

## c\lbofo !

### Plk; ; }fgfsf]; fdfGo kl/ro

(General Introduction to *Apis cerana*)

### Plk; ; }fgfsf]dxTj

Plk; ; }fgf Pl; of dxfbzdf dfq}kf0g]ePsfh]o; nf0{Pl; ofnl  
3f/df}l klg eGg]ul/G5 . of]df}l gkfnsf]kfs[ts ; Dkbfsf]  
cleGg c. sf]kdf /xl cfPsf]5 . of]/yfg]df}l (native bee)  
ePsf]xgfn]h. ndf, ?vsf 6f8sdf, 9: fsf sfkdf / 3/df  
/flvPsf d9]Pj d\vfk]3f/x;df ; lhn}kfpG ; lsG5 .



of]df]ln]o; lf]sf]s[if k0ffnl, ag:klt, h]j s ; f] / x]j fkg]l; # /fd] ; #hg sfod u/\$f] xG5 . :yfglo-:t/df pTklQ ePsf sltko k/lhjl Pj +zqx?; # of]df]l ; lhn}hemy ; S5 . ; h; h] -e/f]f tyf 6k]ln]l; , cl/ufn, aR50Fcf]baf6 of]df]ln]; lhn} kf/ kfpq ; S5 . t/ a9l dx pTkbgsf nflu g]kfn le0f0Psf] o/f]k]hl hftsf]Plk; d]l]kn]f df]lnf0{eg]tl ; h; h]hljx?n]7hf] lft k%ofp5g\ . Plk; ; }fgf df]lsf]r/g ; do nfd]xG5 / o; n] klts]h df}ddf klg sfd ug{; S5 . lxp5 ; lsPsf]nuQ}kl5 km]g]sltko lj?jfx?df of]df]ln]Plk; d]l]kn]fsf]e6bf /fd]l k/fu; }g ug{; S5 . of]df]ln]klts]h df}ddf klg cfm]f] cxf/sf]Joj:yf cfm] u5{. To; sf/0f o; nf0{d]l]kn]fsf]hit lrgl-rf:gl / cf]lwsf]cfj Zostf kb} .



Plk; ; }fgfaf6 yf]}nufgl / sd d]gt u/} klg p]n]y]glo nfe lng ; lsG5 . of]df]l Pl; ofsf s]x efudf dfq}kf0g]ePsfh] o; sf]dxnf0{Ps cgkd pTkbgsf ?kdf laqm ug{klg ; lsG5 .

# Plk; ; }fgfsf s|x :j efj x?

Plk; ; }fgfsf s|x :j efj x? o; k\$ f/ 5g\

- Plk; ; }fgfn]c\Wof\F]7fpFdg k/fp5 .
- of]df}\ln]uf]hf agfp\Ps eGbf a9l ; dfgfGt/ rfsfx? agfp5g\ . Pp6f rfsfb]v csf[rfsf; Ddsf]b'l \* dl=dl= xG5, h; nf0{df}\ cf}\-bf}\ ug{rflxg}7fpF(Bee space) elgG5 -lrq g=#!\_ .
- Plk; ; }fgfnf0{6kaf/ tyf rf\$; ePsf]3f/df /Vg / cfknh] rfx]cg' f/sf]Jo :yfkug {; lsG5 . t/ tl rf\$; x?sf]gfk / cfsf/ 7lSs ldn\$]xg' kb5 -lrq g=#@\_ .
- of]df}\sf]uf]hdf cf} tdf ^-\* j6f 5fp/f ePsf rfsf, !%,)))-@),)) ; Dd sdl{df}\, Pp6f /fg' / @))-#)) hlt efn}? xG5g\.
- Plk; ; }fgfdf xh 56g] sdl(n]knh kfg[/ df}\ln]3f/}5f\$] hfg]sfo{a9l xG5 .
- Plk; ; }fgfsf]efn]sf]sf]6kkfdf ; -; fgf l5b}? xG5g\.
- Plk; ; }fgf ; h; h\af6 ; lhn}aRg ; S5 . sdl{df}\ln]Psn] csf\$]hlpdf ePsf ; h; h]f0{x6fpgdf d2t ub5g\.

