NtU | bvBtUtRb A- vBtWi cO<sup>u</sup>qv Dm<sup>c</sup> i c<sup>t</sup> Siv, tK<sup>t</sup> i wmm, wOU-cov (Narcotic spot) cvZvi Wm<sup>v</sup> I ukbv<sup>u</sup>q c<sup>o</sup> hvl qv c<sup>f</sup>uZ. Dcm<sup>o</sup> t<sup>-</sup> Lv hvq | w<sup>-</sup> Z c<sup>-</sup> v<sup>-</sup> P KYv w<sup>u</sup>kvUeZ<sup>o</sup> Dm<sup>c</sup> i cvZiq c<sup>o</sup> c<sup>t</sup> i U<sup>u</sup>et<sup>u</sup> i Kvi Y NUvq | dtj M<sup>v</sup>mq Av<sup>-</sup> vb-c<sup>o</sup> vb (Gas exchange), cwi avi Y q<sup>g</sup>Zv I Ab<sup>-</sup> vb<sup>-</sup> kvixi e<sup>u</sup>q kvh<sup>u</sup>g e<sup>-</sup> vnZ nq | G Kvi t<sup>-</sup> YB uk<sup>t</sup> Kvi Lvbv<sup>i</sup> w<sup>u</sup>kvUeZ<sup>o</sup> t<sup>-</sup> t<sup>-</sup> b M<sup>t</sup>Qi cvZv Siv, Wm<sup>v</sup> i uk<sup>t</sup> qv hvl qv, cvZv I dtj i q<sup>g</sup>Z m<sup>o</sup> nl qv BZ<sup>-</sup> w<sup>-</sup> Am<sup>u</sup>ear t<sup>-</sup> Lv hvq | evZv<sup>t</sup>m SO<sub>2</sub> Gi Awak<sup>-</sup> NUtj Av<sup>1</sup>/<sub>2</sub> j RvZiq Dm<sup>c</sup>, Zjv I AvZv dtj i cvZv nj<sup>-</sup> ntq (Necrosis) hvq | dtj Drcv<sup>-</sup> b q<sup>g</sup>Zv e<sup>-</sup> vnZ nq | m<sup>t</sup> gv<sup>t</sup>vi I t<sup>-</sup> Riv (0.02- 50 w<sup>u</sup>cvGg) ZvgvK, Utg<sup>t</sup>Uv, mxg, cvBb BZ<sup>-</sup> w<sup>-</sup> M<sup>t</sup>Qi q<sup>u</sup>Z m<sup>v</sup>ab Kti |

**evqy H<sup>Y</sup>i c<sup>u</sup>ZKvi**

q<sup>g</sup>Z<sup>a</sup> KYv RvZiq `HK I weirfbae q<sup>u</sup>ZKvi K M<sup>v</sup>t<sup>-</sup> mi c<sup>ve</sup> t<sup>-</sup> tk evqy Uj t<sup>-</sup> K cwi "Ob<sup>e</sup>ivLvi Rb<sup>-</sup> eZg<sup>u</sup>tb weirfbae x<sup>u</sup>Zi D<sup>m</sup>eb ntq<sup>t</sup>Q | G<sub>s</sub> t<sup>-</sup> j vi g<sup>t</sup>a<sup>-</sup> -

- w<sup>u</sup>M<sup>o</sup>t<sup>-</sup> bi c<sup>te</sup> w<sup>-</sup> Z evqy K m<sup>u</sup>Z<sup>o</sup> c<sup>o</sup> K<sup>t</sup>oi (Porous chamber) w<sup>f</sup>Zi w<sup>-</sup> t<sup>-</sup> q c<sup>u</sup>vnZ Kti w<sup>e</sup>lv<sup>3</sup> q<sup>g</sup>Z<sup>a</sup> KYv c<sub>w</sub> KK<sup>i</sup> Y |
- w<sup>-</sup> Z evqy K cwi Uvl qv<sup>t</sup> i t<sup>-</sup> fZi w<sup>-</sup> t<sup>-</sup> q c<sup>u</sup>vnZ Kti `e<sup>Y</sup>q w<sup>-</sup> Z c<sup>-</sup> v<sup>-</sup> c<sub>w</sub> KK<sup>i</sup> Y |
- w<sup>-</sup> j Q<sup>u</sup>Kb<sup>u</sup>vi (Bag filters) gva<sup>-</sup> t<sup>-</sup> g evqy<sup>-</sup> a<sup>u</sup>j KYv cwi t<sup>-</sup> kvab Kiv |
- B<sup>U</sup>w<sup>-</sup> ÷ b<sup>u</sup>j B<sup>t</sup>j K<sup>t</sup>U<sup>-</sup> ÷ w<sup>u</sup>UK Si Yvi gva<sup>-</sup> t<sup>-</sup> g (Industrial electrostratic precipitation) t<sup>-</sup> a<sup>u</sup>qv RvZiq `H<sup>Y</sup>i cvZb NUv<sup>t</sup>bv BZ<sup>-</sup> w<sup>-</sup> D<sup>t</sup>j -L<sup>t</sup>hvM<sup>-</sup> |

G<sub>s</sub> t<sup>-</sup> j v Q<sup>u</sup>ovl AwZ<sup>u</sup> m<sup>u</sup>ZK<sup>u</sup>vgj<sup>-</sup> K e<sup>-</sup> v<sup>-</sup> wntmte hZ<sup>-</sup> i m<sup>u</sup>e Kqjv, t<sup>-</sup> ct<sup>u</sup>U<sup>u</sup>j qvq c<sup>f</sup>uZ R<sup>x</sup>evk<sup>u</sup> R<sup>y</sup> vbi e<sup>-</sup> envi Kgv<sup>t</sup>Z nte | w<sup>e</sup>K<sup>i</sup> e<sup>-</sup> v<sup>-</sup> wntmte R<sup>j</sup> w<sup>-</sup> y<sup>-</sup>, evqy<sup>-</sup> j (Wind mill), t<sup>-</sup> m<sup>u</sup>Si kv<sup>3</sup> BZ<sup>-</sup> w<sup>-</sup> i e<sup>-</sup> envi evov<sup>t</sup>Z nte |



**Abk<sup>u</sup>j b (Activity)** t<sup>-</sup> evs<sup>t</sup> t<sup>-</sup> tk kni I M<sup>o</sup>gv<sup>u</sup> A<sup>t</sup>j i g<sup>t</sup>a<sup>-</sup> t<sup>-</sup> Kv<sup>-</sup> vq evqy<sup>-</sup> HY t<sup>-</sup> w<sup>e</sup>k | evqy<sup>-</sup> HY nwmK<sup>t</sup> Kx Kx c<sup>-</sup> t<sup>-</sup> q<sup>u</sup> M<sup>o</sup>h<sup>Y</sup> Kiv c<sup>o</sup>qvRb etj Av<sup>-</sup> c<sup>u</sup>b g<sup>t</sup>b K<sup>t</sup>i b Zv w<sup>e</sup>eZ K<sup>i</sup> ab |

**cv<sup>t</sup>W<sup>e</sup>i gj<sup>-</sup>iqb 2.2**





mvf\_ ugfk b`x ev mvlMti cmbtK `wZ Ki tQ| GmKj thSMK imvqvBK `te`i gta`  
DDT AZ`š k w<sup>3</sup>kyj x, `vqx Ges qWZKi | KviY DDT ubR`wKsev cOKuZK cUqv  
gva`tg f f<sup>1/2</sup> hvqbr ev webó nq br| dtj `xNq` b afi Gi cUzUqv eRvq\_vtK|

- 4/ tZRw`G eR<sup>Q</sup>(Radioactive waste) t tZRw`G tgj e`envi RwbZ mkí I cvigvYueK Pj` kxZj ivLvi Rb` me`v VvUv cmbi c`evn ubwOZ ivLv nq| e`envi vt`š GB cmb DEB Ae`vq b`x ev Ab` tKv`br Rj vktq cotj cmbi Zvcgv`v evx cvq|
- 5/ tZj RvZiq `HY t tZtj i U`v`vi, Kj Kvi Lvbr t`tK temotq Avm tZj ev Ab` th tKv`br Kvi tY tZj vbtmZ ntq cmbtZ cotj Zv `wZ nq|
- 6/ wUvi tRÈ t eZgvb h`M Kvcó favqi cvDWi mvgM` hv wUvi tRÈ brtg cwi wPZ, Rj R cwi t`ek wgvkZ ntq `tY NUvq|
- 7/ Rj R Dm` t A`bK mgq Rj R Dm` mgr cmb `t`Yi Rb` `vqx| Giv c`kz ev Rj vktqi e`envi Dc`thwMzv Kgvq| dtj A`bK mgq bre`Zv, gvQ aiv I Ab`vb` e`envi i t`f` cUZe`JKZv m`ó nq|

**cwb `H`Yi c`ve**

- 1/ bvj v-b`gvi `wZ cmb e`envi Ktj iv, UvBdtqW, Avgvkq g`vtj wqv c`vuz tiv`Mi m`ó Kti | GB cmbtZ `RueK `te`i Rvi tYi dtj c`p`z o<sub>2</sub> e`vqZ nq Ges CO<sub>2</sub> Gi cwi gvY evx cvq| dtj cmbtZ `keij, AY`xe I dvB`Uvc`vU`bi Awak` NtU| cmbtZ `exfZ O<sub>2</sub> Gi `f Zv gvQ, Ab`vb` Rj R c`Yx I A`bK Dm` i Rb` qWZKi |
- 2/ Kj Kvi Lvvi AveR`vq mvqvbi BW, tdbj, G`v`gmbqv c`vuz wlv<sup>3</sup> `è` \_vKvq Zv cmbi AY`xe I Ab`vb` R`x`ei Rb` qWZKi | Z`gwi G, t`j v Lv`-wKtj c`ek Kti Rxe t`n bvbwea RuUj Zv m`ó Kti | Btj KtU`c-wJv Kvi Lvbr ntZ wM`Z fwi avZz mvqvbi BW cmbi q`vi Zj I A`z`i evx Kti | K`óK tmwW I t`Kwi b d`v`wi ntZ wM`Z AveR`vq cvi `RvZiq `te`i c`p`z\_vtK hv `j R I Rj R c`Yxi Rb` úgvk`f`c|
- 3/ KxUv`kK `è` Lv`-wKtj c`ek Kti gvbe`f`n K`v`Yvi, `wqy e`p`Zv, wj DKwgvq c`vuz tiv`Mi Rb` t`q| A`bK KxUv`kK w`ekl Kti DDTi c`fite dvB`Uvc`vU`bi mvj vKms`k-IY q`gZv t`j vc cvq| eU Rj R c`Yxi i K`Kw a`sm nq| GbRvBg cU`vq wvNvz nevi Kvi tY cwl i tMvbiW w`Kv`ki c\_ i`y nq| dtj wv`c`v`t`Y wj w`N`t`U| wv`gi K`v`wqvg AveiY µgk cvZjv ntq GK mgq a`f`Yi w`Kv`k eU ntq hvq| Gfite c`w`ex t`tK eU c`Rwzi cwl wj`j ntq tQ|
- 4/ cvigvYueK kw<sup>3</sup> tK`f` i eR<sup>Q</sup>Dm` I c`Yx Df`qi Rb`B tZRw`G Zv RwbZ w`c` m`ó Kti | tZRw`G c`v`\_P Abg`et`ki dtj wki g`Z`i nvi evx cvq| Zvcgv`v evx RwbZ Kvi tY A`bK gv`Qi wv`g d`zU t`c`v`r`tei ntj I ch`B Aw` tRb I Lv`v`fite gvi v hvq| gv`Qi c`Rbb I ti w cU`Z`i va q`gZv t`j vc cvq|
- 5/ tZj RvZiq `I`Yi dtj cmbi Dc`ti tZtj i Av`li Y c`ti | Av`li tYi c`j`z`i Aek` wbtmZ tZtj i gv`vi Dci w`f`k`xj | KzqZ I Biv`ki h`x` c`p`z tZj Dcmwix Gj vKvq Qvotq cto| GtZ c`p`z cwl, gvQ I Ab`vb` mvgv`K c`Yxi e`v`cK qWZ mvaZ ntq tQ| Gmgtq Biv`k eU w`Kj v`z m`š`t`bi Rb`v`ntq tQ etj I c`Kv`k|
- 6/ cmbtZ wUvi tR`Èi Dc`w`vz AY`x`ei evx NUvq Ges BDU`d`k`k`b cU`vq Ziv`šZ Kti |

**cwb `H`Yi cU`Z`Kvi**

KxUv`kK `è` Lv`-wKtj
c`ek Kti gvbe`f`n
K`v`Yvi, `wqy e`p`Zv, wj
q`v`Kwgvq c`vuz tiv`Mi Rb` t`q
A`bK KxUv`kK w`ekl Kti
DDTi c`fite
dvB`Uvc`vU`bi mvj vK-
ms`k-IY q`gZv t`j vc cvq

Kwl.1 cj-x Dbqob -ğ

- 1/ "v" mŞZ cqtçVij x e"envi KiİZ nte| "RueK çµqvı gra"tg b`Ğv I cqtçVij xi AveRÖtK "RueK mŞti i fcvŞli KiİZ nte|
- 2/ cmb wei x ivLİZ nŞj İKİ KviLvri AveRÖtK hTZİ tdj v eÜ KiİZ nte| G, tj v İbR "çµqvıq "Re İbabŞhıM" (Biodegradable) Dcv`vb A\_er çytçµqvıRıZ- KiİZİ (Recycling) e"e"v KiİZ nte|
- 3/ "ıqv/ AŞqıx i İmvıqbK I KxİbvıktKi e"envi hv Lv`"İkKŞj çÖek KŞi, İbıv x İNıYı KiİZ nte| hZ` i mŞe mgıŞZ İcvKıvıKo çÖZİİva e"e"v (Integrated Pest Mangement, IPM) AŞyıY KiİZ nte| i İmvıqbK mŞti i çvıeŞZ"ım I "RueKıvı (Biofertilizer) Gi e"envi evıŞZ nte|
- 4/ mZKŞvi mŞt\_ İZRı"Şj c`vŞ\_P AcıvıY KiİZ nte Ges GRb" DbŞZİ çŞıŞ e"envi İbıÖZ KiİZ nte|
- 5/ GÖıvıv AŞbK Dı"ç İbŞRıv`İŞZ c`v\_ŞMŞY KŞi çvbŞZ`İŞYı gvİv KgvŞZ mŞg| İhgb İ KPŞx çvıv çvbŞZ`İŞfZ avZİn eü İelıvŞ c`v\_ŞbgŞ KiİZ mŞg|

hZ`i mŞe mgıŞZ İcvKıvıKo çÖZİİva e"e"v (Integrated Pest Mangement, IPM) AŞyıY KiİZ nte| i İmvıqbK mŞti i çvıeŞZ"ım I "RueKıvı (Biofertilizer) Gi e"envi evıŞZ nte|

**çvıVİİ gj"ıqb 2.3**

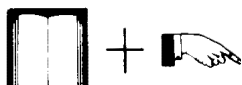
mıWK DİŞİİ çvık İUK İPŞ (✓) İb|



- 1/ tKv\_vq cll\_exi cllq 70 fivM Rj i vki e`vB NtU#Q?
  - K) tWvev, cKz, Lvj I wefj
  - L) mivMi-gnivmivMti
  - M) b`x, byj v, n#`
  - N) fMf`cmbtZ
  
- 2/ tKvbU mivK bq?
  - K) e`enmiv K Ktqi thvM`Zv nvi vj cmb`#Z nq
  - L) mKj Rj vktqi B mivgZ eR`c#tclqvKi #Yi qigZv\_vfK
  - M) `tY cmbi is eY`#` tKvb&cvi eZB NtU bv
  - N) vki Kvi Lvvi eR`mivqvBvBW, tclbj, G`v#gmbqv cfvZ weLv`e`\_vfK|
  
- 3/ KivvktKi gta` DDT metPtq qvZKvi K tKb?
  - K) GivU cKvZK clqvqi gva`tg qvcB nq bv
  - L) GivU cmbi miv` mivR vgtk hvq
  - M) GivU qv`vqx A\_P Avak Kvhrix
  - N) GivU `Mh` I cBbkvj
  
- 4/ `#Z cmbi Dci nvj Kv Av`iY cto tKb?
  - K) mivvitr#i Kvi #Y
  - L) Rj R Div` RvbZ `tYi dtj
  - M) tZj RvZxq c`v`P Kvi #Y
  - N) b`gvi `tY thvM nvi dtj
  
- 5/ Btj KtU#c`vS Kvi Lvbv ntZ vbmZ `tY cmbi Kx cvi eZB Avtb?
  - K) cvi ` RvZxq Dcv`vbi evx NtU
  - L) Av` trtbi cvi gvY Kgvq
  - M) AY#xe I divBtUvcvsvtbi Avak` NUvq
  - N) qvi Z; I AvZ; evx Kti
  
- 6/ cvLi GbRvBg clqv I tMbvW meKvtki c\_ ifx nq tKb?
  - K) mivBqvBtWi Kvi #Y
  - L) DDTi cfvte
  - M) cmbtZ mivvitr#i Kvi #Y
  - N) K`vj vktqgi Afvte

**cw 2.4 RbmsL`v I cvi tek `tY**

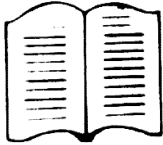
G cvV tk#I Avcib -



Kul. I cj-x Dbqob`x

- ◆ RbmsL`vRvbZ cwi`tek I mvgvRK`HY m`ut`K`eY`v Ki`Z cvi`teb|
- ◆ RbmsL`vRvbZ Kvi`Y evqy Kul. I ebR m`ut` c`Z`u`q`v m`ut`K`eY`v Pbv Ki`Z cvi`teb|
- ◆ RbmsL`vRvbZ Kvi`Y`HY tgvKv`fej vq Ki`Y`q m`ut`K`eY`v Ki`Z cvi`teb|

**RbmsL`v I`H`Yi avi`Yv**



cwi`tek me`Avbx B.uc,  
I Wtgi (Odm 1971) g`Z,  
bMxi cwi`na hZ evot`Q  
cwi`cmk`R Gj`vKv` t`K Zvi  
Pmn`v thvMv`bi gv`vI  
evot`Q| dtj c`K`u`ZK  
cwi`tek mecb`enevi Avk`vI  
c`K`U n`q` t` Lv`v` t`Q|

AvR Avk`vI RbKv`fite miv`v c`u`exi RbmsL`v evot`Q| RbmsL`v e`v`x`i GB nvi Dbz` wek|  
A`c`q`v Abj`z` we`k`B Awa`K| m`gea`g`v`b G RbmsL`vi Rb` Pvb c`q`v`R`b`q` M`p` ms`-vb, Abel  
e`-j| Avi Avivg Avt`q`ki Rb` Pvb vej`vm mvgM`i, t`f`S`Z m`j`h`v`M`-m`y`e`av I Avi I A`b`K` w`K`Q`y  
g`v`b`y Zvi Gme tg`S`ij K Pmn`v I vej`vm migM`i thvMv`b w` t`Z w`M`q` ewa`Z n`v`i Avni`Y Ki`Z  
LubR I ebR m`u`-| Kul. I w`k`i t`q`j`I NvU`q`q`Q wec`e, D`m`e`b K`i`i`Q be be c`h`y`P`i| dtj  
m`u`-`i Dci tetot`Q Avv`K`v`L`Z Pvc| fvi`mvg` n`v`i`q`q`Q cwi`tek, `w`Z n`q`q`Q Zvi Avv`  
i`c`| RbmsL`v we`c`u`vi`Y I cwi`tek`HY AvR ZvB G`K` A`b`i`i cwi`c`i`K| Avi G ev`b`Z`v`U  
M`g`v`A`j A`c`q`v kniv`A`j`B te`k`| Kvi`Y, kniv`A`j`i tg`S`ij K Pmn`vi thvMv`b m`v`v`i`Y`f`ite  
M`g`v`A`j t`\_t`KB n`q`\_v`K| ZvB we`k`o` cwi`tek me`Avbx B.uc, I Wtgi (Odm 1971) g`Z,  
bMxi cwi`na hZ evot`Q cwi`cmk`R Gj`vKv` t`K Zvi Pmn`v thvMv`bi gv`vI evot`Q| dtj  
c`K`u`ZK cwi`tek mecb`enevi Avk`vI c`K`U n`q` t` Lv`v` t`Q| Avi G wecb`ac`wi` tekB mvgvRK,  
A`\_`v`u`ZK, Kul.R, eb`f`ig BZ`w` m`p`v`S`i` H`Yi gj`-Kvi`Y|