## /fg\$]dxTj

df}\sf]uf]hdf Pp6f dfq}/fg' xG5 h; sf]dVo sfd knh kfg{xf]. /fgh]rfsfdf ePsf ; fgf sf]fx?df kf/\$f l; lrt knx?af6 sdl{df}\ hGdG5g\eg] cln 7hf]sf]df kf/\$f cl; lrt knhaf6 efn] hGdG5g\ . l; lrt knx?nf0{lazif k\$f/sf]sf]df x\$ f0 kf]; nf]



Irq g#M Plk; ; }fgfn}; dfgfGt/ rfsf agfp5 / x/\$ rfsfx?sf]alrsf]b/l  
a/fa/ xG5 .



Irq g#M 3f/df 6dSs; # k# ldnfP/ /Vg hfgg eg]df]ln]k#ix?nf0{af- f]  
jf 7f8f] # (vertically) hf\$} klg rfsfx? agfp5g\ . t; y{Pp6f 3f/df ePsf  
; a}k#sf]nDaf0{ r#f0{/ df7f0{a/fa/ xg' kb5 .

Plk; ; }fgfdf /fg'pTkfbgMk|zIf0f ; f# kl: tsf

cfxf/ lbPdf To; af6 /fg' aGb5g\ . /fgh]df]L uf]hfsf ; DkOf{  
u0fx?nf0{; fg]sfo{ub5 . /fgh]kf/]sf kmhdf p; sf cfkm]f  
cg'zq (genes) / p; E ; dfud ug{cfPsf efn]df]Lsf cg'zqx?  
xG5g\ . tl cg'zqx? g}j xfgut u0fsf ; jfxs dflgG5g\ . /fg'  
; DkOf{df]L uf]hfsf]hggl ePsf]xgfn]o; sf]km]abnaf6 uf]hdf  
hftlo ; wf/ Nofpg ; lsG5 .

/fgh]df]Lsf]kl/jf/nf0{Psqlt ugOf klg d2t k%ofp5 . o; sf]  
z/l/af6 Ps lsl; dsf]uGw÷af:gf cfp5, h; sf sf/0fn]df]Ln]  
cfCgf]/ c? uf]hfsf]df]Lnf0{lrGb5g\ . /fg]sf]uGwn]sdL{df]Lsf  
clwsfz lqmfnsnfkx?nf0{Aojl:yt klg ub5 .



## df]L uf]hdf xg]k]hgg\

df]Lsf]uf]hdf b0{lsl; dsf k]hgg\xG5g\  
-!\_ uf]hdf lgoldt ?kdf df]Lsf]hGd xg';  
-@\_ Pp6f kOf{gofFuf]hf aGg' .

df]lsf]uf]hdf sdl{df]lx? lgoldt ?kdf lg:sl /xG5g\ . xj fkgf / r/gsf]cgshhf Pj +df]l3f/sf]cj:yf cg' f/ /fgh]Ps lbgdf #))-\*)) ;Dd khh kfb5 . sg}sg}7fpdf /fgh]aif/L khh kf/L /xG5 eg]sg}7fpdf aif\$]\*-!) dlxgf dfq khh kfg]ub5 . pRr kxf8l e\$df cTolws hf8f\$ sf/0fn]@-\$ dlxgf /fg' khh gkf/]a:5]. 7fpCg' f/ j if\$]Ps k6s j f b0{k6s uf]hdf df]lsf]; Wof pTisifdf kUb5 . /fdf]r/g / ;lj wfoQm tfkqnd ePsf]df}ddf /fgh]kz:t dfqdf efn\$]khh kfb5 / sdl{df]ln] /fg'sf]fx? agfpg yfNb5g\ . /fg'sf]af6 /fg' lg:s]kl5 %)-^)Ü sdl{df]l, slx efn]df]l / k/fgf]/fg' 3f/ 5f\$] eflb5gV gofF uf]hf agfp5g\ . o; /L Pp6f 3f/af6 b06f uf]hf df]l aGg kUb5g\ .

**k]s[ts ?kdf uf]hdf /fg' aGg]cj:yfx**

k]s[ts ;kdf df]ln]lgDg tlg cj:yfdf /fg' pTkfbg ub5g\ -!\_ xh lgof{ sf ahf, -@\_ /fg' kl]t:yfkg ug\$ f nflu, -#\_ cfsl:ds cj:yfdf .

**xh lgof{ ÷ xh 5\$lg'**

xh lgof{ eg\$]Pp6}3/df a:b}cfPsf bhhef0{5\$LP/ cnu-cnu 3/df a:g uP h:t}xf].

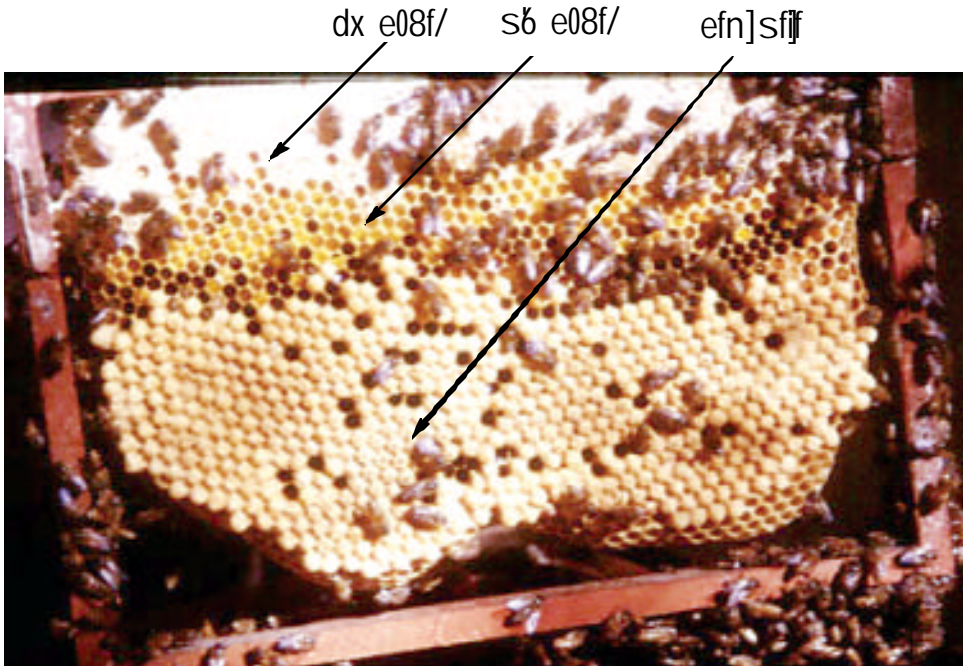
xh lgof{ df]lsf]az a[4sf]Ps k]s[ts kl]qmf xf]. of]7fpF cg' f/ km/s-km/s ;dodf xg]ub5 . ;fdfGotof kz:t dfqdf

r/g ePsf]/ ; lj wfhgs -pkoQm tfkqmd ePsf]df}ddf xh  
lgof{ xg]ub5 . xh lgof{sf nflu df]ln]lgs}klxn]v g}offhg  
agfPsf xG5g\.

xh lgof{ xg' eGbf !%-@) lbg klxn]v g}/fgh]efn]df kth  
kfg{yfN5]/ (-!) lbg klxn]v g}sdl]h]/fgsf] agfpg yfN5g\  
-lrg g=# / \$\_ . xh lgof{ xg' eGbf @-# lbg k'{/fgh]kth kfg{  
agb u5]/ 3f/df k: t efn]df]lx? b]vG5g\ . sg}sg}3f/df t  
/fgsf]af6 /fg'lg:sg' k' {g}xh 56g]ub5 . xh lgof{sf]ahf  
)-^ ) klitzt sdl]df]lx?, Pp6f /fg' / s]x efn]df ;fydf 3f/  
5f] u}cs]7fp] a:b5g\.