**RbmsL`vRvbZ mvgvRK`HY**

eim Dc`thvM`x GKvU Aveim M`p` c`Z`u`U g`v`b`j`i`B Ab`Z`g tg`S`ij K Awa`Kvi| Gv`k`q`v  
c`k`v`S`g`n`v`m`i A`A`j`i t`\_k`\_t`j`v`Z we`k`l K`i`i` Pvb, fvi`Z, B`v`v`b`v`k`q`v, c`v`K`-v`b` I  
e`v`j`v` t`\_k` c`u`exi tgvU 5.5 vej`qb RbmsL`vi A`a`f`K`i`I te`k` t`j`v`K`i` eim Ges Gme t`\_k`  
RbmsL`v e`v`x`i nvi Awa`K| m`u`-`i` t`\_f`Zv` t`n`Z`z`G`Z`-`A`j` ewa`Z G RbmsL`vi Rb` M`p`v`q`Y  
GKvU c`K`U m`g`m`v`| dtj bM`i I M`g`v`A`j` g`v`b`y`w`b`g`v`t`bi Aveim`-t`j` AZ`-S`i` Agv`b`w`e`K Ae`-v`q`  
emeim Ki`Z eva` n`-`Q|

kniv`A`j R`x`e`b avi`Yi me`Pv`B`Z Dch`y`-v`b e`j` we`te`w`P`Z| A`\_`P RbmsL`vi P`v`c` g`v`b`j`v,  
Xiv`Kv, Kuv`Kv`Zv, t`e`v`t`-t` b`v`q` Gv`k`q`v`i Rbe`uj` kni`\_t`j`vi GK ZZ`x`q`v`t`ki Awa`K t`j`v`K  
e`v`-v`m`x`| Zv`-`i Rb`-`t`b`B t`Kv`b cwi`"Ob`e`Av`t`j`v`-e`v`Z`v`m, c`v`b`x`q`R`j` I`-`v`-`m`e`S`Z c`q`c`v`j`y`x`i  
e`-e`-v`| dtj h`I`Z`I` M`to DV`t`Q g`q`j`v, AveR`v`i`-`c`| NU`t`Q t`-`v`-`n`v`b`x`| ew`A`Z n`-`Q` j`v`Lv`  
g`v`b`y` R`x`e`t`bi Awa`Kvi t`\_t`K| G`f`v`te`B we`b`o` n`-`Q` mvgvRK cwi`tek|

g`v`b`y` mvgvRK R`x`e`| ZvB e`u`g`l`x` Pmn`vi thvMv`b w` t`Z w`M`q` ci`-`u`-`i`i Dci w`b`f`P`k`j` n`Z  
n`q`| Avi GRb`-`Pvb m`g`z`thvMv`thvM` e`-e`-v`| w`K`S` ewa`Z RbmsL`vRvbZ Kvi`Y f`v`g` I m`u`-`i`  
Dci c`P`U Pvc`\_v`Kv`q` thvMv`thvM` e`-e`-v` Dbq`t`bi g`Z`v` L`y` Kg f`v`g` I m`u`-`B Gme Gj`v`Kv`q`  
Ae`w`k`o`\_v`K`| dtj RbmsL`vi P`v`c` Ges h`\_v`h`\_ thvMv`thvM`i Af`v`te` g`v`b`y`x, Av`M`K`v`U, So-  
S`A`v BZ`w` c`K`u`ZK`-`j`h`v`M`K`v`t`j` cwi`ng`Z miv`v`t`h`i Af`v`te` g`v`b`y` t`Kv`b w`b`w`Z Ae`j`-`b` L`j`R  
c`v`q`bv| dtj gv`v`w`Z`v`i`<sup>3</sup> v`b`x`q` m`u`-` e`-en`v`i K`i`i` cwi`te`k`K` K`i`i` t`Zv`j` fvi`mvg`-`n`x`b|

**RbmsL`v e`v`x` I evq`Y`HY**

RbmsL`v e`v`x`i m`v`-`\_` g`v`b`j`i` tg`S`ij K Pmn`v thgb` e`v`x` c`v`q` t`Z`g`v`b` e`v`x` c`v`q` Zvi t`f`v`M` mvgM`i  
Pmn`v| ZvB RbmsL`vi c`v`k`v`c`v`m`k` c`v`j`v` w` t`q` N`t`U P`t`j` t`Q w`k`i`-wec`e| Avi RbmsL`v I w`k`i`-

Kvi Lvbr DftqB`z emotq Zjt0 kw<sup>3</sup> e`enitii cwi gvY Ges evqy I tYi DcKiY| RvrbtB Aew`Z mekciitek MtelYv KZ<sup>9</sup> (Global Environmental Research Authority at Japan) 1993 mtj GK mgx<sup>9</sup>lvq cKvk Kti th, Gukqvi t`k<sub>3</sub> t<sub>1</sub>K mbM<sup>2</sup> CO<sub>2</sub> Gi cwi gvY eZ<sup>9</sup>vb`ktKB kZKiv 30 fM epx cte Ges Avb<sup>9</sup>WZK nrti wgt\_b M'v<sup>9</sup>mi epx Nute| Avi G`Uv M'v<sup>9</sup>mB evqy`I tYi Ab`Zg tmvcib| weAvrbt`i gtZ c<sub>1</sub>exi evqy<sup>9</sup>Ujt BtZvgta`B kZKiv 25 fM CO<sub>2</sub> Gi AwaK` NtUt0| RbmsLv epx RvbZKv<sup>9</sup>tY CO<sub>2</sub> Gi cwi gvY Avi I evotj Zv evqy tYi t<sup>9</sup>t<sup>9</sup> Z<sub>v</sub> Mib n<sup>9</sup>DR c<sup>9</sup>Z<sup>9</sup>lvqv Nvrbvi <sup>9</sup>IgZv CO<sub>2</sub> Atc<sup>9</sup>lv

**Kvl Drcv`b I`IY**

RbmsL`v epx i mt<sub>1</sub> gvb<sup>9</sup>jt i Lv` Pm<sup>9</sup>v evot0| GB ewaZ Lv` Pm<sup>9</sup>v tgvrbvi Rb` gvb<sup>9</sup> D<sup>9</sup>teb Kti0 Dakx RvZi dmj | dj b epx i Rb` e`eniv Ki0 mvi I KxUv<sup>9</sup>kk| GK mgx<sup>9</sup>lvq t`Lv tM<sup>9</sup>Q tKvb dmtj i Drcv`b w<sub>3</sub> Y evotZ ntj mvi, KxUv<sup>9</sup>kk I kw<sup>3</sup> e`enitii cwi gvY 10<sub>3</sub> Y evotZ nt<sup>9</sup>Q| dtj evqyl c<sub>1</sub>vb Kj<sup>9</sup>vtZ nt<sup>9</sup>Q| Av`Rjve<sup>9</sup>x RvgtZ avb Pvl t<sub>1</sub>K mbM<sup>2</sup> nt<sup>9</sup>Q wgt\_b M'v<sup>9</sup>mi| GB M'v<sup>9</sup>mi Mib n<sup>9</sup>DR c<sup>9</sup>Z<sup>9</sup>lvqv Nvrbvi <sup>9</sup>IgZv CO<sub>2</sub> Atc<sup>9</sup>lv 10<sub>3</sub> Y gZv<sup>9</sup>sti n<sup>9</sup>Rvi <sub>3</sub> Y tevk| BtZvgta`B we<sup>9</sup>tkj kZKiv 17 fM wgt\_b av<sup>9</sup>bi Rvgt<sub>1</sub>K Avm<sup>9</sup>Q| Avi I RbmsL`v epx tctj av<sup>9</sup>bi Drcv`b evotZ nte| tmB mt<sub>1</sub> wgt\_b Drcv`bI teto hite| b<sup>9</sup>vBU<sup>9</sup>m A- vBW (N<sub>2</sub>O) Av<sup>9</sup>i K<sup>9</sup>U kw<sup>3</sup>kvj x Mib n<sup>9</sup>DR M'v<sup>9</sup>mi| Gi cwi gvY ermti 0.2 t<sub>1</sub>K 0.3 fM nrti evot0 Ges Gi Mib n<sup>9</sup>DR c<sup>9</sup>Z<sup>9</sup>lvqv Nvrbvi <sup>9</sup>IgZv CO<sub>2</sub> Gi P<sup>9</sup>vB<sup>9</sup>Z 180 t<sub>1</sub>K 300 fM tevk| Avi AwaK<sup>9</sup>vsk N<sub>2</sub>O M'v<sup>9</sup>mB mbM<sup>2</sup> nq`R<sup>9</sup>iek D<sup>9</sup>rm t<sub>1</sub>K| Gi gta` km<sup>9</sup>t<sup>9</sup>t<sup>9</sup> e`euZ b<sup>9</sup>vB<sup>9</sup>U<sup>9</sup>t<sup>9</sup>R<sup>9</sup>b<sup>9</sup>R<sup>9</sup>v<sup>9</sup>Z mt<sup>9</sup>i i e`eniv t<sub>1</sub>K m<sup>9</sup>o nq c<sup>9</sup>q GK c<sup>9</sup>Agisk|

Av`Rjve<sup>9</sup>x RvgtZ avb Pvl t<sub>1</sub>K mbM<sup>2</sup> nt<sup>9</sup>Q wgt\_b M'v<sup>9</sup>mi| GB M'v<sup>9</sup>mi Mib n<sup>9</sup>DR c<sup>9</sup>Z<sup>9</sup>lvqv Nvrbvi <sup>9</sup>IgZv CO<sub>2</sub> Atc<sup>9</sup>lv 10<sub>3</sub> Y gZv<sup>9</sup>sti n<sup>9</sup>Rvi <sub>3</sub> Y tevk| BtZvgta`B we<sup>9</sup>tkj kZKiv 17 fM wgt\_b av<sup>9</sup>bi Rvgt<sub>1</sub>K Avm<sup>9</sup>Q|

D<sup>9</sup>W<sup>9</sup> m<sup>9</sup>vtj vK<sup>9</sup>ms<sup>9</sup>t<sup>9</sup>k-IY c<sup>9</sup>lvqv<sup>9</sup> g<sup>9</sup>va<sup>9</sup>t<sup>9</sup>g e<sup>9</sup>0<sup>9</sup>ti c<sup>9</sup>q 4-9x10<sup>11</sup> t<sup>9</sup>K<sup>9</sup> CO<sub>2</sub> M<sup>9</sup>h<sup>9</sup>Y K<sup>9</sup>ti Ges c<sup>9</sup>q mg cwi gvY O<sub>2</sub> Z<sup>9</sup>W K<sup>9</sup>ti |

**eb v<sup>9</sup>bab I RbmsL`v RvbZ`IY**

Av<sup>9</sup>R c<sub>1</sub>extZ th nrti RbmsL`v evot0 Zvi t<sup>9</sup>P<sup>9</sup>t<sup>9</sup>q AwaK M<sup>9</sup>vZ<sup>9</sup>t eb m<sup>9</sup>u` a<sup>9</sup>ysm nt<sup>9</sup>Q| Gi gtj itq<sup>9</sup>Q gvb<sup>9</sup>jt i bZ<sup>9</sup> emvZ, M<sup>9</sup>vqY, bMi c<sup>9</sup>E<sup>9</sup>b BZ<sup>9</sup>W<sup>9</sup> K<sup>9</sup>viY| D<sup>9</sup>W<sup>9</sup> m<sup>9</sup>vtj vK<sup>9</sup>ms<sup>9</sup>t<sup>9</sup>k-IY c<sup>9</sup>lvqv<sup>9</sup> g<sup>9</sup>va<sup>9</sup>t<sup>9</sup>g e<sup>9</sup>0<sup>9</sup>ti c<sup>9</sup>q 4-9x10<sup>11</sup> t<sup>9</sup>K<sup>9</sup> CO<sub>2</sub> M<sup>9</sup>h<sup>9</sup>Y K<sup>9</sup>ti Ges c<sup>9</sup>q mg cwi gvY O<sub>2</sub> Z<sup>9</sup>W K<sup>9</sup>ti | Avi G O<sub>2</sub> nt<sup>9</sup>Q mKj c<sup>9</sup>lvxi k<sup>9</sup>h<sup>9</sup>b<sup>9</sup>K<sup>9</sup>v<sup>9</sup>h<sup>9</sup>c<sup>9</sup>vi P<sup>9</sup>v<sup>9</sup> b<sup>9</sup>vi D<sup>9</sup>cv`vb| m<sup>9</sup>z<sup>9</sup>iv<sup>9</sup>s AZ<sup>9</sup>waK RbmsL`vi P<sup>9</sup>tc eb m<sup>9</sup>u` a<sup>9</sup>ysm ntj Zv c<sup>9</sup>lv<sup>9</sup>R cwi tetki wech<sup>9</sup> t<sup>9</sup>W<sup>9</sup>t<sup>9</sup>K Av<sup>9</sup>te|

**RbmsL`v I v<sup>9</sup>kv<sup>9</sup>vb RvbZ`IY**

evqexq cwi tek` I tYi c<sup>9</sup>lv D<sup>9</sup>cv`vb vnt<sup>9</sup>te CO<sub>2</sub>, CFC<sub>s</sub>, wgt\_b BZ<sup>9</sup>W<sup>9</sup> t<sup>9</sup>K`v<sup>9</sup>qx K<sup>9</sup>iv nq Ges Gi AwaK<sup>9</sup>vsk v<sup>9</sup>kv<sup>9</sup>vb<sup>9</sup> t<sup>9</sup>tki D<sup>9</sup>cv<sup>9</sup>Z etj B we<sup>9</sup>te<sup>9</sup>PZ| v<sup>9</sup>K<sup>9</sup> eZ<sup>9</sup>vtb RbmsL`ve<sup>9</sup>uj t<sup>9</sup>k<sub>3</sub> t<sup>9</sup>vtZ GK<sup>9</sup> t<sup>9</sup>K thgb RbmsL`v evot0 Ab<sup>9</sup>v<sup>9</sup> t<sup>9</sup>K A<sup>9</sup>W<sup>9</sup>ZK Kg<sup>9</sup>R<sup>9</sup>v<sup>9</sup>U<sup>9</sup>l`z<sup>9</sup>Zvi mt<sub>1</sub> teto P<sup>9</sup>tj t<sup>9</sup>Q| P<sup>9</sup>vb 120 t<sup>9</sup>K<sup>9</sup>U RbmsL`v Aa<sup>9</sup>vt Z c<sub>1</sub>exi w<sup>9</sup>Z<sup>9</sup>xq ep<sup>9</sup>E<sup>9</sup>g K<sup>9</sup>qv Drcv`bK<sup>9</sup>vix, 60 t<sup>9</sup>Zj Drcv`bK<sup>9</sup>vix Ges 4<sup>9</sup>ve<sup>9</sup>z<sup>9</sup> Drcv`bK<sup>9</sup>vix t<sup>9</sup>k vnt<sup>9</sup>te we<sup>9</sup>te<sup>9</sup>PZ| eZ<sup>9</sup>vtb Zvi A<sup>9</sup>W<sup>9</sup>ZK c<sup>9</sup>lv<sup>9</sup>ni n<sup>9</sup>ri kZKiv c<sup>9</sup>q 8 fM| g<sup>9</sup> ev<sup>9</sup>Rvi A<sup>9</sup>W<sup>9</sup>ZK Kg<sup>9</sup>R<sup>9</sup>v<sup>9</sup>U<sup>9</sup>i Av<sup>9</sup>Ivq P<sup>9</sup>vt<sup>9</sup>K Zvi A<sup>9</sup>W<sup>9</sup>ZK Kg<sup>9</sup>R<sup>9</sup>v<sup>9</sup>U<sup>9</sup> e<sup>9</sup>Rvq iv<sup>9</sup>lv<sup>9</sup>i Rb` Af<sup>9</sup>sl<sup>9</sup>ixY kw<sup>3</sup> NvU<sup>9</sup>v tgv<sup>9</sup>vt<sup>9</sup>ej<sup>9</sup>vi Rb` Avi I K<sup>9</sup>qv I t<sup>9</sup>Zj Av<sup>9</sup>g<sup>9</sup>v<sup>9</sup>bx Ki<sup>9</sup>t<sup>9</sup>Z nt<sup>9</sup>Q| 1993 mtj e<sup>9</sup>v<sup>9</sup>t<sup>9</sup>K Ab<sup>9</sup>v<sup>9</sup>Z Av<sup>9</sup>en<sup>9</sup>lv<sup>9</sup>qv Av<sup>9</sup>Av<sup>9</sup>ij K mt<sup>9</sup>sj t<sup>9</sup>B Dc<sup>9</sup>W<sup>9</sup>Z Z<sup>9</sup> Ab<sup>9</sup>lv<sup>9</sup>qx P<sup>9</sup>vb BtZvgta`B c<sub>1</sub>exi 11% CO<sub>2</sub> Drcv`t<sup>9</sup>bi g<sup>9</sup>va<sup>9</sup>t<sup>9</sup>g h<sup>9</sup>iv<sup>9</sup>o<sup>9</sup> I i<sup>9</sup>vk<sup>9</sup>qv<sup>9</sup> c<sup>9</sup>tiB Z<sup>9</sup>Z<sup>9</sup>xq`v<sup>9</sup>tb Ae<sup>9</sup>v<sup>9</sup>b Ki<sup>9</sup>t<sup>9</sup>Q| G<sup>9</sup>k<sup>9</sup>xq t<sup>9</sup>k<sub>3</sub> t<sup>9</sup>v BtZvgta` kZKiv 25% Mib n<sup>9</sup>DR M'v<sup>9</sup>m Drcv`b K<sup>9</sup>ti P<sup>9</sup>tj t<sup>9</sup>Q h<sup>9</sup>vi A<sup>9</sup>ta<sup>9</sup>RB CO<sub>2</sub>| v<sup>9</sup>K<sup>9</sup> th nrti Guk<sup>9</sup>qv RbmsL`v evot0 Ges v<sup>9</sup>kv<sup>9</sup>vb NU<sup>9</sup>Q Z<sup>9</sup>t<sup>9</sup>Z L<sup>9</sup>g k<sup>9</sup>v<sup>9</sup>NB Guk<sup>9</sup>qv t<sup>9</sup>kmg<sup>9</sup> Av<sup>9</sup>g<sup>9</sup>vi K<sup>9</sup> I BD<sup>9</sup>t<sup>9</sup>v<sup>9</sup>cx<sup>9</sup>q<sup>9</sup> kmg<sup>9</sup>ni m<sup>9</sup>vtj Z`IY gv<sup>9</sup>vt<sup>9</sup>KI Q<sup>9</sup>mo<sup>9</sup>t<sup>9</sup>q h<sup>9</sup>ite etj Av<sup>9</sup>kv<sup>9</sup> K<sup>9</sup>iv nt<sup>9</sup>Q|



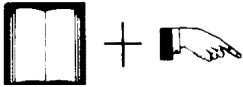


mıWK DEđii cvřk ıUK ıPıı (✓) ıı b|

- 1| řKı\_vq RbmsL`ıv RıbZ cıı řek `ıY řek NřU?
  - K) Dbřř ř`řk
  - L) Rbeıj Dbřřbkıj ř`řk
  - M) Dbřř I Abřřř mKj ř`řkB
  - N) Kg RbmsL`ıv Aaıj Z ř`řk
  
- 2| řKıvıU mıWK bq?
  - K) eım DcřřıMı Mı gıvđı i Aıııg AıřřkRıbZ AııKıı
  - L) Pıı, fıı Z, cııK`ııb, Břř`ıřbııkqv I evsj vř`řk cıı\_eri AřřřKıı řek řj vřKıı eım
  - M) Dbřřbkıj ř`řkı epr bMııı GK ZZııqısk řj vK ew`evııı
  - N.) eııř RbmsL`ıv I ıkı -Kıı Lıvı DřřqB cıı řek ` I řYı Kıı Y
  
- 3| Rj ve× aıřbı Rııg ř`řk Kx ııbMřř nq?
  - K) CO<sub>2</sub>
  - L) CO
  - M) CH<sub>4</sub>
  - N) O<sub>2</sub>
  
- 4| řKıvıU meřřřř řek Mııb nıDR Břřđ± NUııq?
  - K) CO<sub>2</sub>
  - L) CH<sub>4</sub>
  - M) CFC
  - N) NO<sub>2</sub>
  
- 5| ebřřıg aıřřıı Kıı řY evřřřř ıKřřı A fıı nře?
  - K) CO<sub>2</sub>
  - L) O<sub>2</sub>
  - M) N<sub>2</sub>
  - N) H<sub>2</sub>
  
- 6| Dbřřbkıj Rbeıj ř`k\_řj vı gřř meřřřř řek cıı řek `ıY NUııřQ řKıv ř`k?
  - K) fıı Z
  - L) evsj vř`k
  - M) Pııb
  - N) Břř`ıřbııkqv
  
- 7| řaycřřřı Dřřřeb bq RbmsL`ıv I `ıY mgııv řgıKıřejıı meıı AıřřM cııııRb řKıvıU?
  - K) epr bMıııqb I Kj Kıı Lıvı Mřřo řZııı
  - L) aıııđ gřřřeva RııMřřř řZııı
  - M) AııK đmı Drcıı`b
  - N) `bııZK, A\_řřııZK, AııBbMZ I mııııRK mZKřřı Mřřo řZııı

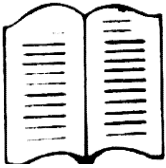
**cıı 2.5 gııEKıı `ıY (Soil Pollution)**

**Kul. I cǝ-x Dbǝb ǝ**



G cǝV ǝkǝI Avcǝb –

- ◆ gǝĒKǝ ǝ ǝY Kǝ Zǝ ej ǝZ I ǝj LǝZ cǝv ǝbǝ|
- ◆ gǝĒKǝ ǝ ǝYi Drmmg-n Dǝj-L Kǝ ǝZ cǝv ǝbǝ|
- ◆ gǝĒKǝ Kǝfǝtǝ ǝ ǝZ nǝ Zǝ eYǝv Kǝ ǝZ cǝv ǝbǝ|
- ◆ gǝĒKǝ ǝ ǝY tǝvǝtǝ cǝǝqǝRbǝq e ǝ ǝv MǝǝǝYi cǝšǝmgǝy Zǝj aǝ ǝZ cǝv ǝbǝ|



**gǝĒKǝ ǝ ǝY Kǝ**

gǝĒKǝ AZǝe ǝ ǝZǝc-ǝcǝKǝZK mǝǝǝ | Bnǝ cǝL ǝxi AǝǝKǝsk Rǝǝi Lv ǝ Drcǝv ǝbǝ gǝǝgǝ|  
 gǝĒKǝǝK ǝKǝ ǝ Kǝi mKj KǝL KǝR AvcǝZǝ nǝqǝ gǝvǝǝǝ i ǝǝqǝKǝgǝ Ab ǝvǝ cǝKǝZK Dcǝǝǝ  
 gǝĒKǝ ǝ ǝZ nǝqǝ bZǝ bZǝ cǝǝǝǝ i D ǝǝǝǝ Ges gǝvǝǝǝ i cǝǝqǝRǝb Zǝvǝ AvcǝǝǝPZ e ǝǝǝǝ ǝ b  
 ǝ b DeP gǝĒKǝǝK Kǝj ǝZ Kǝ ǝZǝ| dǝj gǝĒKǝ DePZǝ nǝm cǝǝǝǝ Q Ges dǝmj PǝǝI gǝĒKǝ  
 Abǝǝǝǝǝ nǝǝǝǝ| GUǝ AZ ǝš ǝ ǝǝǝǝRbKǝ| fǝǝǝǝ Z cǝRbǝ ǝbǝ AbšǝI Kǝj gǝĒKǝǝK ǝbǝvǝǝǝ  
 e ǝǝǝǝ Kǝ ǝZ cǝǝǝǝ tǝmRbǝ gǝĒKǝ mǝǝǝǝ ǝK ǝ ǝY gǝǝ i vLǝZ nǝǝ| hǝǝǝǝK, gǝĒKǝ ǝ ǝY ǝK  
 ǝbǝǝǝǝǝǝ msǝǝǝǝǝ Kǝv hǝqǝ| gǝĒKǝ ǝ ǝY ej ǝZ ǝvSǝq gǝǝǝ cǝǝqǝRbǝq Dcǝv ǝbǝ nǝm I  
 Avcǝǝǝ c ǝ v ǝǝǝǝǝ mǝǝǝ hǝ Rǝe I D ǝǝǝǝ RMǝZǝi cǝǝǝǝ Agǝǝj RbKǝ| Avcǝǝǝ c ǝ v ǝj ǝZ  
 tǝmǝe Dcǝv ǝb ǝvSǝq hǝ gǝĒKǝǝ tǝǝZǝvPK cǝǝ eZǝ NUǝqǝ|

gǝĒKǝ ǝ ǝY ej ǝZ ǝvSǝq  
 gǝǝǝ cǝǝqǝRbǝq Dcǝv ǝbǝ  
 nǝm I Avcǝǝǝ c ǝ v ǝǝǝǝǝ  
 mǝǝǝ hǝ Rǝe I D ǝǝǝǝ RMǝZǝi  
 cǝǝǝǝ Agǝǝj RbKǝ| Avcǝǝǝ  
 c ǝ v ǝj ǝZ tǝmǝe Dcǝv ǝb  
 ǝvSǝq hǝ gǝĒKǝǝ tǝǝZǝvPK  
 cǝǝ eZǝ NUǝqǝ|

gǝĒKǝ ǝ Yvcǝǝǝ AvcǝǝǝǝǝI (Soil degradation) gǝĒKǝ ǝ ǝYi Avl Zǝvǝǝ ǝǝǝPbǝv Kǝv nǝqǝ|  
 ǝǝǝǝǝǝǝǝǝǝ gǝĒKǝ ǝ ǝY NǝǝU ǝǝǝǝǝ| gǝĒKǝ ǝ ǝYi dǝj gǝĒKǝǝ e ǝǝǝǝǝǝǝǝ nǝm cǝqǝ|  
 gǝǝǝ ǝ ǝY cǝǝǝǝǝ ǝ ǝYi Ab ǝZǝ Askǝ| bMǝvǝb I e ǝvǝKǝvǝǝ RbmsLǝv ǝǝǝ cǝZ ǝǝǝ I  
 cǝǝǝǝǝǝǝǝ gǝĒKǝ ǝ ǝY NUǝqǝ|

**gǝĒKǝ ǝ ǝYi cǝǝǝ ǝbǝqǝK (Factors) mǝǝǝ**

- 1| ǝǝǝǝǝǝǝǝǝǝ fǝǝǝ ǝǝǝ
- 2| e b ǝv
- 3| Aǝǝqǝǝǝǝ tǝmP I ǝbKǝvK
- 4| Avc ǝ bǝvǝK, i vǝmǝqǝbK mǝvǝ I D ǝǝ dǝj bKǝj RǝǝZǝi ǝbǝǝe e ǝǝǝǝ
- 5| gǝĒKǝǝ A ǝǝǝǝǝ ǝǝǝ (Acidification)
- 6| tǝmP cǝǝǝǝ e ǝǝǝǝǝǝ gǝĒKǝǝ j eYv<sup>3</sup> Zǝ I ǝǝǝǝ KZǝ ǝǝǝ
- 7| gǝǝǝǝǝ
- 8| Avcǝǝ Kǝǝ Z KǝL fǝǝǝ e ǝǝǝǝ
- 9| cǝǝǝǝ ǝ ǝǝǝǝǝ hǝ ǝǝǝǝ e ǝǝǝǝ
- 10| ǝkǝ eR<sup>ǝ</sup> (Kǝǝǝ, Zǝj, ǝRe I AǝǝRe)
- 11| tǝšǝ I Mǝǝǝǝ eR<sup>ǝ</sup>
- 12| tǝZRǝǝǝ AvcǝRǝǝ, BZ ǝǝǝ

**gǝĒKǝ ǝ ǝY Kǝfǝtǝ NǝǝU**

weirfbæKvi tY gweKv`LY msNiuZ nq| eb`v, b`xfv½b, AwZewó, evqzðvn cfiuZi Kvi tY weirfbæaitbi fig¶lq NtU| Gme fig¶lq DeP fig dñj Pti Abi ntq cto| b`b`xi µgea¶vb cov Ges cmvox Xtj DeP fig tZ AbP ewij Rgv BZ`vir Dti LthM`| gweKv`xN` mgq cmbi ubtP cto`vKv`Ksev`wZ`cñb`ðviv`tmP`c0vfb| gweKv`LY NuTZ`cvti| Kul¶¶¶¶¶ Acni Kwi Z fite ivmiqubK mvi I KxUviktKi e`enivi c0ZubqZB gweKv`wZ`Kti Zxt0| Avc`biktKi AwakvskB weirfbæfite gweKvq`xN`b Ae`vb Kti hv gweKvi` Yvej`xtZ`cP0 ¶¶¶¶¶ cfi ve tdtj | Gt`i cfi ve gwUtZ Ae`vbKvix Dckvix RxeYjv tetP`vKtZ`cvti`bv| Avgiv Rmb, GK tkwR DeP gwUtZ mtePP 2 ¶¶¶¶ qb e`vKtUvi qv, 400 ¶¶¶¶ qb QÍvK, 50 ¶¶¶¶ qb k`vI jv Ges 30 ¶¶¶¶ qb t0tUvRvqimn Ab`vb` eo I ¶`a gweKv Rxe evm Kti | gweKvq evqgUj`xq`bvBtUvRb msthvRbmn gweKv`weirfbæi`vmiqubK`weirfv msNUtb Gt`i figKv LgB`i`zcy¶¶ KxUviktKi I ivmiqubK mvi e`enivi Gt`i gZz`NUvq gwU k³ ntq Dtv Ges DePZv`nrm`ciq|

gweKvq gj- Avc`biktKi (Pesticide) kZKiv 75-100 fivM cfi ve bó ntZ th cwi grY mgq j vtM Zv ubtPi mvi YxtZ`c0E`ntj v-

Avc`biktKi bvg	cfi ve bó ntZ`c0qvRbxq`mgq (ermi)	Avc`biktKi bvg	cfi ve bó ntZ`c0qvRbxq`mgq (gvm)
Gj`wB	3	WiqvRbb	3
tKvi`wB	5	g`vj`w`qb`I`c`vi`w`qb	0.25
wv.wv.wU	4-10	t0c0vRb`I`wctKvi`ig	18
tnbvtKvi	2	wgvRb	12
wj`t0b	3	2,4,5`wU	5
wvBGj`wB	3	GtUvRb`I`tgvbyb	10
tUv`wB	4	GgvwG	3

**Drm**

GumW ewó, A¶¶¶¶ ivmiqubK mvti i e`enivi gweKvi A¶Zv`ewx`tctq`gweKv`LY`NtU| Kul`g`eva`w`tq`b`xi`bre`Zv`bó`Kiv`I`e`vcK`niti`e¶¶`wbatbi`dtj`Livi`c0Kvc`ewx`ciq`hv`gweKv`LY`NUvq| Acni Kwi Z`Kul.`figi`e`enivi,`wbeo`Ddkx`dñtj`I`Pti`I`dtj`w`b`w`b`gweKv`Re`c`v`Ktg`hvq| Gfite`gwU`µgkt`e`enivi`I`AbgthvMx`ntq`cto| AemAZ`wki`eR`¶,`tZRw`¶`c`v`¶`I`Ab`vb`¶¶¶¶¶`e¶R`¶`wgvkY`gweKv`LY`NUvq| tZRw`¶`Zv`y`gwU`t`tK`Drcw`Z`dñj`gvbyb`I`Rb`¶¶¶¶¶| G`Qvor`cuj`w`b`e`vM`e`enivi`ci`Zv`thLvtb`tmLvtb`gwUtZ`tdtj`w`tj`Zv`gweKv`LY`NUvq|`cuj`w`b`e`vM`Dv¶¶¶¶`i`wKktoi`ewx`tK`ti va`Kti`Ges`tmP`I`wbKvtk`gvi`vK`Amjæavi`mup`Kti`|

**gweKv`LY`ti`¶ta`Ki`Yvq**

gweKv`GKuW`AZ`¶¶¶¶`i`zcy`c0KwZK`m¶¶¶¶`| Gi`m0ze`enivi`wbu0Z`KtZ`ntj`gweKvtK`LY`g¶`ivLv`Avek`K| gweKv`LY`g¶`ivLz`wKsev`LY`h¶`gweKvtK`e`eniv`c`thvMx`KtZ`wbaevYz`c`t¶¶¶¶`MhY`KtZ`nte|

Kul. I cj-x Dbqab -g

- 1/ `æp gweKv e'e-iv weifbrecoKuzK `hivMi (thgb eb'v, Liv, figq, jeYv<sup>3</sup>KiY, AieqKiY, ZjvbxKiY, cmb jvMv, DePZv num BZ'w) cavb KviY| G mgm'v `hixY Kul. I Kul.KivRi miv\_ RivoZ mKj tK `æp gweKv e'e-ivcbv Livvc w'K, tjv mæutK© mPZb Ki tZ nte Ges cvkvcnk Dbæ e'e-ivcbv tKSkj wkqv w' tZ nte| Gtqj t MYgra tgi AskMhYmn mi Kwi I temi Kwi Dt' VM cOqvRb|
- 2/ exR, mvi, cmb e'e-ivcbv, Avc` e'e-ivcbv, Pvlvev` cYvj x, BZ'w h t\_ó `qZvi miv\_ e'envi wboZ Ki tZ nte thb gweKv `IY b'bzg chq ivLv hvq|
- 3/ Dbæ chypMZ e'e-ivcbv tKSkj Aeja b Kti `yYh gweKvi Dbqab NUvtZ nte|
- 4/ MtelYvi gra tgi dmj Pti Dbæ chyp i D'web I e'envi Kihqg tRvi`vi Ki tZ nte|
- 5/ fig I gweKv mæu` e'envi i Rb` RvZxq chq bmvZgvj v cYqb I ev`evqb Ki tZ nte|
- 6/ mKj `ti cwi tek mæutK wkv`vb I cOqv tYi e'e-iv MhY Ki tZ nte|
- 7/ i vniqubK c`vt\_ p e'envi h\_v mæe Kigtq cOkuZ. c`vt\_ p (thgb `Remvi, meR mvi, Ktæuv, Lvgvi RvZ mvi, RxevYmvi, Pti e'VM, BZ'w) e'envi eivrtbv Avek`K| G t'qj t cOvgKfite Amyear ntj I `xNqgv`x jv t fi K\_v wetePbv Kti e'envi i Af'vm Mto Zj tZ nte|

**cuWæi gj'vqb 2.5**



mivK DEti i cvtk wUK wPy (✓) w`b|

- 1/ gweKv `IY ej tZ Kx eSvq?
  - K) gvi cOqvRbxq I AemAZ Dcv`vb num cvq
  - L) gvi cOqvRbxq Dcv`vb evx cvq
  - M) gvi AemAZ Dcv`vb num cvq
  - N) gvi cOqvRbxq Dcv`vb num Ges AemAZ Dcv`vb evx cvq
- 2/ tKvbu gweKv `I tYi cavb wbvqK bq?
  - K) figq
  - L) eq'ivcY
  - M) eb'v
  - N) giKiY
- 3/ Gj wv I wvB-Gj wv Gi c'vie bó ntZ KZ ermi mgq j vM?
  - K) 3 ermi
  - L) 5 ermi
  - M) 1 ermi
  - N) 7 ermi
- 4/ Giv w evi dtj Kx nq?
  - K) gweKvi qvi Zj evx cvq
  - L) gweKvi AæZv evx cvq
  - M) gweKvi jeYv<sup>3</sup>Zv evx cvq
  - N) Aægvvi AæZj Ktg hvq



**cvřvři gj`iqb**

mivK Dřři i cvřk ivK ivřý (✓) iv b|

- 1| `řřYi Rb` řKřivU cřřivR` bq?
  - K) cřKivZK `evkó AUV`\_vřK bv
  - L) řřřivZK I ivmřvubK cřiv eZř nq
  - M) `ř, eY, MÜ Acřiv evZř`\_vřK
  - N) řh řKřiv&e`i Avřak` ev Abřřřek NřU
  
- 2) AvřabřřivM` ` IYřq Dcř`vřbi `evkó řKřivU?
  - K) cřKivZK řivře `řř cřbkrj
  - L) Rře-fřivmřvubK Přř cřřekřřivM`
  - M) cřKivZř PřřivKřři AveZřřřivM`
  - N) cřb řkřř ivlv<sup>3</sup> řřgZř řj vc cřvq
  
- 3| evřý I řřYi Dcř`vř ivmřivře co Gi `vř řKřivU?
  - K) cřg
  - L) ivřřřq
  - M) Zřřřq
  - N) PZř<sup>©</sup>
  
- 4| G`řřivmř Rřvřřq `řřY Kř`\_vřK?
  - K) M`řm I Křvř c`v`<sup>©</sup>
  - L) `řayKřvř c`v`<sup>©</sup>
  - M) `řayevřevř c`v`<sup>©</sup>
  - N) Křvř I Zřj c`v`<sup>©</sup>
  
- 5| evřřřř ivKřřiv Avřak` NÜřj ivř<sup>3</sup>i Avř řRb evY řřgZř nřm cřvq?
  - K) CO
  - L) CO<sub>2</sub>
  - M) SO<sub>2</sub>
  - N) H<sub>2</sub>S
  
- 6| evřřřř řKřiv&Dcř`vř tevř`\_vřKřř GřmW evř nq?
  - K) Rj řq evř<sup>©</sup>úiv cřiv gvY
  - L) ajřv-evřj iv cřiv gvY
  - M) SO<sub>2</sub> M`řm
  - N) CO<sub>2</sub> I CO M`řm
  
- 7| `řřZ cřivřřř `RřevK `ře`i Rřivřbi Rb` ivKřřiv Afřře NřU?
  - K) Lv` mřgMřři
  - L) Avř řRřřiv
  - M) Křevř WivB-A` vBřřiv
  - N) Ab`vř` M`řřřiv

Kv. I c j -x Dbq b -ž

- 8) Btj t±t#c-Us Kvi Lvbv t\_ tK wBMZ `t-Y cwb tZ Kx NUvq?  
K) ZvcgvT v evovq  
L) ZvcgvT v Kgvq  
M) A±Zj I qvi Zj evovq  
N) A±Zj I qvi Zj Kgvq
- 9) wbtPi tKvbiU tZRw®q `tYi mvt\_ m±u,³ bq?  
K) wki gZzi nvi ewx cvl qv  
L) cwb tZ ZvcgvT v ewx NUv  
M) gv tQi cRbb qgZv nvm cvl qv  
N) gvmUi Drcv`bkxj Zv tj vc cvl qv
- 10) th mKj Dv™c cwb i `tY gvT v Kgv tZ m qg tm ,tj v Kx Kx?  
K) avb I cvU  
L) KPzI cvU  
M) KPzi cvb I tK I j v  
N) niBwMj v
- 11) c wlexi evqgU t j BtZig ta B kZKi v KZfM CO<sub>2</sub> ewx NtU tQ?  
K) 50 f vM  
L) 25 f vM  
M) 15 f vM  
N) 10 f vM
- 12) Lv™ Drcv`b w, Y evov tZ wM t q mvi I KxUv k tKi e`enri KZ, Y ti t o tQ?  
K) `k , Y  
L) cvB , Y  
M) w, Y  
N) GK , Y



### DĚi g j v

1. M 2. L 3. L 4. N 5. K 6. M  
7. L 8. M 9. M 10. M 11. L 12. K



### Povš g j -vqb

BDıbu-2

**msuŋB I iPbugj-K ckae**

- 1/ mvari Yfite cwi tek `HY ej tZ Kx ešvq e`vL`v Ki ly|
- 2/ BtKvmtotgi `wotKvY t\_tK `yYi tkwYeb`im Dc`rcb Ki ly|
- 3/ tZRw`ŋ eR©Kx? Gt`i cŋve I cŋZKvi wbtq Avtj vPbv Ki ly|
- 4/ cwbtZ Kx ai tYi `HY NUtj ekj v½ mšltbi Rbš nq? wkí Kvi Lvbv t\_tK wMŠ `tYi cŋve I cŋZKvi Dc`rcb Ki ly|
- 5/ ōgvbyB gvby i cwi tek `tYi Rb` gj-Z `vqŋ— e`vL`v Ki ly|
- 6/ eb wbatbi dtj Kxfite cwi tek `HY NtU eŋstq ej ly|
- 7/ RbmsL`v wētūvi b I cwi tek we` IYti vta mēte` mgvaib wbtq Avtj vPbv Ki ly|
- 8/ `HY ej tZ Kx ešvq ek` fite Avtj vPbv ej ly|
- 9/ `Re-wbab I `Re-AwbatthvM` `HY Kx? Gt`i cŋZwqrv e`vL`v Ki ly|
- 10/ GmW eŋó Kx? GmW eŋó cŋfite Kx ai tbi Amēar nq Zv Dtj -L Ki ly|
- 11/ evqy HY RubZ Kvi tY DvM` th cŋZwqrv nq Zvi msuŋB weei Y w` b|
- 12/ wkí -Kvi Lvbvi eR©Kx Ges Gme Kxfite cwbt `HY NUvq Zv Avtj vPbvq Ki ly|
- 13/ DDT Gi cŋfite DvM` I cŋYxi t`tn thme ŋwZKi cŋve cwj wŋZ nq Zv mstŋtc Avtj vPbv Ki ly|
- 14/ AwaK RbmsL`v RubZ mŋgmRK `tYi wPŋ Ztj ai ly|