xh lgof{ df]lsf]az a[csf]nflu /fd]dflgP tklg df]lkfnsf  
nflu Tolt /fd]dflg . olb 56]xhnf0{; df]g ; s] j f  
cfkth E yk 3f/ 5g eg] xh 56]af6 df]lkfnsf0{7hf]gf; fg  
xg hfG5 . xh lgof{ x] uf]h ;fg]/ sdhf] xG5, h; n]ubf{  
dx pTkbfgdf g/fdf]c; / kb5 . t; y{xh lgof{af6 s; /l knf0bf  
lng]/ o; sf]/fyd s; /l ug]eGg]lj ifodf df]lkfnsf0{  
hfgsf/l xg' cfj Zos dflgG5 . o; af/]yk hfgsf/l sf nflu  
; Gbe{; 'l @ df pNn] ePsf k':ts k9g' xfhf .

**xh lgoGqof ug]lalwM** olb cfkth u cilt/Qm 3f/ 5g / uf]h  
a9fpg]rxfg klg 5g eg]df]lnf0{xh lgof{ ug{lbg' eGbf o; sf]  
lgoGqof ug{/fd]xG5 . xh lgoGqofsf nflu lgDg pkfox?  
ckgfpq ;lsG5 .

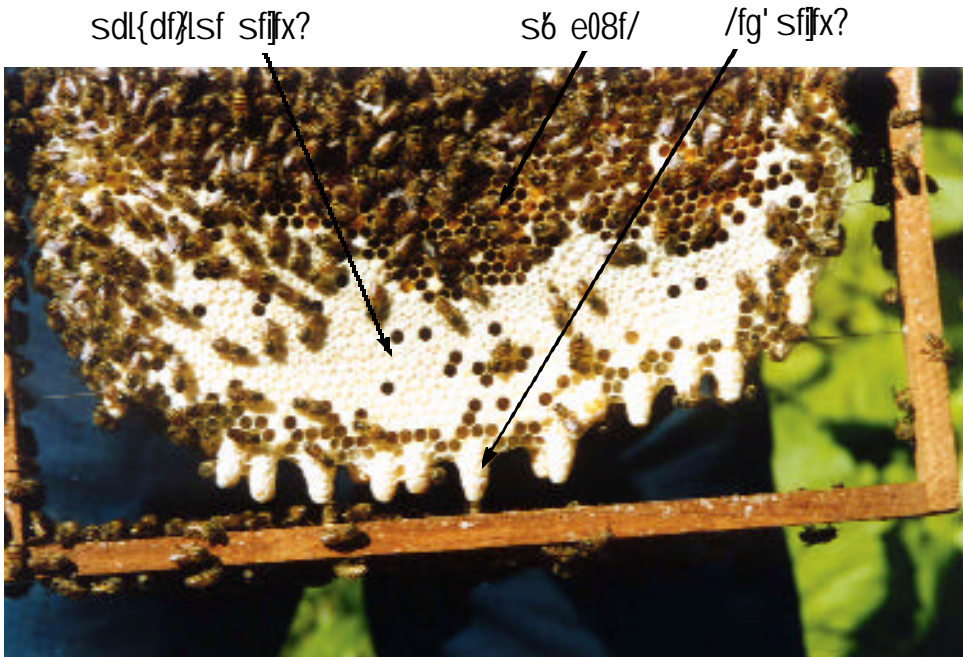


dx e08f/

s6 e08f/

efn]sfif

lrq g#M xh 56g]k] {tof/lst nflu df/ln]efn\$]fifx? agfp5g\ . efn\$]fifx?  
v; f] x65gV logsf]6kkfdf ;fgf]kj fn h:t]b]v65 .



sdl{df/]sf sfifx?

s6 e08f/

/fg' sfifx?

lrq g#\$M rfsfsf]lkwdf k#z:t /fgsfifx? xg'g}xh 5l\$g]culd hfgsf/lst]  
nlfof xf]. /fgsfifx? uf0{f]yg h:t}b]v65g\.



- xh lgof{ sf] ; do cfpg' k] {3f/sf]/fd\l lg/lif0f ug]
- df\l3f/sf]aRrf slfdf vfnl 7fpFeP rf\$; /fv\ lbg]/ dfly dx slf ykl lbg]
- k'/fgf]rfsf 5g\eg]x6f0{lbg]
- efn\$ff] agfpg z? u/\$f]eP ; f]rfsfnf0{x6f0{lbg]
- /fg\$ff] agfPsf eP efFl lbg]
- 3f/df /fdff]e]06n\$zgsf]Jo] :yf u/l lbg]
- dx a9l 5 eg]dx lgsfNg].

**xh ; dffg]lalwM** xh lgof{ e0{eflbg]df\l w\}h; f]st}glhs\$ff] ?v, 3/sf]5fgf, kvfn cflbdf a:g]ub5g\ . olb glhs a:g vflh/x\$ff 5g\eg]kfgl, v/fgl, whf]5s\$ klg df\lnf0{a; fpg ; lsG5 . df\l a;l ; s\$kl5 uf]hf]8Nnf]agfp5g\h; nf0{; lhn}u ; dfpg / 3f/df /fvG ; lsG5 -lrq g=#%-\*\_ .

- df\lnf0{uf]hf agfP/ a:g lbg]-lrq g=#%\_
- df\lsf]uf]hf jf em08sf]dfly afFsf]8fnf]/fvG] 8fnf]gePdf To:t}lsl; dsf]c? efBf jf em]hf kof]u ug{; lsG5 . -lrq g=#^\_
- df\lnf0{xftn]la:tf/}8fnf]t/ wsNg]
- ; a)df\l 8fnf]eq u0{s\$kl5 8fnf]nf0{cWof/f]sf]7fdf n]hfg] -lrq g=#&\_
- ; dft\$ff]xhnf0{/fvG]3f/ tof/ kfgI/ csf]sg}3f/af6 5fp/f ePsf]Pp6f /fdff]rfsfnf0{To; df lbg]
- 8fnf]df ePsf]df\lnf0{em6sf lbP/ 3f/df vGofpg]/ df\l gp8g\ eGgfsf nflu 3f/nf0{t?Gt ?dfnn]5fk\ lbg] -lrq g=#\*\_
- df\l 5fp/f slfdf u0; s\$kl5 3f/ aGb u/l lbg]
- a]h\$lkv lrgl rf:gl lbg].



Irq g#%M xh 5l\$P/ uPsf df}l 3/sf]glhs}ufihf agfP/ a:5g\.



Irq g#^M xh 5b} uPsf]df}l\$sf]ufihfdly afFsf]8fnf]/fv} tna6 la:tf/} df}lnf0{dflylt/ ws}nof]eg]df}l 8fnf]eq k:g yfN5g\.



Irq g=&M df;l 8fnf]eq k;L ; s;kI5 8fnf]f0{To; lbgf]lbpFf]cWof/]sf]fdf /Vg]/ a]hSlkv 3f/df vGofpFf /fd]]xG5 .