**DĒi gvjv**

*Kwl. I cj-x Dbqpb -ğ*

***cW - 2.1***

1. *M* 2. *L* 3. *K* 4. *M* 5. *L*

***cW - 2.2***

1. *M* 2. *K* 3. *L* 4. *N* 5. *L* 6. *K* 7. *M*

***cW - 2.3***

1. *L* 2. *M* 3. *K* 4. *M* 5. *N* 6. *L*

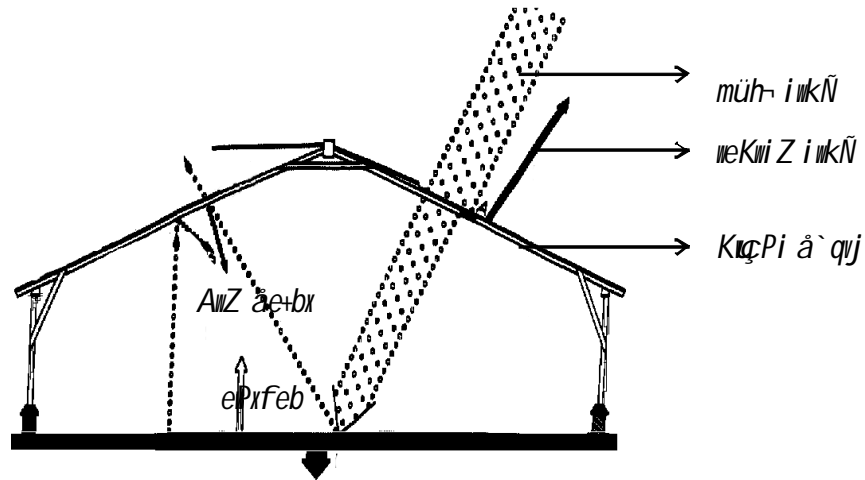
***cW - 2.4***

1. *L* 2. *K* 3. *M* 4. *N* 5. *L* 6. *M* 7. *N*

***cW - 2.5***

1. *M* 2. *L* 3. *K* 4. *L*





IP1- 3.1-1: GKwU cKZ.Mib niDRi gfwj

GLvrb `k`gvb tmsi kw<sup>3</sup> qjZi<sup>3</sup>kwv<sup>3</sup> (400-760 nm) KwP i t`qj w`tq Ly mntRB tfZti cdek Kti Ges tmLvrb i wqZ Dw<sup>m</sup> I Ab`vb` cwicwkRZvq Qwotq cto| cWZdj tbi ci GB tmsi kw<sup>3</sup> i GKwU Ask KwP i t`qj tf` Kti evqgUtj weKwi Z nq Ges Avti KwU Ask, hv gj-Z A`k`gvb AwZ-j yj weKwi Y (Infrared radiation), KwP i t`qj evavM0` nta KwP i Nti gta` t`tk hvq| dtj tfZti i ZvcgvIv evBti i ZvcgvIv Atc qv tek wKQv ewx cvq| Avi GuvB nt`Q cKZ.Mib niDR|

**Mib niDR cfiE**

Mib niDR cfiE K\_wU evqgUtj i ZvcgvIvi mvt\_ m`uKq<sup>3</sup>| cW\_extZ mKj Zvc I kw<sup>3</sup> i Drm mh<sup>3</sup> mh<sup>3</sup> t`K AwMZ Avtj vK iwk`wevfbreZi<sup>3</sup> `N`wbtaq MvZ| Gi mKj Zi<sup>3</sup> `N`B `k`gvb bq| mth<sup>3</sup> `k`gvb Avtj vK Zi<sup>3</sup> i `N`400-760 nm| Avevi Avtj vK iwk`i meUKB Rxtai KwR j vtm br| AwZwi<sup>3</sup> Ask fcp t`tk Aetj vnz Zi<sup>3</sup> iwk` (Infrared radiation) wntmte, hvi Zi<sup>3</sup> `N`760 nm Gi Dta<sup>3</sup> weKwi Yi gra`tg evqgUtj i emnti Ptj hvq| wKs` evqgUtj Ggb wKQvM`im i tqto hv mth<sup>3</sup> `k`gvb Avtj vK iwk`K cW\_extZ AvmtZ tKvb evav t`q br| wKs` Giv fzp t`tk weKwi YKvtj Aetj vnz iwk` tkvly Kivi qvgZv ivtL| dtj fep t`tk weKwi Z Zvtci meUKzgnvktb` Ptj hvevi cwietZ wKQv Ask cW\_exti evqgUtj t`tkB hvq| GfiE KZUKZv cW\_exti evqgUtj t`tk hvte Zv Aek` wbf<sup>3</sup> Kti Aetj vnz iwk` tkvly qvgZv m`ubaeKx cwigvY M`im evqgUtj we`gvb AvtQ Zvi lcti| mZivs evqgUtj G aitbi M`vami Awak` hZ tenk nte Zvi Zvc tkvly qvgZv ZZ evote| A`P G mKj M`im Mib niDRi KwP i teobxi gZv KwR Kti evqgUtj i Zvc ewx Kti| eZgvtb KveB WvB-A- vBwMn wKQvM`im evqgUtj ewx cvevi dtj cW\_exti D`Zv ewx cvt`Q etj weAvxiv chvY tctqtQb| dtj KwP i Nti chvYi gZv cW\_exti ZvcgvIv evovi Avk`v t`Lv w`tqto| Avi GuU i bvgB nt`Q eZgvtb mgta euj Avtj wPZ Omib niDR cfiE ev Omib niDR Btd<sup>3</sup>|

eZgvtb KveB WvB-A- vBwMn wKQvM`im evqgUtj ewx cvevi dtj cW\_exti D`Zv ewx cvt`Q etj weAvxiv chvY tctqtQb| dtj KwP i Nti chvYi gZv cW\_exti ZvcgvIv evovi Avk`v t`Lv w`tqto| Avi GuU i bvgB nt`Q eZgvtb mgta euj Avtj wPZ Omib niDR cfiE ev Omib niDR Btd<sup>3</sup>|

**Mib niDR Btd<sup>3</sup> i DrciE**

kw<sup>3</sup>, i vnvqubK wqj-wewqj I tfsZ Ae`w i GKwU Rivj mgvkiYi gra`tg DrciE ntqtQ cW\_exti Rjevqy i mu M`ni DEvc GZ Awak` th, tmLvrb GKRb gvby tcsQvIv Zvi kixti i i<sup>3</sup> dltZ AvitKite| cqvst<sup>3</sup> gZj M`ni DEvc wngv<sup>3</sup> i GZB wbtP th, tmLvrb tcsQvi mvt\_ mvt\_ GKRb gvby cpU wUvq RgvU teta gZzeiY Kite| G`gUv M`n ZvcgvIv

wevfbzV nevi gj- KviY Mh`gtUvi evqexq Dcv`vfb weivU ivmivqubK wfbzV| cll\_ex, g1/2 I iµ G wZbuU MhNB cPz tmSi kur<sup>3</sup>i Dcv`wZ i tqtQ| wKŠ wevKi tYi gva`tg th cwi gvY Zvc kur<sup>3</sup> gnvk tB` wdti hvq Zv wbfP Kti Mh` tji evqgU tji M`vixq Dcv`vfb Dci | Mh nuD tRi tFZti th cµµqvq KµPi XvKbv w` tq Zvc Ave× ntq hvq, tmB GKB cµµqvq KveB WvB-A· vBW I wgt` tbi g tZv wKQyKQyM`vm evqgU tji wbar tki Zvc tkvY Kti DEvc ew× Kti | iµ Mhni we` » DEvtci KviY gjZ tmLvbKvi CO<sub>2</sub> mg× evqgU j, hv AwbqwsZ Mh nuDR cµµqvq NUvq| Acic t`q, g1/2 Mh CO<sub>2</sub> I Ab`vb` Mh nuDR M`v tmi cwi gvY GZB Kg th, Zv wngv t`i Dcti Zvcgv t`v at i vL tZ mg` bq| c`qvŠti, cll\_exi i tqtQ bvB tU tRb mg× evqgU j thLvfb CO<sub>2</sub> Gi cwi gvY kZKiv cµq 0.03 fvm, hv weMZ KtqK j` q ermti I tZgb ew× cvqub|

gvbe mō Kvhfej x w` tq cll\_exi RūUj fvi mg`Zv wevNz ntZ cvti Ggb avi Yv cūg cKvk Ktib mBwK i mvqbwe` tmfvb tZ Ai tnbqvm 1896 mtj | Kaj v, tZj, M`vm BZ`w` Rievk`

Ai tnbqvm gZ cKvk Ktib th, w` wki wec`tei Rb` Awak Kaj v tcvotbv ntj CO<sub>2</sub> M`v tmi gv t`v teto hvte Ges Zv axi Muz tZ evqgU j tK DEB Kivi KviY ntq w`vte| ZLbKvi mg tq GuU Ki -Kvnbx A\_ev Zv wEK w elq wntmte wetePZ ntj I cµq 60 eQi ci 1957 mtj K`vuj dnbqvi w` Lem Bbwi UDU Ae I tmtbv Mh dx tm mZ`Zvi cµvY cub|

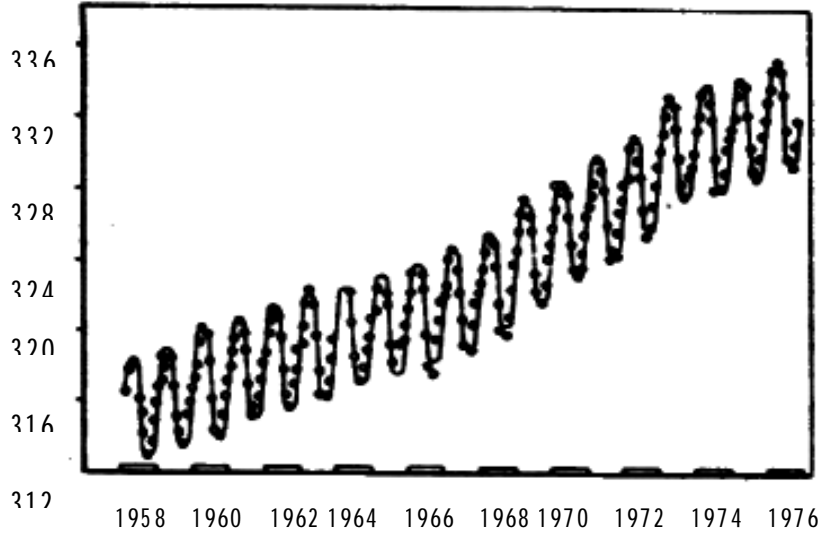
NuUZ Ryj wbi` nb tk tI CO<sub>2</sub> wBZ nq| Ai tnbqvm gZ cKvk Ktib th, w` wki wec`tei Rb` Awak Kaj v tcvotbv ntj CO<sub>2</sub> M`v tmi gv t`v teto hvte Ges Zv axi Muz tZ evqgU j tK DEB Kivi KviY ntq w`vte| ZLbKvi mg tq GuU Ki -Kvnbx A\_ev Zv wEK w elq wntmte wetePZ ntj I cµq 60 eQi ci 1957 mtj K`vuj dnbqvi w` Lem Bbwi UDU Ae I tmtbv Mh dx tm mZ`Zvi cµvY cub| Ziv t`Lvb th, cll\_ex tZ th cwi gvY CO<sub>2</sub> wBZ nq Zvi cµq A tRb` v`vxfvte evqgU tji Ave× ntq hvq| Gic t`i weAvbx tWvFU wKuj s 1958 mtj nvl qvB tqi gbiy qv tZ evqgU tji CO<sub>2</sub> Gi NbZj 315 wcvGg wntmte ti KW`Ktib| wKŠ eZ`v tB Zv teto 350 wcvGg AwZµg Kti tQ| tmfvb tZ Ai tnbqvm B cūg Mh nuDR B t d±0 K`vU e`envi Ktib| wki wec`tei h tM wec`j cwi gvY Kaj v tcvotbv dtj th cwi gvY CO<sub>2</sub> evZv tm wgt ktQ Zvi Kzlj m`v tK`v Zv tmv`Pvi ntq v tQ t j b| wZv fvel` vYx Ktib th, evqgU tji CO<sub>2</sub> ew× tctq w` Y ntj cll\_exi DōZv 5° tmj wqvm chŠ teto hvte| wZv Avi I gZ cKvk Ktib th, CO<sub>2</sub> M`vm Ktg hvvi Kvi tYB Z`vi h tMi mō nq| mZ`v s G K`v ej vi B A t c`qv i v tL bv th, Mh nuDR c`v v B GKmgq cll\_ex tK evm t h v M` Kti wQj | Zvc Acw evnx K`v mōi Kvi tYB cll\_exi Mo Zvcgv t`v eZ`v tB 15° tmv E tM w, Ab`v q Zv -17.7° tmv E tM w i t w k ntZv bv| mZ`v s Mh nuDR M`v tmi AeZ`v tB cll\_ex i v Zvi wZ cwi YZ nte cµvnx kxZj Mh | ZvB cll\_exi v`vweK Z`v Ab`k j- Aw` tZ j Rb` GK w` tK thgb G t`i cwi wZ Dcv`wZi cµqv Rb i tq tQ, Ab`w` tK evqgU tji G t`i A`v`vweK Dcv`wZ thb wech`q Ki Ae`vi mō bv Kti Zv j` q Yxq|





ukí weí tei mvt\_ mvt\_ A\_@  
 ewaZ Rxevkf Rjy mb e`envi i  
 ci t\_#K Avenvl qmZ mgxKiY  
 GK bZb gvTiv thm nq| Kvi Y  
 ukí Kvi Lvbr th cwi gvY Rxevkf  
 Rjy mb e`envi Kti ewaZ CO<sub>2</sub>  
 mbMZ Kti, Dv<sup>m</sup>c I mMi ZZUv  
 tkvly Kti mbZ e`\_nq|

Kvi Lvbr th cwi gvY Rxevkf Rjy mb e`envi Kti ewaZ CO<sub>2</sub> mbMZ Kti, Dv<sup>m</sup>c I mMi ZZUv tkvly Kti mbZ e`\_nq| GQvor G kZtKi tMvovi w`K t\_#K tgvUihrtbi Avne`rti i dtj e`vcK Rxevkf Rjy mbi e`envi cwi w`wZtK Avi I RvUj Kti Ztj | GQvorl i tqtQ Avak Rb- msL`vRmbZ KviY Lv` , MfwbgPv mvgM<sup>0</sup> I Rjy mb Pvn`v ci-tYi Rb` ubnePti e`n| ubab| dtj cKwZ nvi v`Q CO<sub>2</sub> AvExKiYi Drm|



uPÍ- 3.2- 2: evqgÚtj KveB WvB-A- vBW M`v`mi cwi gvY (uc.uc.Gg.)

1958 m`bi ci t\_#K cu\_xi CO<sub>2</sub> epxi cwi gvY Nubôfvte j`n` Kiv n`Q | tm mgq t\_#K eZgub `kK chSÍCO<sub>2</sub> epxi nvi 0.5 fiv t\_#K 1.0 Gi gta` mvgvex i tqtQ| KveB WvB-A- vBtWi Drmmgr eÜ ev ubMg`tbi gvTiv KgvTz br cvitj epxi eZgub nvi th Avi I DaYvngx nte ZvZt tKvb&mt`n tbB| Avi Gi dtj evote Mib nvdR cÚwLrqv|

**Kvi v metPtq tenk CO<sub>2</sub> `LY NUv`Q**

mivari Y fvte Dbz t`kmgfKB evqgÚtj CO<sub>2</sub> epxi Rb` `vqx Kiv nq| 1980 m`bi GK mgx`vq t`Lv tM`Q Dbqbkxj t`kmgf t\_#K thLvrb evqz CO<sub>2</sub> mbMg`tbi cwi gvY uQj 13% tmLvrb DEi Avtgwi Kv, cwoG BDti vc I `t-cP` t\_#K mbMg`tbi cwi gvY uQj 57% CO<sub>2</sub>| uKŠ BtZvgta` Dbqbkxj t`kmgf n k<sup>3</sup> e`envi i cwi gvY tefo hvl qvq avi Yv Kiv n`Q AvMvgx kZvxi cÜ\_gvstKB CO<sub>2</sub> mbMg`tbi w`K w`tq Dbqbkxj t`kmgf Dbz t`k\_`uj tKI Qvotq hvte|

**vgf\_b (CH<sub>4</sub>)**

GK AYyKveB I Pvi AYynvBtWtRb mgstq MwZ GKwU M`v`mi bvg vgf\_b (CH<sub>4</sub>)| GuU cÜKwZK M`v`mi c`vrb Drm Ges Gi `vn` `JgZv AtbK tenk| vgf\_b ubMg`b RbmsL`v epx I Kul KvthP mvt\_ euj vstK m`uKf`v | weMZ 200 ermfi evqgÚtj vgf\_tbi cwi gvY cÜq uQ\_ Y n`tqtQ| cÜKwZK Drm Qvorl Rj vfvq, cPbkxj eR<sup>0</sup>, Mew` ci, DBtcvKvi AtŠfemeimKvi x e`vKtUvi qv BZ`w` Drm t\_#KI vgf\_b M`vm mbMZ nq|

Rj vev avtbi RvgtZ `Re c`v`e`vKtUvi qv Qviv veRvwoZ ntq vgf\_b M`vm DrcbeKti | eZgub ve`kji tgvU vgf\_b Drcv`tbi kZKiv 10 fivMB Rj vev avtbi Rvgt t\_#K AvmtQ| vekf-Lv` I Kul.ms`vi (FAO, 1994) gtZ avtbi Rvgt t\_#K ermfi 60 vgvj qb Ub vgf\_b Drcbe nq Ges Gi kZKiv 90 fivMB Avtm Gukq t`k\_`uj t\_#K| bqv-w`j` BvUqv





### cuVvEi gj-vgb 3.2

mWVK DEti i cuvk WUK WPy (✓) w`b|

- 1/ Mib nvdR cZwμqv NUvZ CO<sub>2</sub> Gi Ae`vb kZKiv KZ?  
K) 50 fVM  
L) .03 fVM  
M) 18 fVM  
N) 14 fVM
  
- 2/ GKRB gvby cZw b wtkjmi mif\_ Kx cwi gvY CO<sub>2</sub> Z`VM Kti?  
K) 10 cvDU  
L) 8-10 cvDU  
M) 5-7 cvDU  
N) cUq 2 cvDU
  
- 3/ cZ eQi eb-DRwOKiY cμqv gva`tg th cwi gvY CO<sub>2</sub> evqzZ msthvRZ nq Zv cUq KZ wgvj qb Ub?  
K) 2860 wgvj qb Ub  
L) 1660 wgvj qb Ub  
M) 3000 wgvj qb Ub  
N) 1000 wgvj qb Ub
  
- 4/ evqzZ CO<sub>2</sub> evori gj- Kvi Y tKvbW?  
K) eb wbab  
L) RbmsL`v epx  
M) RievkRj mbi e`envi  
N) bMi vqb
  
- 5/ cKwZK M`vmi cAvb Dm tKvbW?  
K) CO<sub>2</sub>  
L) CH<sub>4</sub>  
M) N<sub>2</sub>O  
N) CFC<sub>s</sub>
  
- 6/ Rj vev avbi Rwg t`K Drcbwgt\_b M`vmi wmsnfvMB Avtm tKvb&Gj vKv t`K?  
K) Dbz t`k, wj t`K  
L) AbtbwZ t`k, wj t`K  
M) Gwkqvi t`k, wj t`K  
N) DEi Avtgui Kvi t`k, wj t`K

7/ eZ@v7b evq7Z N<sub>2</sub>O evxi nvi kZKiv KZ?

- K) 0.3 fivM
- L) 3.0 fivM
- M) 30 fivM
- N) 0.1 fivM

8/ CFC<sub>s</sub> Miv7mi c7vb D7m tKivU?

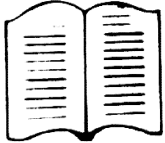
- K) evq7Uj
- L) c7KivZK Liv
- M) D7v7c RivZ
- N) givbe m7

**cW 3.3 R7e RMZ I M7b n7DR B7d±**



G cvV tkfI Avciab -

- ◆ Mib nVDR Btd± I Avenvl qvi cwi eZB m=utK<sup>e</sup>vL<sup>v</sup> Ki tZ cvi teb|
- ◆ Mib nVDR cFvtei dtj Kwl tZ th cZm<sup>v</sup>qv t<sup>v</sup> Lv t<sup>v</sup> q Zv eYB<sup>v</sup> Ki tZ cvi teb|
- ◆ eb m=ut<sup>v</sup> i Dci cFve m=utK<sup>e</sup>ej tZ I wj LtZ cvi teb|
- ◆ Rj xq Pμ I cVxKtj cZm<sup>v</sup>qv eYB<sup>v</sup> Ki tZ cvi teb|
- ◆ Dvj mLZ cZm<sup>v</sup>qv<sup>v</sup> hKi tYi Dcvqmg<sup>v</sup> P<sup>v</sup>ryZ Ki tZ cvi teb|



G K<sub>v</sub> AvR meRb<sup>v</sup> KZ.th evqgU<sup>v</sup>tj KveB<sup>v</sup> WvB-A<sup>v</sup> vBW, wgt<sub>b</sub>, b<sup>v</sup>BU<sup>v</sup>m A<sup>v</sup> vBW, w<sup>v</sup>m.Gd.w<sup>v</sup>m cFvZ. Mib nVDR M<sup>v</sup>vtmi e<sup>v</sup>xR<sup>v</sup>ubZK<sup>v</sup>vi tY c<sup>v</sup>l<sub>exi</sub> Zvcgv<sup>v</sup>Iv evotQ| wK<sup>v</sup>S<sup>v</sup> evqgU<sup>v</sup>tj Kx cwi gvY Zvtci e<sup>v</sup>x NtUtQ ev f<sup>v</sup>iel tZ Nu<sup>v</sup>te Zv wbtq w<sup>v</sup>efb<sup>v</sup>reZ<sup>v</sup> ch<sup>v</sup>ij vP<sup>v</sup>br K<sup>v</sup>i m=ut<sup>v</sup> th wP<sup>v</sup>I dZU I tVtQ Zv t<sub>tK</sub> GUv w<sup>v</sup>bwDZ th, w<sup>v</sup>EMZ 100 eQt<sup>v</sup>i evqgU<sup>v</sup>tj i Zvcgv<sup>v</sup>Iv 0.5 ± 0.1° tmt e<sup>v</sup>x tctqtQ (wP<sup>v</sup>I: 1-3.3)



wP<sup>v</sup>I - 3.3 - 1: evqgU<sup>v</sup>tj i Zvcgv<sup>v</sup>Iv

Zvcgv<sup>v</sup>Iv e<sup>v</sup>x i GB aviv Ae<sup>v</sup>inZ<sup>v</sup> vKtj AvMgx 2030 m<sup>v</sup>j b<sup>v</sup>M<sup>v</sup> evqgU<sup>v</sup>tj i Mo Zvcgv<sup>v</sup>Iv Avil 1.5 t<sub>tK</sub> 4.5° tmt ch<sup>v</sup>S<sup>v</sup> e<sup>v</sup>x c<sup>v</sup>te etj Avenvl qv I cwi tek w<sup>v</sup>Avbx<sup>v</sup> i avi Yv|

evqgU<sup>v</sup>tj i MocoZv Zvc 1940 m<sup>v</sup>j ch<sup>v</sup>S<sup>v</sup> e<sup>v</sup>x tctj I cieZ<sup>v</sup> wZb<sup>v</sup> k<sup>v</sup>tK clq Acwi ewZ<sup>v</sup> wQj | wK<sup>v</sup>S<sup>v</sup> 70 Gi<sup>v</sup> k<sup>v</sup>tKi ci t<sub>tK</sub> Zv nVv K<sup>v</sup>i Averi evotZ<sup>v</sup> v<sup>v</sup>tK Ges 80<sup>v</sup> k<sup>v</sup>tK Zv mte<sup>v</sup>PP gv<sup>v</sup>lvq t<sup>v</sup>c<sup>v</sup>stQ| Gi g<sup>v</sup>ta<sup>v</sup> 1988 m<sup>v</sup>tj i Zvcgv<sup>v</sup>Iv MZ 130 eQt<sup>v</sup>i i g<sup>v</sup>ta<sup>v</sup> me<sup>v</sup>tP<sup>v</sup>tq tewk wQj | Zvcgv<sup>v</sup>Iv e<sup>v</sup>x i GB aviv Ae<sup>v</sup>inZ<sup>v</sup> vKtj AvMgx 2030 m<sup>v</sup>j b<sup>v</sup>M<sup>v</sup> evqgU<sup>v</sup>tj i Mo Zvcgv<sup>v</sup>Iv Avil 1.5 t<sub>tK</sub> 4.5° tmt ch<sup>v</sup>S<sup>v</sup> e<sup>v</sup>x c<sup>v</sup>te etj Avenvl qv I cwi tek w<sup>v</sup>Avbx<sup>v</sup> i avi Yv| wK<sup>v</sup>S<sup>v</sup> Avenvl q<sup>v</sup>me<sup>v</sup>t<sup>v</sup> i g<sup>v</sup>tZ Zvcgv<sup>v</sup>Ivi Mo Atc<sup>v</sup>q<sup>v</sup> m<sup>v</sup>iguqK Pig e<sup>v</sup>x B tewk w<sup>v</sup>c<sup>v</sup> RbK|

**Avenvl q<sup>v</sup>MZ cwi eZB**

Mib nVDR M<sup>v</sup>im 0<sup>v</sup>iv f<sup>v</sup>c<sup>v</sup>t<sup>v</sup>oi Zvcgv<sup>v</sup>Iv e<sup>v</sup>x i dtj Rj evq<sup>v</sup>MZ cwi eZ<sup>v</sup>B b<sup>v</sup>rvv ai tbi R<sup>v</sup>Uj c<sup>v</sup>lvqv Pj tQ| Gi g<sup>v</sup>ta<sup>v</sup> i tqtQ Stoi mSL<sup>v</sup> I Z<sup>v</sup>xeZv e<sup>v</sup>x, gv<sup>v</sup>ivK Liv, epr<sup>v</sup> v<sup>v</sup>erbj<sup>v</sup> v<sup>v</sup>b w<sup>v</sup>etk<sup>v</sup>l<sup>v</sup> kZ<sup>v</sup> c<sup>v</sup>evn, Av<sup>v</sup>aK n<sup>v</sup>ti AcZ<sup>v</sup> w<sup>v</sup>kZ eb<sup>v</sup> v<sup>v</sup>BZ<sup>v</sup> w<sup>v</sup> | Z<sup>v</sup>te evqgU<sup>v</sup>tj Mib nVDR M<sup>v</sup>imR<sup>v</sup>ubZ D<sup>v</sup>Erc e<sup>v</sup>x i c<sup>v</sup>Fve c<sup>v</sup>l<sub>exi</sub> me<sup>v</sup>P GKBf<sup>v</sup>ite n<sup>v</sup>te etj w<sup>v</sup>Avbx<sup>v</sup>iv g<sup>v</sup>tb K<sup>v</sup>ib bv| c<sup>v</sup>l<sub>exi</sub> ga<sup>v</sup> A<sup>v</sup>q<sup>v</sup>lv<sup>v</sup>tk Ae<sup>v</sup>w<sup>v</sup>Z t<sup>v</sup> kmgr<sup>v</sup> thg<sup>v</sup>bt At<sup>v</sup> i<sup>v</sup>ij qvi Av<sup>v</sup>aK<sup>v</sup>isk<sup>v</sup> v<sup>v</sup>b, h<sup>v</sup>y<sup>v</sup> i v<sup>v</sup>o<sup>v</sup> Ges P<sup>v</sup>xtbi g<sup>v</sup>tZv t<sup>v</sup> k<sup>v</sup>mg<sup>v</sup>ni Zvcgv<sup>v</sup>Iv R<sup>v</sup>ubZ Avenvl qv cwi eZ<sup>v</sup>B c<sup>v</sup>lvqv me<sup>v</sup>AK Ab<sup>v</sup>fZ n<sup>v</sup>te| Avenvl qv cwi eZ<sup>v</sup>B R<sup>v</sup>ubZ D<sup>v</sup>m<sup>v</sup>Z cwi w<sup>v</sup>Zi GK<sup>v</sup>U eo w<sup>v</sup>c<sup>v</sup> GB th, G<sup>v</sup>U KLb Nu<sup>v</sup>te Zv w<sup>v</sup>bwDZf<sup>v</sup>ite Ab<sup>v</sup>gv<sup>v</sup>eb Kiv h<sup>v</sup>iq bv| n<sup>v</sup>wi t<sup>v</sup>K<sup>v</sup>bi Z<sup>v</sup>xeZv m<sup>v</sup>ub<sup>v</sup>agv<sup>v</sup>l K<sup>v</sup>tqK<sup>v</sup>U N<sup>v</sup>YSo j q<sup>v</sup> j q<sup>v</sup> gv<sup>v</sup>bt<sup>v</sup> i c<sup>v</sup>V<sup>v</sup>nv<sup>v</sup>xi K<sup>v</sup>iv n<sup>v</sup>tZ c<sup>v</sup>vti | Av<sup>v</sup>ndK<sup>v</sup>iv Av<sup>v</sup>aK<sup>v</sup>isk<sup>v</sup> v<sup>v</sup>tb Ges f<sup>v</sup>vi Z<sup>v</sup>xq Dcgn<sup>v</sup>vt<sup>v</sup> tk j v<sup>v</sup>M<sup>v</sup>v<sup>v</sup>Zi<sup>v</sup> B<sup>v</sup> w<sup>v</sup>Z<sup>v</sup>bu Liv-ermi j q<sup>v</sup>

j 7 gubj4K Abvni I gZäi w`k tvtj w`z cvti | dtj A\_9bwZK I mvgwRK wech9 NUte hv tKej gvI AvYueK h3xi fqvzvvi mvt\_ Z3bxq etj meAvbxiv gtb Ktib|

**epocvZ cfve**

Avenl qui cwieZ9 tnZzewocvZi aifl weivU cwieZ9 Avmte etj meAvbxiv gtb Ktib| dtj Dai9A9vstK cP3 epocvZ, M99Uj xq AAjt Nb Nb epocvZ Ges ga" A9vstK M99Kvj xb epocvZ Ktg hvl qui m9vebr itqtQ| Gi A\_9nt"Q bwiZkxZv9 AAjt kxZKvtj nte Av"Ges M99Kvj nte i9| c9vst9i Dc-M999q AAj (Sub-tropic) hv BtZvgta" B i9 Zv Avil i9 n9q hvte| M99 niDR cfvtei dtj h9iv99 epocvZi cwigv AvMvgx 50 erm9i gta" kZKiv 40 fivM nvm c9te etj meAvbxiv i aviYv| meAvbxiv Avil gtb Ktib th AvndKvi vbi9v9q AAjt i epocvZ te9br (Rain belt) DEi w`k mti wMtg mvt9j GjvKv Av"Zih9 Ki9e Ges ga" Pxt9i c999q Kul. fvg9Z cP3 epocvZ NUte| wK9 evsj v`k I fvi9Zi ep9i Ask nte Liv Ke9j Z|

**Kul9Z M99 niDR c9Ziqv**

Kul9Z chv9MZ wec9 N9U vKtj I mek9 Lv" Drcv`b AvRI Avenl qui I Rjevq9Z Dcv`vbi Dci GKv9f9te wbf9Kvj | ZvB Rjevq9Z th tKvb9 cwieZ9b Kul. Z\_v km" Drcv`b, ci cvj b, eb I grm" P9tli Dci c9Z9v9te th cfve c9te Zv9Z tKvb9m9`n tbB| wK9 mek9 Lv" I Kul. ms`vi (FAO) g9Z evq9U9j i Zvc ep9 t9tj AvR thLv9b Z9ek9Z tmme v9tb km" Drcv`b m9e nte| AvMvgx 100 erm9i ga" A9vst9i Rjevq9`li (Climatic zone) Ges Gi mvt\_ m9u9 BtKvmt9g 200 t\_9K 700 wKvg ch9l t9i9 v`k v9v99i Z nte| G9Z i wkv9, h9iv99 I Kv9vWvi g9Zv bwiZkxZv9 AAjt i t`kmg9 DcKZ. nte| wK9 i9| Dci9 AAjt i (Arid and semi arid zone) t`kmg9 9vZM9I nte| m9v9v gi9v9 h9 200 wK. v9. v9v9 v`k mti hv9 Zte tmLv9Kvi m9u" kZKiv 30 Rb tjv9Ki Lv" ms`vb w`z Amg\_9te|

mek9 Lv" I Kul. ms`vi (FAO) g9Z evq9U9j i Zvc ep9 t9tj AvR thLv9b Z9ek9Z tmme v9tb km" Drcv`b m9e nte|

Dv99 i Lv" I Ab`vb DcKiY h\_v`eRvq vKtj evq9U9j Kve9 WvB-A. vBW ep9 RibZ Kv9Y dmt9i Drcv`b 10 t\_9K 80 fivM ch9l ep9 cvl qui m9vebr itqtQ|

Kul. Drcv`b 9U DrK9vRbK Dci9 nt"Q D9P Zvcgv9v I v9v9 epocvZ ev tm9Pi NvU9Z| M99 niDR cfvtei Kv9Y m9 D"p Zvcgv9v f9v I mqv9te9i g9Zv wKQymKQyDv99 P9tli me`iz NUvtj I cv9exi GKvU i9Zc9dmj av9bi c9v9v9b9i Dci tbwZevPK cfve td9te| Dv99 i Lv" I Ab`vb DcKiY h\_v`eRvq vKtj evq9U9j Kve9 WvB-A. vBW ep9 RibZ Kv9Y dmt9i Drcv`b 10 t\_9K 80 fivM ch9l ep9 cvl qui m9vebr itqtQ| Kve9 WvB-A. vBtWi DeP9v9v m9v 9vg9v (Fertilizing effect) m9 v9v9v9v f9te ch9v9Z| dtj Db9Z me9k9 M99 niD9R dmj Drcv`b CO2 tK m9i wntm9te e`envi Kiv nq| Gv9 aviYv Kiv nq th eZ9vb mg9q dmt9i ev9Z Drcv`b9i wQ9b Avsv9Kf9te n9j I evq9U9j ev9Z Kve9 WvB-A. vBtWi GKvU BwZevPK fvgKv itqtQ|

**Kve9 WvB A. vBtWi BwZevPK w`k**

cKwZ9Z Dv99 i Kve9 wecv9Ki Rb" C3 I C4 RvZvq 9U wfb9Zi c9v9Z itqtQ| ev9Z Kve9 WvB-A. vBtWi c9Z m9v9 c9v9b C3 Dv99 C4 Dv99 A9c9v9v tenk KivRix| G9Z Kti Z9bv9j-Kf9te bwiZkxZv9 AAjt i dmj thgbt Mg, ev9j 9Z"v9 Av9K m99v9v t9vM Ki9e| c9v999i, AvL, avb c9v9Z M999Uj xq dmj Kg m99v9v c9te| evq9U9j Kve9 WvB-A. vBtWi Av9iKvU BwZevPK w`k nt"Q mKj dmt9i Rb" Db9Zi c9v9v e`envi 9vg9v (Water use efficiency) ep9 Kiv| Gi dtj Kg c9v9v e`envi 9v9v i9| Dc-i9 AAjt (Arid & semi arid regions) dmj Drcv`b Kiv m9e nte|

**m9v9v i D"pZv ep9 RibZ c9Ziqv**

Kul. cv9v9v I cv9te9k

meAvbxiv i aviYv AvMvgx 50 t\_9K 100 erm9i gta" cv9exi evq9U9j i Zvcgv9v 2-59tmt ep9 t9tj t9i AAjt i Av9K9k eid M9j wMtg m9v9v c9v9Z thvM nte| ZvQ9v DE9c ep9 RibZ Kv9Y m9v9v c9v9v Av9ZbI ep9 c9te| dtj 2100 m9j i gta" mg9j i c9v9v D"pZv 0.3 t\_9K 1 v9v9v ch9l ep9 c9te etj w9v9v9v t\_9K Av9Kv Kivnt"Q|

cw\_exi tgu Rj i mki kZKiv 97.5 fiv mimi Ges gnvmMti, fiv DZP ceZ-k/2 I tgiy AAjt Ges eitd Avex| emk 0.5 fvtMi gta itqtQ b`-b`x, Lvj -wej, n, tWvev-bijv, SiYv I fMf` cmbi Avavi | weAvbxt` i aviYv AvMiqx 50 t\_tK 100 ermii gta cw\_exi evqgUjt i ZvcgrIv 2-5°mt ewx tctj tgiyAAjt i Avakisk eid Mtj wMtq mimi cmbtZ thvM nte| ZvOvov DEvc ewxRwbZ Kvity mimi cmbi AvqZbl ewx cite| dtj 2100 mtj i gta mgty i cmbi D`PZv 0.3 t\_tK 1 wglvi chS ewx cite etj weifbemt t\_tK AvksKv Kiv nt`Q | Zte gij Ox, Bt`vfbwqv, wftqZbvg, evgf, Pixmn cw\_exi eu wbaAj Ges evsj vt`tki cOq GK ZZxqusk GjvKvj eYv` cmbi wotP Wte hvte| nwi tq hvte Pvl thvM` DeP Rwg| Mpxnb nte j j j Rbc` | web nte DcKj xq grm` Pvl I g`vbMf ebiAj | Rjt v`Qptmi AvLZvq Avmte DcKj xq w`w`w` e-Ox AAjt i `r`ycmbi Avavi , t j v j eYv` cmbtZ fti hvte| GfiteB evck cwi eZB Avmte `Re-Btkvmt ÷ tg|

**grm` Pvl cive**

Avenl qvMZ cwieZebi dtj grm` mzt` i Dci A`vmeK Pvc mw nte, Zv tm mimi ev wglv cwb thLvbb thvK| gvtQi mvgv`K Avev`j I cusUthi `vbsli NUte, e`nZ nte Drcv`bkxj Zv| `r`ycmbi gvQ Liv, eb`v I D`P Zvc Oviv `viYfvte qvZM` nte| GKBfvte qvZM` nte wPsox Pvl | dtj grm` Pvl I AvniYi mt` m`u` j j j gvbj i Rieb hvlvq coe Pi g Uvbr tcvov|

**ebm`ut` cive**

cw\_exi KveB Pm weeZeb e`j i mri fvgKv LyB , iZcY` cOq 2000 weij qb KveB cw\_exi meR MvOcvj v I gvu aviY Kti AvtQ, hv evqgUjt Aev`Z tgu KveB cOq wZb , Y| e`j wbab ev AcvriYi dtj aviYKZ.KveB Rjv wv wmvte e`euZ ntq A`ev cOwZK Dcvq Rvii Z ntq cYivq evqgUjt wdti Avtm| GK mqv`lvq t`Lv tMtQ 1950 t\_tK 1989 mtj i gta` eb wbatbi dtj 90-180 weij qb Ub KveB evqgUjt Rgv ntqtQ hv Kaj v I Rjv wv t\_tK RgvKZ.KveB cOq mgcwi gvY|

eaBkxj MvOcvj v mtj vK-mstK-IY cOqv qv`tg evqgUjt i KveB WvB-A` vBW tkvtl tbq Ges AvExKiY Kti ivtL| Avak nti e`j wbatbi A`nte GKw`tk KveB AvExKiY cOqv wevZ nlqv, Ab` w`tk KwZ e`j i mri RviY cOqv t\_tK evqgUjt Avil KveB Rgv nlqv| dtj Mib nvdR cOkv Avil ewx cite|

Mib nvdR civeRwbZ DEvc ewxtZ e`j i mri I Ab`v` Dv` i Dci weifc cOZvqv mw nte| Avakisk e`j B` f` cwi mi ZvcgrIv gta` (Narrow range of temperature) AvfthvRZ| evqgUjt i ZvcgrIv KtqK wvMtm: ewx tctj Zv nte ebfvgi Rb` wechqKi | Kvity GtZ eZgib Rj evqyAAj , t j v kZ kZ wK. wglv tgiyAAjt i w`tk mti hvte| wKs` ebiAj mti hvevi Rb` th mgtyi cOqv Rb` Rj evqycwi eZebi eZgib nvi Zvi tPtqI Avak| ZvB mgqgZ ebiAj Avfemb cOqv tRvi`vi Kiv bv ntj ebiAj i Rie`evP` gvi wKfvte qvZM` nte|