Irq g=\*M df]lnf0{8fnf]f6 3f/df vGofpg' eGbf klxn]3f/df 5fp/f ePsf] Pp6f rfsf lbg' k5{/ a]hSl lrgl rf:gl lbg' k5{. To; f]ubf{df]l eflG]; efj gf /xGg .

xh cfslif ug{3f/ yfkg} aerf , afh/f, hDnf cflb 7fpEf df}l-  
kfnsx?n]xh cfslif ug\$ f nflu vfnl 3f/nf0{RofE}yfkg]u/\$f  
xG5g\ . 3fd nflu]vNnf 7fpEf sg}le/dgl /lQf 3f/x? /fVg]/  
tl 3f/df dx, dğ tyf df}lnf0{cfslif ug{agf0Psf]3f] 8{bNg]  
ul/G5 . 3f] 8{eg\$}f}\$-% j 6f k/fgf rfsf, @ rDrf hlt hf  
e6\$}f]; ft' ! rDrf wlk / P}l\$}f]k}nnf0{/fd}l lk; } \$ rDrf  
dxdf d5} agf0Psf]8Nnf]xf]. 3f] 8\$}f]8Nnf}nf0{vfnl 3f/sf]  
leqk\$}l / df}l leq-afix/ ug}9f\$}fdf /fd}l bNg]ul/G5 . ha  
df}l\$}f]xh 56}]; do cfp5 ta sg}sg}uf}fx? 3f] 8{bn}  
/fv\$}f tl 3f/df uP/ a:g]u56}\ . RofE}yfkg\$}f]3f/df df}l cfPsf]  
yxf kfPkI5 3f/nf0{3/df Nofpg]/ cfk}h}rxf\$}f]7fpEf /fVg]  
ul/G5 .

df}l\$}f]56} uPsf]xh kfom h; f]Ps}:yfgdf / vf; lsl; dsf]  
7fpEf a:g]u5{. 3/sf]j|/kl/ \$-% j 6f ?v ePtfklg xh 56}  
uPsf]df}ln]sg}lglZrt ?vsf]lglZrt xfEfnf0{a9l dg  
k/fpE5g\ . klxnf]xh hg ?vdf a:5 kfom h; f]bf] f]xh klg To; }  
?vdf a:5 . hDnfsf s}x cgejl df}lkfnssf]egf0{cg' f/ kf}f}  
; fn hg ?vdf df}l\$}f]xh a; \$}f]lyof] o; j if{klg Tolx ?vdf  
df}l\$}f]xh a:g]; e}j gf a9l xG5 . t; y{To:tf]?vsf]xfEfdfly  
afEsf]8fnf]c8\fpfg]/ ; f]8fnf}df clnslt dx / dğ j f 3f] 8{  
bNg]xf]eg] df}l\$}f]xh 5\$}lP/ ; f]8fnf}leq k:5 -lrg g# ( \_ .  
df}l uf}hf]agfP/ 8fnf}leq k;l; s}kI5 8fnf}nf0{Nofpg]/ cfk}h}  
rxf\$}f]3f/df df}l vGofpg]ul/G5 .



Irq g=(M xh 5b] uPsf df]lx?n]sg}sg}?vsf]xfufnf0{w}]dg k/fp5g\  
 To:tf]xfufdfly clnsit dx / dg nufPsf]8fnf]/fvdf df]ln]; f]8fnf]eq g}  
 uf]hf agfp5g\  
 /fg'kl't:yfkg

***/fg'kl't:yfkg***

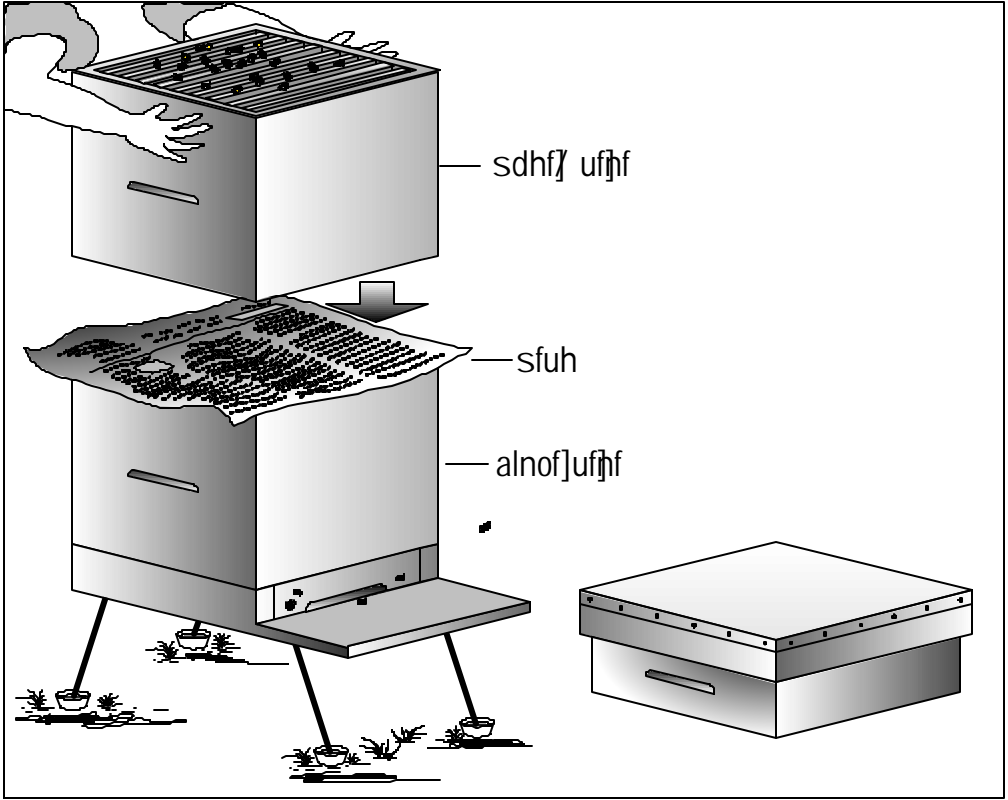
a9f] czSt, 3f0t]jf /f]l /fghf0{df]l :j o#]x6f0{p; sf]7fp#f  
 gofF/fg' :yfkgf ughf0{/fg' kl't:yfkg elg65 . rfsfdf 5l/Psf jf  
 clgoldt k#h Pj +5fp/f b]vPdf, sdl\$]e6bf efn\$]f 5fp/f a9l  
 ePdf tyf /fg'sf]af:gdf sdl cfPdf sdl(df]ln]/fg' czSt jf  
 sfd gnflg]ePsf]7x/ ub5g\  
 To;kl5 pglx?n]rfsfsf lsgf/df /fg'sf]fx? agfpg yfNb5g\h; df pxl k'/fgf]/fgh]k#h kfb5].  
 o; /l agfPsf /fg'sf]fx?sf]; Vof xh lgof{ sf nflu agfPsf sf]f  
 e6bf sd x65 / b06f sf]f]sf]alrsf]b/l a9l x65 . /fg'sf]faf6  
 /fg'lg:sl; s]kl5 s]x lbg; Dd gofF/ k'/fgf]/fg' ; E}klg a:g]  
 ub5g\  
 t/ ha gofF/fg'efn] E nfu] k#h kfg{yfNb5] ta p;n]  
 k'/fgf]/fghf0{df/l lb65]. /fg'kl't:yfkg slxn}sf]x dfq xg]

;fwf/0f 36gf xf]. o;af6 df]lkfnsnf0{w}7hf]gfkrf-gf\$; fg  
Joxf]kbg . /fghf0{sldtdf klg b0{j ifdf Ps k6s km]u/df /  
3f0t]Pj +f]ul /fghf0{t?Gt}km]u/df of]cj:yf cfpbg .