**Abkxj b (Activity)** t Mib nvdR cOZvqv dtj GKisk kZvaxZ evsj vt`tki Kul. I cwi tetk thme cOZvqv t`Lv w`tZ cvti Zv Dvj L Ki ab (Abg`200 ka)|

**Mib nIDR cfi ve ibqstY KiYiq**

0gube mfZv A`veva  
hZ,tjv mgmiv tgvKitejv  
Kti tQ Rj evqycwi eZBRibZ  
mgmiv ntv Gi wfZi  
metPtq gvi vZK0

Mib nIDR cfi ve gube mo GKU nekje`imc mgmiv| 0gube mfZv A`veva hZ,tjv mgmiv tgvKitejv Kti tQ Rj evqycwi eZBRibZ mgmiv ntv Gi wfZi metPtq gvi vZK0- (Avj tMvi, Dci v0cWZ, gwK0 hY i v0, Gucj 1994)| mZi vs AvAvj Kfite Gi tKvb&mgvavb mpe bq| cwi tek veAvbt`i gtZ eZ0vb`IY nvi GLtbv ibqstYi evBti Ptj hvqvb| mZi vs hZ`Z mpe nekje`imc th c`tj|c,tjv tbqv DiiPZ Zv ntv vt

- RievKf Rjv vnb h\_vmpe ibagvIvq ivLtz nte Ges nekI e`e`v intmte ibi vc` Rjv vnb i Drm L0tz nte|
- clyte`envi thvM` kwi3 hv mvaivYfite cwi tek`IY NUvq bv thgbt evqy cmb, tmSi kwi3, cvi gvbieK kwi3 BZ`wi e`envi ti i c0Z tenk bRi v`tz nte|
- `f tZj e`envi Dc thvMx gUi hvb D`m`eb Kti Rjv vnb e`envi KgvTZ nte|
- c0KwZK eb mpu` msi qjY I bZb Kti ebvq tbi e`e`v vbtZ nte|
- Kul tz ivmivqvbK mti i e`envi Kvgtq`Re mti i e`envi evovTZ nte|
- m`i nekI Avew`v ti i gva`tg CFCs e`envi KgvTZ nte ev c0qvRtb eU Kti v`tz nte|
- gUi hvb I wki Kvi Lvbr t`tk vbmZ aqv t`tk Mib nIDR M`im Acvvi tYi chv3 D`m`eb Ki tz nte|
- wki Kvi Lvbr,tjv vbi vc` ivLvi chv3 D`m`eb Ki tz nte|
- avtbi Riv t`tk Av` vgt\_b vbmZ nq Ggb me avtbi Riv D`m`eb Ki tz nte|
- Mib nIDR cfi ve`ixKi tY Dbz nek tK AMVx FvgKv cvj b Ki tz nte Ges Dbqbkj t`k,tjv tK c0qvRbxq Kwii Mix I Avw`R mviqZv c0vb Ki tz nte|
- MY-gva`g I Ab`vb` gva`tgi gva`tg Mib nIDR cfi vtei Kzj mpu`tk`RbmtPZbZv Mto Z`tz nte|
- `vbxq I AvSR0ZK chvq mgvSZ cwi ki bv MhY I Zv ev`evq tbi e`vcK c0vZ vbtZ nte|
- thtnZz RbmsL`v evxRvbZ Kvi tYI cwi te tki`IY nt`Q tm Kvi tY RbmsL`v vetCvri Yti vta KvhRix e`e`v MhY Ki tz nte|

**cvfVei gj`iqb 3.3**

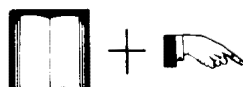
mivK DEti i cvfk wUK vPy (v) v`b|



Kwl.1 cǵ-x Dbǵb ǵ

- 1) weMZ 100 eQti evǵǵŪtj i ZvcǵvŪv KZ wŪwŪmt tetotQ?
  - K) cŪq 5 wŪwŪtm.
  - L) cŪq 0.5 wŪwŪtm.
  - M) cŪq 10 wŪwŪtm.
  - N) cŪq 0.1 wŪwŪtm.
  
- 2) weMZ 130 eQti evǵǵŪtj i ZvcǵvŪv meŧPtq temk wQj tKvb mŧj?
  - K) 1988 mŧj
  - L) 1976 mŧj
  - M) 1986 mŧj
  - N) 1990 mŧj
  
- 3) ZvcǵvŪv ewxRwbZ Avenvl qv cwi eZŧbi cŧve meŧPtq temk AbŧZ nŧe tKvb AĀtj?
  - K) weŧǵxq AĀtj
  - L) wbi ŧŧxq AĀtj
  - M) μvšŧq AĀtj
  - N) Dc-μvšŧq AĀtj
  
- 4) MŪb nŪDR cŧve hŧ i vŧŧŧewŧcŪZ kZKiv KZ Kŧg hŧe?
  - K) 50 fŪM
  - L) 80 fŪM
  - M) 40 fŪM
  - N) 10 fŪM
  
- 5) ZvcǵvŪv ewxRwbZ Avenvl qv cwi eZŧbi dtj Kwl.Drcr`b evŧe tKvb AĀtj?
  - K) MŪŧŧgŪj xq t`kmgŧn
  - L) i`ŧ AĀtj i t`kmgŧn
  - M) tǵi yAĀtj i t`kmgŧn
  - N) bŪwZkŧZvŧ AĀtj i t`kmgŧn
  
- 6) tǵi yAĀj I ceŧ kŧ½ Ave x ei tdi cwi ǵvY cŪ\_xi tǵi U Rj i wki kZKiv KZ fŪM?
  - K) 8 fŪM
  - L) 10 fŪM
  - M) 5 fŪM
  - N) 2 fŪM
  
- 7) cŪ\_xi meŧ MŪQcŪj v I ǵwŪtZ avi YKZ.Kveŧbi cwi ǵvY evǵǵŪtj i tǵi U Kveŧbi cŪq KZ ŧY?
  - K) wZb ŧY
  - L) wŪ ŧY
  - M) cvP ŧY
  - N) GK ŧY

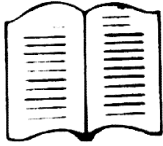
**BDıbu 3.4 I ŧRıv ǧi i ŧŧq I Rŧe RŪtZ Gi cŧve**



G cıV tŧtI Avcıb –

♦ I ŧRıv Kx Ges Gi e`wŪŧ tKv\_vq Zv ej tZ I wj LtZ cıv tŧb/

- ◆ I tRvb`li qitqi c0ZKwZ I KviY m0utK0Avtj vPbv KitZ cvi teb|
- ◆ Rxe RMtZ I tRvb`li qitqi djvdj e`vL`v KitZ cvi teb|
- ◆ I tRvb`li qiq c0Ztvt0a Ki Yxq cšimgy Ztj aitZ cvi teb|



Av tRtbi wZb cigvYvbtq MvZ GKwU ifctft`i biv I tRvb (O<sub>3</sub>)| meAvtbi fvlvq hv Atj wck gwMvdtkkb bvtg cwi wPZ| mthP qZ` Zi 1/2 ` tNq AvZ te<sub>u</sub> w iwkf (Ultraviolet ray) Av tRb AYtK tft1/2 tdjvi qIgzv ivtL| mvariYfvte mthP 240 nm Gi tPtq qZ` Zi 1/2 wkw0 AvZ te<sub>u</sub> w iwkf cftvte Av tRb AYj mvtj vK-vehw<sup>2</sup> (Photo disassociation) NtU| Gfvte temotq Avmv gY Av tRb cigvYv Av tRb AYj mvt\_ wgwj Z ntq I tRvb (O<sub>3</sub>) `Zwi Kti|

**evqgUjt I tRvtbi e`wB**

cw\_exi evqgUj KZ\_wj c0vb`li wbtq MvZ| G\_tjv nt`Qt UtcwUqvii, UtcvtcivR, ÷ tUwUqvii, AvqvbtwUqvii BZ`w`| evqgUjtj me tPtq wbtPi`li wU me`wZ f\_çp t\_ tK c0q 11 wK.wg. chš Ges GuU bivB UtcwUqvii | tgN, evqgUjv, So cfwZ G`ti B mNwZ nq| UtcwUqvii DaYwixgtK UtcvtcivR etj| mvariYfvte UtcvtcivRi Dcti ajv-ewj I Rjxq ev`u`\_tK bv| G`ti Mfxi Zv LpB Kg| Gi Dcti itqt0 ÷ tUwUqvii, hvi me`wZ f\_çp t\_ tK c0q 50-60 wK. wg. chš| GB ÷ tUwUqvii gta`B f\_çt0i 20 t\_ tK 30 wK.wg. DtaY`m wbtwK Avt0 I tRvb Mv`mi GKwU cvZjv`li hv I tRvbwUqvii bvtg| cwi wPZ| cw\_exi evqgUjtj i c0q meP B Kg tewk I tRvb cvl qv hvq| Zte f\_çt0i 25 wK.wg. DtaY`Gi NbZj mekaK 15 wC.wC.Gg. |

cw\_exi evqgUjtj i c0q meP B Kg tewk I tRvb cvl qv hvq| Zte f\_çt0i 25 wK.wg. DtaY`Gi NbZj mekaK 15 wC.wC.Gg. |

**I tRvb`-i qitqi c0ZKwZ.**

gj-Z gvbtj i wqv KtgP dtjB eZgvtb I tRvb`li qic0B nt`Q etj cKvk| evqgUjt I tRvb`li i qiq c0g aiv cto 1983 mvtj hLb ewk G`vUvK0UkV mvtF`vbtg GK`j ewk MteIK G`vUvK0UkV evqgUjt I tRvb`li GKwU weivU MnYi t`LZ cvb| ZLb G MtZP cwi gvc wj 40 kZvsk| 1987 mvj chš Zv teto`wvq 60 kZvstK|`tbi cwi gvtc GuU c0q hY ivt0f mgcwi gvY etj meAvbxiv avi Yv Kti b| 1978 mvtj cwi Pwv Z c0v Gwi bvm Avfhtbi (wPvj i`w qAvj xq GKwU kni c0v Gwi bvm) Z` t\_ tKI Kzgiy AvKvtk I tRvb`li i MnYi m`nvZxZ fvte c0wYZ nq| GB Avfhtb AvI c0vY cvl qv hvq th, mvqMk fvte MZ 18 eQtI I tRvb`li i 2-3 kZvsk wejxb ntq tMt0|`iayKzgiyAAjt i AvKvtkB bq cw\_exi eU Rbeuj AAjt i AvKvtk I tRvb`li I Rb KgtZ`i yKti t0| Zte Zvi gv`v KzgiyAAjt hZ bvUkxq fvte NtU t0 ZgbwU bq|

tKvb tKvb meAvbxi gtZ Kzgiy AvKvtk m0 I tRvb`li i MnYi m0Y`I tRvb NvUwZ RvZ Kvi tY bq| eis AtbKuv evqy`ti i web`vm RvZ`I wdi Kvi tY ntq`vKtZ cvti| w0vm Avenl qv Dcm0 t\_ tK j qI Kiv tMt0 eQtI i tKvb mgtq Kzgiy I tRvb`li nvj Kv ntq hvq Avevi Ab` mgq Zv`rfmeK Ae`vq wdti Avtm| Awakusk I tRvb`Zwi nq M0gUj xq AAjt i evqyZ| M0\$ gUj t\_ tK tgiyAAjt evqyc0vtni`rfmeK MvZ ct\_ AtbK mgq c0ZeUkZvi m0 nq| dtj Kzgiy I tRvb`rfmetKi tPtq AtbK Kg tcš0| AvI tm Kvi tYB tgiyAAjt evqyZ I tRvb NvUwZ ntq`vKtZ cvti etj AtbK gtb Kti b|

I tRvb`li m0utK`Awak Z` Avni tYi Dti tK` 1989 mtb hYivo, iwkv, etUb, dvY, Rvg0x I Rvctbi meAvbxiv GK thš` Avfhtb cwi Pvj bv Kti b DEi tgiyZ| Zvt`i Zt` Rvbn hvq RgvU bvUk GwmtWi tgN DEi tgiy I tRvb`li tLq nvj Kv Kti tdj t0|

**IžRvb -i ųųqi KviY**

CFC<sub>s</sub> cųg emYiR`K e`envi  
iiy nq 1960 mųj  
wiwRvųiUųii kxZjxKiųYi  
KvųR| cųi Aek` G aiųbi  
M`im GqviKųvi, t`u`K`vb,  
c-wųK tųvtgi Dcv`vb,  
gvBųμvBųj KwiK mwiKų cwi`vi  
Kivi `eY BZ`w` e`uiea KvųR  
e`eüZ nųq AvmųQ|

mųų`ųK AvMZ AwZ te, ub iukųi gviwK ųųwZKi cųųve t`ųK cų\_exi RxeKųųK i ųųv Kivi  
Rb` th IžRvb`li QvKbxi gųZv e`eüZ nq Zv AvR gvųųi i ųμqv KųgP dųj B nvj Kv ev aųsm  
cųB nųZ hvų`Q| we`Avbųų`i gųZ IžRvb`li ųųq mvaųb gų` fvgKv ivLųQ gibe mų tKvųiv-  
ųųųiv Kveų (CFC<sub>s</sub>) bvgK wKųRvZ M`im, hvi tKvb cųKwZK Dm tbB| 1928 mųj  
hųivųųų tRbųųij gUm`ųKv`u`vbx i we`AvbųMY CFC<sub>s</sub> M`im D`m`eb Kųib| Zųe CFC<sub>s</sub> cųg  
emYiR`K e`envi iiynq 1960 mųj wiwRvųiUųii kxZjxKiųYi KvųR| cųi Aek` G  
aiųbi M`im GqviKųvi, t`u`K`vb, c-wųK tųvtgi Dcv`vb, gvBųμvBųj KwiK mwiKų cwi`vi  
Kivi `eY BZ`w` e`uiea KvųR e`eüZ nųq AvmųQ| GB M`im weI wenxb, ubw`ų, mnųR Ab`  
tKvb&c`vų`P mųų` weμqv NUvq bv Ges ubPZzicgvųvq ev`u`rfZ nq| AwaKvsk CFC<sub>s</sub> evbųųv  
mnR Ges `vųgI m`ų|

IžRvb aųsmKvix CFC<sub>s</sub> Drcv`b 1960 mųj i ci t`ųK kZKiv 30 fųM nųųi evųųQ|  
e`envųi i Dm t`ųK CFC<sub>s</sub> M`im evqųųųj cųek Kiųj Zv `xN`w` b AųųZ Ae`vq `vųK|  
evqųųųj i Uųcwiųqvi t`ųK CFC<sub>s</sub> cwiPvj b c`xwZųZ c`ewwZ nųq ųųųUwųųqvi t`cųųų  
cųZμqv kųjyKiųZ mgq jvųM AųųZt GKųM| wKų` tmLųb t`cųųųųų tmLvbKvi c`ej  
mgvųųvų evqųųųųni ms`uųk`Gųm `ų we`ųZ jvf Kųi Ges AwZ te, ub iukųi weμqv  
KviųY Lų`f mgųqi gųa` `ųK cwiYZ nq| mųųP AwZte, bx iukųi cųųve CFC<sub>s</sub> tųųų gų  
tKwi b cigvYy(CI) teo nųq Avųm| wehų tKwi b cigvYyZb cigvYywekų IžRvb (O<sub>3</sub>)  
tųųų Drcb`Kųi tKwi b gųbv vBW I Aw ųRb| cigvYyZB tKwi b gųbv vBW Avevi gų  
Aw ųRb cigvYy mųų` hų nųq Aw ųRb M`im I gų tKwi b cigvYyDrcb`Kųi| Gųųve  
GKwI tKwi b cigvYyμgVMZ tPbB weμqv gra`ųg 1,00000 AYyAw ųRbųK tųųų tųjųZ  
mųųg| dųj `ų ųųq nų`Q IžRvb`li |

meųKl Zų` Rvbr tMųQ IžRvb`li ųųųqi wųųb iayth CFC<sub>s</sub> `vqx Zv bq| tKwi bhų Ab`vb`  
M`im thgbt Kveų tUųųKvi vBW, wų\_vBj tKvųivdig BZ`w` I IžRvb`ųi ųųq mvaųb KiųųQ|  
km` tųųų e`eüZ bvBųųųRbNwZ mvi t`ųK wefbaecųKwZK cųųųų Ges tmsi kw`ų cųųve  
bvBUųm A- vBW Drcb`enq| GB M`im ųųųUwųųqvi t`cųųųų mųųP AwZte, bx iukųi cųųve  
tųųų Uųųiv Uųųiv nųq bvBųųųRbųi tiwK`ųj cwiYZ nq| bvBųųųRbųi GB tiwK`ųj  
IžRvbųK AvμgY Kųi Ges aųsm Kųi | gų tKwi b cigvYy tPųq bvBųųųRb tiwK`ųj i  
IžRvb weaųsm ųųgZv 6 , Y Kg| Zųe evqųųųj bvBUųm A- vBųwi cwi gvY eųųi 0.25 fųM  
nųųi evųųQ Ges Gi KgųųgZv m`eZ 150 eųųi chųų eRvq `vųK| gibe mų KviųYi  
cųvųcwk tmsi-Kjųųi KviųYI `ųfmetKi tPųq AųbK tenk cwi gvY IžRvb aųsmKvix  
bvBųųųRb tiwK`ųj mųų nq etj aiv Yv Kiv nq|

**Rxe RMųZ IžRvb`ųi i cųųve**

ųųųUwųųqvi i Zv Kviųųv msi ųųųY IžRvb`ųi i fvgKv Acwi mųg|mų` nųZ AvMZ  
AwZte, bx iukųi (Ultraviolet ray) kZKiv 99 fųMB IžRvb`li tKvųY Kųi ivųL| emK gvų 1  
fųM Gųm t`cųųųų aivcųųų | G iukųi gvųųų i tPųųL aiv cųųų bv| A\_P Zv gvųų I Dwi`mn mKj  
cųųųKųj i Rb`B Pig ųųwZKi | IžRvb`li mųųP GB ųųwZKi AwZte, ub iukųi QvKbxi gųZv  
iųų ubųq cwi`ObmųųP Avųj v cų\_exųK Dcvri v`ų`Q| AwZ te, ub iukųi iųųųųų KviųY G  
`ųi i Zvcgvųv AZ`ųų tenk(cųq 170° dvt)| Avi Gi webgųqB aiv-cųų i ųųv cųų`Q AwZ  
D`Eųųci Kej t`ųK| IžRvb bvųgi M`vųmi G ej q wųųgi tLwmi gųZv j ųų tKwI eųųi atų  
i ųųv Kųi AvmųQ cų\_exi RxeKųųK|

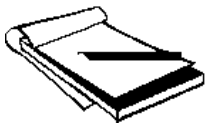
I tRvb`fi i qjq ev Gi NbZ; nij Kv nI qv RvbZ Kvi tY ÷ tUmCiqvi I fctoi gta` Zvtci fvimvg` webó nte| mthP AwZ te, ub iukf tkvIY Kti otUmCiqvi GLb th ZvcgvIv aviY Kti AvtQ I tRvb`fi i Afvte Zv mivmvi UtcwCiqvi ev f,ctó Gtm tmLvbKvi Zvtci gvIv emotq Zjtē|

I tRvb`fi webó ntj mthP tK AwMZ gnvRvMvZK AwZ te, ub iukf mivmvi cll\_extZ Gtm cOYx I Dv`c Ktj i Rb` gvi vZK cOZvUqv mpo Ki te| GtZ cOYx`tn K`vYvti i gtZv`jvtivM` e`mai mpo nte| AwZ te, ub iukf cfvte gvbjl i Mvtqi Pvgovi cxZvf is aviY, Pvgovq fvr cov, tPrL Qmb covm bvbv aitbi RvUj tivtMi mpo nte| evote nmcM I tncvUvBilum tivtMi cfvte| ZvQvov Gi cfvte gvby I Ab`vb` cOYxi tivM cOZtiva qJgZvI tjvc cvte euj vstk|

AwZ te, ub iukf ms`utkGtj gvbjl i Pvgovq`avgvv I g`vjvbgv bvtg`aitbi K`vYvi mpo nq| Avtgvv Kvi cwi tek msi qJY GtRvYi (EPA) Z`vbyvUbx`i gtZ 1% I tRvb`fi i qjq ZtK 5% tenk`avgvv K`vYvi Ges 2% AwK g`vjvbgv K`vYvi mpo Ki te| g`vjvbgv K`vYvi GKvU RvUj tivM, hv t`tK AvtivM` jvf Kiv cOq Amæ| Zt` Avil cKvK Kóv/2`i tPtq tkZv/2ivB Gi Oviv tenk Avmvs`ntē| Rbeuj GjvKvq I tRvb`fi qjq-cOß ntj Zvi cwi YvZ nte Avil fq/4i| I tRvb`fi qJqi Avt KivU qJvZKi v`K AvtQ| Zv ntPQ I tRvb`fi UtcwCiqvii Dcti GKvU QvZvi gtZv t`tK cll\_extK AwZ te, ub nvZ t`tK i qJv Ki tQ| tKvb Kvi tY GvU nij Kv ev tKv\_vl tKvb vO`ntj mthP AwZ te, ub iukf f,ctó tcStQ evqgUjtj i ubæitj i mg`I Av` tRbtK I tRvb` M`vfm cwi YZ Ki tZ cvti| GtZ Kti velv<sup>3</sup> I tRvb` M`vfm AvatK` RxeRMZ gvi vZK wechq i mæb nte|

**Kuliz cfiē**

I tRvb` i qjqRvbZ Kvi tY cll\_exi Rj evqyl Kul i Dci l weifc cOZvUqv cote| AZtZ I tRvb`tK Dv`c evxi mnvqK vbgvK vnmvte vetePbv Kiv ntZv| vKs` eZvvtb mth`nvZvZ fite cOYvYZ th GvU Avmtj cwi tek I Dv`c`i Rb` gvi vK qJvZKi| I tRvb`fi qjqRvbZ Kvi tY AwZ te, ub iukf cfvte Dv`c tKvI vKZ.vl qv, avb, tmvqmeb, etavKvuc, t`vqvK BZ`v` eü dmtj i mvtjvKms`k vY gvIv nvm cvevi dtj Drcv`b e`vNz nte| chPß cwb cvl qv mtZj j Zv, j v I Pvi v MtQ cOYi DtOj Zv\_vKte bv| gvQ i Drcv`b, gvQ i cRbbmn mKj aitbi mvgv`K cOYxI G Oviv qJvZM`Intē|



**Ablyj b** (Activity) t I tRvb`fi qJqi tKSkj e`vL`vceR Kul. I cwi tek Gi cfiē eYv`v Ki ab|

**I tRvb`fi qjq tivta KiYvq**

we`tkj Dbz` t`kmg`tn I tRvb` avsmKvix cävB M`vm CFC<sub>s</sub> Drcv`b Z ntj I Gi e`vcK e`envi meP| ZvB I tRvb`fi i qJq tivta Dbz` vektKB GvMtq AvmtZ nte| thtnZvCFC<sub>s</sub> `vN`Kvj evqgUjtj AqJZ Ae`vq Ae`vb Kti I tRvb`fi tK avsm Kti, tmtnZvGLbB Gi Drcv`b eÜ Kiv DvPZ| vKs`evvYvR`K Kvi tYB G gvjtZ`Zv mæ bq| ZvB evqgUjtj hZ Kg CFC<sub>s</sub> vBMZ nq tm v`tK mKj tKB mRvM`\_vKtZ nte| vclR, Gqvi Kzv, BZ`v` hšcvmZ (thLvtb CFC<sub>s</sub> e`eüZ nq) tgi vGZ/vi PvmR` Gi mgq CFC<sub>s</sub> thb vBMZ bv nq Zv vbwöZ Ki tZ nte| mæ ntj cbt e`enviti i cO`Pov vbtZ nte| GQvov Gme CFC<sub>s</sub> Drcv`bKvix`e`v`i veki`Zvii Ki tZ nte|



**cu#V#Ei gj-ıqb 3.4**

mW/K DE#i i cu#k WUK WPy (✓) W b |

- 1/ evqygÜtj i th -#i I #Rvb ej q Aew-Z Zvi brg Kx?  
K) Avq#bWÜqvi  
L) U#cWÜqvi  
M) -#UWÜqvi  
N) U#cvcR
  
- 2/ evqygÜtj I #Rvb -#i i ¶q cÜg aiv c#i tKvb mtj ?  
K) 1987 mtj  
L) 1983mtj  
M) 1986 mtj  
N) 1989 mtj
  
- 3/ weÁvbx`i g#Z K#j#Z mó I #Rvb Mn#i i cwigrY h#iv#ó# AvqZ#bi cÜq KZ Ask/, Y?  
K) GK ZZxqysk  
L) WÜ, Y  
M) WZb, Y  
N) mgvb
  
- 4/ #PBb weWqvi gra #g GKW tKwi b ci grYyKZiW I #Rvb AY#K a#sm Ki #Z m¶lg?  
K) 1,00000 WJ  
L) 10,000 WJ  
M) 1,000 WJ  
N) 1,00 WJ
  
- 5/ fcp t\_#K I #Rvb -#i ch#itc#Q#Z cFC, Gi KZ mgq j #M?  
K) GK `kK  
L) GK h#  
M) GK kZvãx  
N) GK ermi
  
- 6/ I #Rvb -#i mh-##Z AvMZ AwZ te, Wb i Wk#i kZKi v KZ fW tklY K#i tbq?  
K) 10 fW  
L) 50 fW  
M) 80 fW  
N) 99 fW

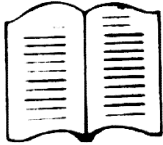
### cw 3.5 evtqm`im I eR`e`e`lcbv



G cvl tk`l Avcwb -

- ◆ evtqm`im Kx Ges Gi e`envi m`ut`K`eY`v Ki`Z cvi`teb|
- ◆ evtqm`im `Zwi i tK`Skj wkL`Z cvi`teb Ges wP`mn Zv eY`v Ki`Z cvi`teb|
- ◆ eR`Kx Ges Gi `enkó` m`ut`K`ej`Z cvi`teb|
- ◆ eR`e`e`lcbvri tK`Skj wP`w`Z Ki`Z cvi`teb|

#### evtqm`im Kx



tMvei I Ab`vb` cPbkxj `Re c`v`e` evqj Abgw`wZ`Z `Re weRvi`Yi dtj wgt`b (CH<sub>4</sub>) M`im Drcbæng| c`KwZK Dcv`q th mKj c`Yx Rvei Kv`U (thgbt tMv-gw`l, QvMj) Zv`i A`šj Ges Av`Rb weewR`Z B`Kvj RxK`vj GjvKv thgbt Rjvex` fvg, müZmü`Z tFRv RvqMv, gqj vhs` cwbv Avavi c`wZ. `vb t`Kl wgt`b M`im Drcbæng| GB M`im iswenb Ges L`y mn`RB `vn`| `Re Dm t`K Drcbæ`j GB M`im`K evtqm`im ej v nq|

#### evtqm`im e`envi I m`zav

- 1| evtqm`im Rjvwb wntmte me ait`bi ivbwi Kv`R e`envi Kiv hvq| e`envi dtj nwo-cwZj, emo-Ni I Kvcó-tPvcó gqj v cto bv|
- 2| GB M`im w`tq iv`Z g`vUj tR`j n`vRvK j vB`Ui gtZv Av`j v cvl qv hvq| tK`i wntbi weK`i wntmteI e`envi Kiv hvq| we`y Drcv`tbi Kv`RI evtqm`im e`euZ nq|
- 3| imvqbvM`i tKjv M`im, G`v`v`Rb M`im ev tctU`j M`im weK`i wntmte Kg Li`P GB M`im e`envi`thM`|
- 4| tMvei I Ab`vb` cPbkxj `Re c`v`e` t`K evtqm`im Dcwi wntmte cvl qv hvq| Gi c`i úvix wntmte hv Aewkó `v`K Zv L`yB Dbz`g`v`bi `Re mvi | `Re-`nb c`l`u`qvi Kv`i`Y mKj AvMvQvi exR A`z`v`Mg `I`gZv nwi`q tdtj | dtj GB mvi e`envi Rvgt`Z AvMvQvi cwi gvYI nwm cvq|
- 5| evqj`vax Ae`vq cPb w`l`v m`z`æng etj tKvb `M`Qovq bv Ges gkv`v`Qi Dc`eI `v`K bv|
- 6| GB M`im cwi ewi K cwi`tek`K cwi`Qbæi`v`L| weK`i Rjvwb wntmte e`envi Kiv nq etj Dv`c Rjv`vbi Dci Pvc K`g hvq|
- 7| GKwU evtqm`im c-v`E `f cwi mi `v`v GgbwK Rbeúj GjvKv`ZI `Zwi Kiv m`e`| Gi c`Z c`v`j x I i`Y`v`e`Y mnR Ges LiPI Kg|

tMvei I Ab`vb` cPbkxj  
 `Re c`v`e` t`K evtqm`im  
 Dcwi wntmte cvl qv hvq|  
 Gi c`i úvix wntmte hv  
 Aewkó `v`K Zv L`yB  
 Dbz`g`v`bi `Re mvi |

#### evtqm`im c`U wbg`Y tK`Skj

GKwU evtqm`im c`v`Ei c`v`b Ask n`Q WvB`R`v`i ev dvi`gt`E`kb U`v` Ges M`im tnv`i vi | Gi m`v` msukó `v`K Bb`j U U`v` ev Lv`Kvj x (Feeding Channel), wMg`v` bvj x I AvDU`j U Kc Ges M`im mie`v`n jvBb| GKwU evtqm`im c`v`Ei wev`f`b`e`Astki AvKvi AvKwZ w`f`P K`i M`im Pwn`v, e`euZ K`v`v`g`v`j i cwi gvY, aiY BZ`w`i Dci |

GLv`b 4-5 wU Mi`x`v`l Av`Q Ggb evox`Z 6/7 Rb cwi ewi K m`m`i Rjvwb Pwn`v tgUv`v`v Dc`thv`Mx GKwU evtqm`im c`v`Ei eY`v` t`qv ntj v| c`l`g 8 wU Mfvi I 7 wU e`v`mi GKwU Ke Lbb Ki`Z n`e| LbbKZ.K`i`c`i Zj vq 3" Av`i.wm.wm Xij vB w`t`Z n`e| GB Xij vB`t`q`i Dc`i 6 d`z Af`š`l`xY e`v`m I 8 d`z D`PZv wewkó 5 Bw`A B`Ui Mv`l`v`x w`t`q GKwU tMjv`Kvi



**ertqm`im cävÈ Pvj Kivi**

ubgP tktl G aitbi M`im cävÈ cÜg Pvj Kivi Rb` 40/50 gY tMvei cÜqRb| tMvei I cmb 1:1 AbgvtZ uguktq úvix (tMveti i`èY) `Zwi Kti wclwS Uvt`i gta` tXtj w`tj B Zv `Z WvBtR ÷vti tcsÜte| wclwS Gi mgq M`im tnvì vi evqykè` Kivi Rb` M`im jvBb tLjv ivLtz nq| WvBtR ÷vi Uv`¼ fivZ`nevi ci úBj KK`eÜ Kti M`im jvBtbi msthvM w`tz nq| KtqK w`tbi gta`B M`im Rgv ntq M`im tnvì vi Dcti i w`tK Dtv hvte| cÜg w`tK M`im tnvì vti wKQyKveB WvB-A. vBW Rgv nevi Kvi tY Zv bvl Rj tZ cvti | tm t`qjt M`im tnvì vti RgvKZ.m`úY`M`im tei Kti w`tz nte| cÜtgB úvixi mvt\_ wKQycwi gvY jvBg ev Pz (CaO) uguktq w`tj ertqm`im Drcv`bKvix e`vKtUwi qvi Kiv`qZv evx cvq Ges KveB-WvB-A. vBW Drcv`b nvm cvq| ubqvgZ M`im mieivn A`qj`eivLvi Rb` cÜZv b 4/5 evj wZ tMvei I mgcwi gvY cmb uguktq wclwvi P`vtbtj i gra`tg WvBtR ÷vti cÜek Kivtz nte|

GLvfb Dvj -LthvM` th, Used up slurry ev Effluent M`im Drcv`tbi ci hv tei ntq Avtm Zv AZ`sí Dbz gvftbi `Re mvi wntmte gwUtZ e`envi Kiv thtZ cvti | G mvti 1.58% bvtU`Rb, 1.2% dmtDU (P<sub>2</sub>O<sub>5</sub>) Ges 0.7% cUvk (K<sub>2</sub>O) \_vtK|

**mZKZv**

- 1| WvBtR ÷vti hvZ evj cmb bv XzK Zvi Rb` wclwS Uv`¼ WvBtR ÷vi t`tK mvgvb` Dcti \_vKv ev`Abxq| cÜqRtB Dcti tkW `Zwi Kiv thtZ cvti |
- 2| WvBtR ÷vti tMvei-cmb cÜekKvtj Ab` tKvb AveR`v hvZ bv XzK Zv j`q ivLtz nte|
- 3| M`im tnvì vi wU gvts gta` tK`iq cvBtci Pri w`tK Nvj tq w`tj Dcti tMvei I cmbi ugkY k<sup>3</sup> ntZ cvt te bv|
- 4| tKvb Kvi tY Bbtj U ev AvDUtj U cvBc eÜ ntq tMtj tmvRv miyKwv w`tq Zv Qvotq w`tz nte|
- 5| tKvb mgq M`im jvBtb cmb Rgtj cmb Rgv`vb Lvj cmb tei Kti w`tz nte|



**Ablyj b (Activity)** t ersj vt`k ertqm`im cävÈ Pvj Kivi Yi m`ebeb I mgm`imgR wPvYZ Kiab|

**eR`e`e`icbv**

e`envi tktl e`i cwiZ`v<sup>3</sup> th tKvb Astki bigB eR` ev AveR`v| Ab`K\_vq, cYt-cÜqRvRvZKiY Qvov tKvb e` Zvi e`envi thvM`Zv nmi tq tdj tj ZvtKB eR`etj | eR` wvfbæaitbi ntZ cvti thgbt Kivb eR` (Solid waste) I qjvZKviK eR` (Hazardous waste)|

e`envi tktl e`i cwiZ`v<sup>3</sup> th tKvb Astki bigB eR` ev AveR`v| Ab`K\_vq, cYt-cÜqRvRvZKiY Qvov tKvb e` Zvi e`envi thvM`Zv nmi tq tdj tj ZvtKB eR`etj | eR` wvfbæaitbi ntZ cvti thgbt Kivb eR` (Solid waste) I qjvZKviK eR` (Hazardous waste)|

- 1| **Kivb eR` (Solid waste)** t Kivb eR` ej tZ tevSvq evox Ni t`tK tdtj t`qv AcZ`vKZ e`; iv`li Svoyt`qv AveR`v, e`emv emvYR`, wki cÜZövb, Kwl. Lvgyi cÜvZ. `vb ntZ gvbe Kiv`Kjvc mP AvvKwvLZ e`imgRtK| kniv`Atj Gme eR` (Refuse) Ges MÜgv`Atj AveR`v (Litter) wntmte cwi wPZ| Gmtei gta` wvfbæaitbi Dcv`vb itqtQ, thgbt ajv, Lv`RvZ Dv`Qó, KivMR, avZe Dcv`vb, cÜóK, ivevi KivE, cwiZ`<sup>3</sup> Kivco, emvftbi AveR`v, ubgPv mvgMöi tdtj t`qv Ask, c`vKs mvgMö,

**Kwl.1 cj-x Dbqab`q**

mkíRvZ eR<sup>®</sup>, mkúbK'ij eR<sup>®</sup> BZ'w | G Qrov itq̄Q Avi I eúnea `nbthM' I A`nbthM' mvgM̄ Ges tZRi<sup>®</sup>Qv c`v\_ eú aiþbi LvgrvRvZ DwrQóI KwB eR<sup>®</sup> tkWYfz, thgbt tMvei I Mpcwj Z ci-cmLi weö, LoKjv, ktm'i cwiZ'v<sup>3</sup> Ask BZ'w |

**bMi eR<sup>®</sup> `erkó**

evsjv`tk gv\_vclZ eR<sup>®</sup>  
msM̄ni cwi gvY weþkj  
Ab'vb` t`þki Zþbvq AþK  
Kg| thgbt XvKvq gv\_vclZ  
cúZw`þbi Mo thLvþb gvI  
0.22 tKwR tmLvþb Kj KvZvq  
0.51 tKwR Ges wDBqfK  
1.8 tKwR|

bM'ii AwaKvsk KwB eR<sup>®</sup> M̄p, mkí I ewYwR`K Dm t\_þK m̄p| cúZw`b RbcúZ Kx cwi gvY KwB eR<sup>®</sup> msM̄pxZ nþe Zv bM'ii AvqZb, Ges FZz Dci wbfP'kxj | evsjv`tk gv\_vclZ eR<sup>®</sup> msM̄ni cwi gvY weþkj Ab'vb` t`þki Zþbvq AþK Kg| thgbt XvKvq gv\_vclZ cúZw`þbi Mo thLvþb gvI 0.22 tKwR tmLvþb Kj KvZvq 0.51 tKwR Ges wDBqfK 1.8 tKwR| XvKvq GZ Kg nI qvi cãvb KviY nqZ tmLvþbKvi`Qef' msM̄ni e'e`v| bM'ii cãvb cãvb eR<sup>®</sup> mgþni Zvwj Kvq itq̄Q tdþj t`qv Lv` , evRvi GjvKvi DwrQó, cvZv, Nvm, KwMR, cmóK mvgM̄, avZe c`v\_ , K'vb, K'v, tevZj, BþUi UK'iv, e`ysk, fMæc, gqjv, QvB, KvV, Pvgov I ivevi RvZ `ëw` |

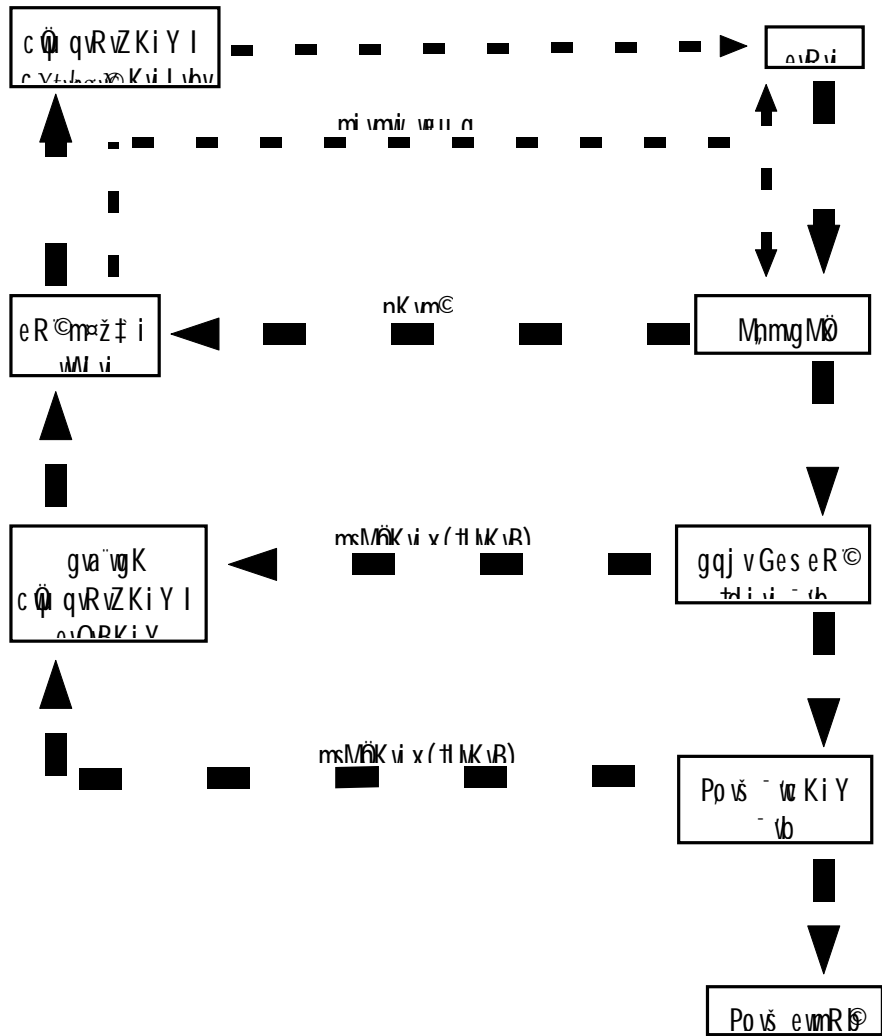
2| **¶wZKviK eR<sup>®</sup> (Hazardous waste)** t Kwl, mkí I ewYwR` cúZw`þbi mKj Kvþeg t\_þKB ¶wZKviK ev weiv<sup>3</sup> Dcv`vb m̄p nq| AwaKvsk t¶þTb Gme Dcv`vþb kZKiv 75 fvþMi I cþi \_vþK i vmvqubK `ë`| Drcbænevi ci t\_þKB G mKj Dcv`vb `xN`iqx mgm'vi m̄p Kþi| GuU thgbt Dbz weþkj Rb` c`hvR`, tZgub Abyz weþkj Rb`I c`hvR`| GmKj i vmvqubK `ë`w` evqy cwb Ges Avqv`i cúZw`nK Rxeþb c`eþki mþhM Kþi tbq| GK Z\_` weeiYxþZ cKvk XvKvi eyoM'v b`xþZ cúZw`b 49,000 wK.M̄. mkí RvZ eR<sup>®</sup> tðjv nþ`Q| PÆM̄þgi KYeþx b`xþZI cúZw`b 45,000 wK.M̄. mkí RvZ eR<sup>®</sup> tðjv nþ`Q| GmKj eR<sup>®</sup> KviþY eyoM'v I KYeþx b`xi cwbþZ `i, tµwqig, K'wMqig I AvitmbþKi gþZv fwi avZz gvIv A`rfweKfite ewx tctq̄Q| Gi dþj b`x I Zrmsj MæDcKj xq Gj vKvq gvþQi Pvi Y I cRbb t¶þI webo nþ`Q|