**cfsl:ds /fgsfj**

slxn\$fr df]lkfnssf]nfk/jfxl jf c6o sg}sf/0fn]cfsl:ds  
?kdf /fg' d/l lbG5 . /fg' d/\$f]s/lj @\$ 306f kl5 slddf]ln]  
/fg'gePsf]yxf kfpbgV gofF/fg' agfpgsf nflu cfsl:ds /fg'  
sf]fx? agfpg yfNb5g\ . cfsl:ds sf]fx? rfsfsf]lsgf/df xf0g  
;txdf agf0Psf xG5g\ . logsf]cfsf/ / agfj 6 xh lgof{sf  
nflu jf /fg'kl|t:yfkgsf nflu agf0Psf]sf]fx?sf]eGbf sd;n  
xG5 . o;/l agf0Psf /fgsf]u0f:t/ klg sd xG5 . df]l uf]hdf  
/fg' dbf{df]lkfnsn]7hf]gf\$; fg Aoxf]kbg . /fg' d/\$f]lbgblv  
gofF/fg'lg:s\$]lbg; Ddsf]cj lw hDdf !# lbg hit xG5 eg] /fg'  
lg:s[kl5 efn] E nfu] kmh kfg{z? u?Gh] ; Ddsf]cj lw &  
lbg]sf]xG5 . o; sf]cy{hDdf @) lbg uf]hdf kmh kfg]sf]xl klg  
xG5 . Ps lbgdf /fgh]cf}tdf %)) kmh kf5[eg]@) lbgdf  
p;n|!)) kmh kfg{; S5]. o; nf0{csf]efiffdf eGg' kb{  
cfsl:ds ?kdf /fg' dgf]df]lkfnsnf0{s/lj !)) df]lsf]  
gf\$; fg klbg hfG5 .

df]l3f/sf]lgoldt / ; fjwfglk] \$ lg/lif0f u/df cfsl:ds ?kdf  
/fg' dg]; Defj gf lgs}sd /xG5 . cfsl:ds ?kdf /fg' d/\$f]yxf  
kfp]lalQs}; Dej eP sg}csf]c; n uf]haf6 /fgsf] lbg /fdf]  
xG5 . olb /fgsf] pknAw 5g eg]; f]uf]hfnf0{csf]sg}/fg'  
ePsf]uf]hf; u ld; f0{lbg]ug{kbg .



lrg g=!)M uf]hf ld; fpg]sfd a]hsl lt/ ug{k5{. uf]hf ld; fpbf ; a}df]l  
 r/gaf6 km]l{s]k]5 alnof]3f/sf]5fp/f slfdly cvaf/ /Vg]/ To; dly sdhf]  
 uf]hf ePsf]5fp/f slf /Vg' k5{.

**uf]hf ld; fpg]tl/sfM sdhf] j f /fg' laxlg uf]hfnf0{alnof]**  
**uf]hf; u lgDg adf]hd ld; fpg ; lsG5 -lrg g=!)\_M**

- sdhf] uf]hfnf0{la:tf/}la:tf/}b0{b0{kml6sf]lx; fan]; fb}  
 alnof]uf]hftkm(n]hfg]/ ba}uf]hfnf0{clnslt lrgl rf:gl vfg  
 lbg]
- ba}3f/ glhs cf0kuk]5 uf]hf ld; fpg' kg[3f/sf]9sgl tyf  
 leql 9sgl lemsl lbg]

- alnof]3f/sf]5fp/f sIfnf0{Pp6f sfuh -klqsf\_ n]5f]kl lbg] / ;f]sfuhdf ; -; fgf Kj fnx? kfg]
- To; kl5 sdhf] uf]hfsf]5fp/f sIfnf0{pQm sfuh /fv}sf] 5fp/f sIfdfly /fvl lbg]/ 9sgl Pj +eql 9sgl nuf0{lbg] uf]hf ld; fp]f a]h]slkv ld; fpg' k5{lsggeg]/fte/ldf ba} uf]hfsf]uGw ldl; G5 / dflyNnf]5fp/f sIfsf df}l cfm}klg tNnf]sIfIt/ hfg yfN5g,\
- o; /L Ps-b0{lbg leq}ba}5fp/f sIfsf df}l ldl; 0{s}kl5 dflyNnf]5fp/f sIfdf ePsf /fd] rfsfnf0{tNnf]sIfdf lbg]/ k'/fgf sfd gnflbg]rfsfnf0{/ dflyNnf]5fp/f sIfnf0{x6f0{lbg].