**eR<sup>®</sup> e`vcbvi tKþj**

AveR<sup>®</sup> ev RÁvj wqšY Kivi Rb` gvþþi mvgþb th wZbwU c\_ tLjv itq̄Q Zvi ms¶þB weeiY GLvþb Zþj aiv nþjv|

- (1) Dbþ`vþb, b`x, nã, m'vMi ev Ab` tKvþ Rjvktq AþkwaZ Ae`vq wþ¶þcb Kiv| G c`þqvri gj-`kþ, ð`þYi mgvavb nþ`Q nuj KvKiYÓ ("The solution to pollution is dilution")| weþkj meþ GuUB eúj cþwv Z eR<sup>®</sup> e`vcbvi Dcvq wntmte weþePZ| th KviþY bMi I mkí KviLvþv, tþv mvari YZ Rj cþ\_i Zxi aþi Mto DþvþQ|
- (2) weþkl fite wbeþPZ `vþb RÁvj `cixKZKiY Ges c`q c`KwZK Dcvþq weþqvRb NwUþq cbte`enriþhM' mæú` m̄pKiY| `rfweK c`KwZK `þY cwi nvi KviX GuUB mnRZg c×wZ| Gi gva`tg AwaK cwi gvþY eR<sup>®</sup> gvþþi i `þ`i cúZ tZgb úgwk m̄p bv KþiB cwi þkvab Kiv mæe|
- (3) hwiþK-i vmvqubK c×wZ (Chemo-mechanical process) Abyri Y Kþi cbte`enriþhM' mæú` m̄pKiY| GB e'e`vi gva`tg hwiþK Dcvþq i vmvqubK þkvab ðiv eR<sup>®</sup> cwi þkvab Kþi cbte`enri DcþhMx Kiv nq| GB c×wZ `þY wqšY LgB KvþRix| wKŠ`e`qeúj c×wZ weavq wKQyKQyDbz t`k Qrov meþ cþwv Z bq|

evsj v`tk thme eR<sup>q</sup> mKQ<sup>v</sup> evRvi P<sup>mn</sup> v i tq<sup>t</sup>Q tm, tjv wZb ch<sup>q</sup>q msM<sup>h</sup> ev D<sup>xvi</sup> Kiv n<sup>tq</sup> v<sup>t</sup>K| c<sup>g</sup> ch<sup>q</sup>q D<sup>xvi</sup> i m<sup>t</sup> R<sup>woZ</sup> v<sup>t</sup>Kb eroxi M<sup>pn</sup>Y<sup>xiv</sup>| Z<sup>iv</sup> KvMR, tevZj, Kb<sup>t</sup>UB<sup>bri</sup>, c<sup>jv</sup>Zb K<sup>ico</sup>, R<sup>zv</sup> BZ<sup>w</sup> `e`w` (h<sup>v</sup>t`i f<sup>vj</sup> evRvi P<sup>mn</sup> v i tq<sup>t</sup>Q) evQ<sup>v</sup>B K<sup>t</sup>i b Ges n<sup>Kvi</sup> t`i w<sup>b</sup>KU w<sup>e</sup>μ<sup>q</sup> K<sup>t</sup>i b| w<sup>z</sup>xq ch<sup>q</sup>q i tq<sup>t</sup>Q ew<sup>t</sup> G<sup>jv</sup> K<sup>vi</sup> `wi`<sup>a</sup> m<sup>ki</sup> i v h<sup>vi</sup> v Ō<sup>t</sup>U<sup>v</sup>K<sup>v</sup>B<sup>Ō</sup> b<sup>rt</sup>g c<sup>iv</sup> w<sup>pz</sup>| G<sup>iv</sup> f<sup>ub</sup>ev K<sup>ub</sup>, K<sup>vb</sup>, K<sup>v</sup>w<sup>ev</sup>w<sup>o</sup> t<sup>d</sup>tj t`qv KvMR, w<sup>Q</sup>b<sup>ae</sup> i c<sup>m</sup>o<sup>k</sup> m<sup>vg</sup>M<sup>h</sup>, avZe cv<sup>t</sup>, I t<sup>d</sup>tj t`qv Ab<sup>v</sup>b` m<sup>vg</sup>M<sup>h</sup> msM<sup>h</sup> K<sup>t</sup>i| Z<sup>z</sup>xq ch<sup>q</sup>q i tq<sup>t</sup>Q `h<sup>i</sup> `a<sup>t</sup>k<sup>iv</sup>Y<sup>i</sup> t<sup>U</sup>v<sup>v</sup>K<sup>v</sup>B<sup>iv</sup>| Z<sup>iv</sup> t<sup>c</sup>s<sup>i</sup>m<sup>f</sup>vi M<sup>v</sup>ox t`t<sup>k</sup> P<sup>ov</sup>s<sup>i</sup>w<sup>b</sup>M<sup>g</sup> t<sup>v</sup>b eR<sup>o</sup>t<sup>d</sup>jvi m<sup>g</sup>q Z<sup>v</sup> t`t<sup>k</sup> evQ<sup>v</sup>B<sup>KZ</sup>. eR<sup>o</sup>msM<sup>h</sup> K<sup>t</sup>i|



IP<sup>t</sup>- 3.5 - 3 t tcšimfvi eR<sup>o</sup>c<sup>lyte</sup>envi KiY c<sup>xvz</sup>

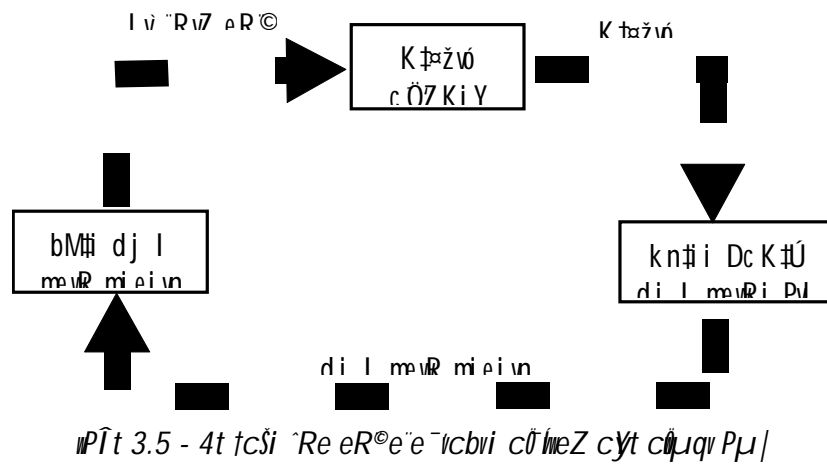
evsj v`tk eR<sup>o</sup>e<sup>e</sup>v<sup>r</sup> c<sup>lyte</sup>envi D<sup>cthv</sup>m<sup>x</sup>K<sup>i</sup>t<sup>iv</sup>i ch<sup>q</sup>, tjv IP<sup>t</sup> 3.5-3 Gi gva<sup>t</sup>g t`L<sup>ub</sup>v n<sup>tq</sup>t<sup>Q</sup>| n<sup>Kvi</sup>, t<sup>U</sup>v<sup>v</sup>K<sup>v</sup>B Ges AveR<sup>o</sup>v t<sup>d</sup>jvi v<sup>b</sup> t`t<sup>k</sup> msM<sup>h</sup>K<sup>v</sup>i<sup>t</sup> i gva<sup>t</sup>g msM<sup>pvz</sup> `e`w` c<sup>jv</sup>Zb `e` w<sup>e</sup>μ<sup>q</sup>K<sup>v</sup>i<sup>t</sup> i t`v<sup>k</sup>v<sup>b</sup> t<sup>c</sup>s<sup>t</sup>Q| Z<sup>iv</sup> tm, tjv Z<sup>ur</sup> w<sup>Y</sup>K<sup>f</sup>ite, taŠZ<sup>KiY</sup>, evQ<sup>v</sup>B<sup>KiY</sup> c<sup>h</sup>μ<sup>q</sup> t<sup>k</sup>t<sup>i</sup> w<sup>lj</sup> v<sup>t</sup> i w<sup>b</sup>KU m<sup>i</sup>e<sup>iv</sup>n K<sup>t</sup>i| c<sup>jv</sup>Zb m<sup>vg</sup>M<sup>h</sup>i w<sup>lj</sup> v<sup>i</sup> M<sup>Y</sup> h<sup>v</sup>h<sup>\_</sup> c<sup>\_</sup>K<sup>i</sup>K<sup>i</sup>Y<sup>i</sup> c<sup>i</sup> m<sup>i</sup>v<sup>m</sup>i e<sup>en</sup>vi K<sup>v</sup>i<sup>t</sup> i w<sup>b</sup>KU w<sup>e</sup>μ<sup>q</sup> K<sup>t</sup>i| Av<sup>i</sup> w<sup>e</sup>μ<sup>q</sup> A<sup>thv</sup>M<sup>h</sup> `e`w` c<sup>lyte</sup>envi t<sup>h</sup>v<sup>m</sup>K<sup>i</sup>Y K<sup>v</sup>i L<sup>v</sup>b<sup>v</sup>q (Remolding factories) t<sup>c</sup>Ō<sup>Y</sup> K<sup>t</sup>i| t<sup>m</sup>L<sup>v</sup>b t`t<sup>k</sup> c<sup>h</sup>μ<sup>q</sup>v<sup>r</sup>v<sup>z</sup>K<sup>i</sup>t<sup>iv</sup>i c<sup>i</sup> c<sup>y</sup>v<sup>q</sup> Z<sup>v</sup> evR<sup>v</sup>i w<sup>d</sup>t<sup>i</sup> Av<sup>t</sup>m|

**PovšiemR<sup>o</sup> I nekí e<sup>e</sup>v<sup>r</sup>** (Final disposal and alternative options)

**Kiv. 1.1 c.j. x Dbqab`g**

evRvi gj` AvtQ Ggb me eR<sup>®</sup> mvgM<sup>®</sup> AmisMvibK cšiq cYiævi Kiv nq| Avi meqvrRKthvM`  
 `RueK Dcv`vbmgn tLjv Ae`vq bMti i Ačc<sup>®</sup> vKZ. vPZvrb`civKti tdjt t`qv nq| Av`  
 Rj evqyAAjt Gme`e``ž cPbtbi dtj Zrmsj MeGj vKvq`M<sup>®</sup> Qmoq cto Ges Amw`Ki  
 cwi tekki mivó Kti| evó cmb gqjvi` tci vFZti cšek Kti cwi tek`yY<sup>®</sup> gZv Avi l  
 emotq Zjt| Gt`i cPž`Y<sup>®</sup> gZihy<sup>®</sup> Pzmb fvg l fMf<sup>®</sup> cmbtK`mZ Kti| Kg Li tP  
 cwi tek`Yg<sup>®</sup> Rec`v`emR<sup>®</sup> bi Dcvq nt`Q`f`m<sup>®</sup>ž j`vUvdj (Sanitary land fill)  
 c<sup>®</sup>vZ| GB c<sup>®</sup>vZtZ D`P`HK c`v`msM<sup>®</sup> ni vbi vc`e`e`v i vLv nq Ges vgt`b M`vm msm<sup>®</sup>  
 Kti Ryj vmb vntmte e`envi Kiv nq, hvi eY<sup>®</sup> G cvtVi c<sup>®</sup>gvtk t`qv ntqtQ|

evQvBKZ. `Re eR<sup>®</sup> Kg tcvó c<sup>®</sup>qvivi gva`tg` Remiti i/cvšti Z Kiv nq| G c<sup>®</sup>qvivq cwi vgz  
 cmb e`vKtUvi qv l AYR<sup>®</sup> xtei mivvth` `Re Dcv`vbmgn i`ž cPb NiUtg Zv`Re mvti cwi YZ  
 Kiv nq| cmb mieivni cwi givY`Re etR<sup>®</sup> ai tYi Dci vbf<sup>®</sup> kxj Ges GvU`evZ  
 (Aerobic) Ae`vq m<sup>®</sup>ubæKiv nq| hms<sup>®</sup> K Dcvtq`evZ MiteR Kg tcvó c<sup>®</sup>qvivi (Aerobic  
 garbage composting) evsj vt`kmn AčK Dbqbkxj t`tkB A`<sup>®</sup> vZKfite j vFRbK etj  
 me tevPZ nqv| Aek` evQvBKZ. vKQy vKQy`Re eR<sup>®</sup> fvi Z l Pxtb D<sup>®</sup> meZ AevZ Kt<sup>®</sup> vó  
 c<sup>®</sup>qvivi (Anaerobic composting) gva`tg mvti cwi YZ Kiv m<sup>®</sup>e ntqtQ| GB c<sup>®</sup>qvivi  
 Avyzt c<sup>®</sup>vZ vP<sup>®</sup> bs 3.5 - 3 Gi mivvth` t`Lv tv ntqtQ|



tčši Gj vKvi AvbabthvM` eR<sup>®</sup> (Non-biodegradable waste) vPZGj vKv fivtUi KivR e`envi  
 Kti cwi tek`tYi gv<sup>®</sup> v Kgv<sup>®</sup> tv m<sup>®</sup>e|



**civ<sup>®</sup> vEi gj`vqb 3.5**

mivK D<sup>®</sup> t i c<sup>®</sup>vk vUK vP<sup>®</sup> y (✓) v`b|

1| GKvU evtqvM`vm c`vEi gj` Ask tKv<sup>®</sup> vU?

- K) Bbtj U U'v¼
- L) Lv`K bj x
- M) WvBtR ÷vi
- N) AvDUtj U Kc

2/ M'im tnvì vti e'im KZ nřZ nte?

- K) WvBtR ÷vti i mgvb
- L) WvBtR ÷vi Atc¶lv mgvb" tQvU
- M) WvBtR ÷vi Atc¶lv mgvb" eo
- N) th tKvb&gvtc i

3/ ubqvgZ M'im mi ei vn A¶lvai vLvi Rb" cŁZw b Kx cwi gvY tMveři i cŁqvRb?

- K) 40/50 UŁwi
- L) 8/10 UŁwi
- M) 4/5 UŁwi
- N) 2/1 UŁwi

4/ Mpcwvj Z cii meov Kx ai řbi eR?

- K) Klvb
- L) Zij
- M) ¶wZKvi K
- N) tZRw`tj

5/ ¶wZKvi K eřR<sup>®</sup>mvavi YZ kZKi v Kx cwi gvY i vmiqubK Dcv`vb \_vtK?

- K) 10 fvM
- L) 20 fvM
- M) 40 fvM
- N) 75 fvM

6/ `HY cwi nvi Kvi x mnR eR<sup>®</sup>e`e`vcbv c×wZ tKvbU?

- K) D=šj`vřb`cxiKiY
- L) ube¶PZ`vřb meřqvRb NUřbv
- M) hvšK-i vmiqubK-c×wZřZ cYte`envi řhvM`KiY
- N) b`x ev Rj ıkřq řdřj ř`qv

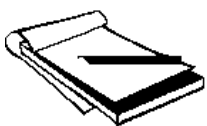
7/ ersj vt`řk tKvbU evRvi Pwv`řhvM" eR<sup>®</sup>msMñi AbyřZ c\_ bq?

- K) mivmii MvřYř`i vbKU ř\_řK
- L) nKvi ř`i KvQ ř\_řK
- M) řUvKvBř`i gva`řg
- N) veAvři gva`řg

### Povřřgř`vqb

#### msv¶B I i Pbvřj-K cŁæ

1/ Mlv nvdR Břd± Kx? D`vni Ymn evřřq ej řj|



Kwl. I cj. x Dbqab ˘z

- 2/ tKvb Zt\_ i wfiE˘Z tmfvb˘Z Ai tnbqvm M˘b nvdR c˘v m˘u˘K˘fiel ˘Z evYx Kti b?
- 3/ ˘M˘b nvdR M˘v˘mi AeZ˘v˘b c˘u\_ex ivZivmZ cwiYZ n˘e c˘Ynxb M˘n˘O G Dw˘uLi h\_v\_Zv- e˘vL˘v Kily|
- 4/ ewaZ RievK˘Rij wbi ci t\_˘K Avenl qvMZ mgxKi˘Y th bZb gv˘v thvM ntq˘Q Zv mst˘q˘c e˘vL˘v Kily|
- 5/ M˘b nvdR c˘Zv˘uqv m˘v˘tZ av˘bi Pvl I Mew˘ ci i fvgKv eY˘v Kily|
- 6/ evq˘Z cwi gv˘Y ˘f n˘j I CFC˘s M˘vm GZ ˘i˘ZcY˘Kb Zv e˘vL˘v Kti ej|
- 7/ GKwU cKZ.M˘b nvd˘Ri eY˘v w˘ b|
- 8/ ˘v˘Uw˘uqv˘i i Zvc-Kv˘v˘gv msi q˘Y I t˘Rvb˘˘i i fvgKv Av˘j vPbv Kily|
- 9/ I t˘Rvb˘˘i q˘c˘B n˘j RieRM˘Z Zvi c˘Zv˘uqv eY˘v Kily|
- 10/ bMi e˘R˘q ˘enk˘o˘mgn˘Dc˘˘vcb Kily
- 11/ eR˘e˘˘vi Rb˘˘ th mKj c˘S˘v e˘˘envi Kiv nq Zvi msv˘q˘B cwi Pq Z˘j aily|
- 12/ M˘b nvdR c˘v˘v˘ei Kvi˘Y Avenl qvi cwi eZ˘B tnZev˘v˘c˘v˘Zi av˘bi th cwi eZ˘B n˘e Zv Av˘j vPbv Kily|
- 13/ evqy˘U˘j i Zvcgv˘v 2–5˘ tmt ew˘ t˘t˘j mvgv˘K c˘Zv˘uqv eY˘v Kib|
- 14/ M˘b nvdR c˘v˘v˘e me˘R MvQciv vi fvgKv Av˘j vPbv Kily|
- 15/ M˘b nvdR c˘v˘v˘e c˘Z˘i˘v˘ta th mKj e˘˘v M˘hY Kiv hvq Zv Dcv˘˘vcb Kily|
- 16/ m˘h˘P AvZ te˘˘ bx i˘k˘i c˘v˘v˘e th c˘u˘qvq I Rb˘˘i a˘sm c˘B nh Zv ev˘Stq ej|
- 17/ I Rb˘˘i a˘sm n˘j gibe t˘˘ tn thme RvUj Zv t˘˘ Lv w˘˘ te Zv w˘tq Av˘j vPbv Kily|
- 18/ I Rb˘˘i q˘qRvbZ Kvi˘Y Kwl i Dci c˘Zv˘uqv e˘vL˘v Kily|
- 19/ evtqvm˘vm Kx? tKb G˘K evtqvm˘vm ej v nq?
- 20/ evtqvm˘v˘mi e˘˘envi m˘u˘˘K˘Av˘j vPbv Kily|
- 21/ eR˘˘t˘˘K Kg˘t˘cv˘˘Zvi Kivi c˘˘wZ eY˘v Kily|



### DËigjv

cW - 3

- 1. M    2. L    3. M    4. N    5. K    6. L    7. M    8. K    9. L    10. M

**cW - 3.1**

1. L 2. L 3. M 4. L 5. M 6. L 7. K

**cW - 3.2**

1. K 2. L 3. L 4. M 5. L 6. M 7. K 8. L

**cW - 3.3**

1. L 2. K 3. L 4. M 5. N 6. N 7. L

**cW - 3.4**

1. M 2. L 3. L 4. K 5. L 6. L

**cW - 3.5**

1. M 2. L 3. M 4. K 5. L 6. L 7. N

