

lgj f{gkl5sf klqmfaf/]sf6{ ; {6/sf]j Qmlo
g{kfnsf]@)&\$; fnsf]k{z tyf kl|t|glw ; ef lgj f{gsf]c{t/f{6@ lgj f{g ko_]f0f ldzg
kf}f ^, @)&\$

kl/ro

dl+ / @# df sf6{ ; {6/n]g{kfndf b0{r/0fdf -dl+ / !) / @!_ ; DkGg k{z tyf kl|t|glw ; ef lgj f{gaf/]
kf/]Des ljj /of k\$zgzdf Nofof]. lgj f{gkl5sf klqmfaf/]of]j Qmlo dtu0fgf ; dfkg / dt kl/0ffdsf]
tflnsls/0fsf] ; ?cftkl5sf]cBfj lws xf]. lgj f{g kl/0ffd / rbfj ; DaGwl sb}klg ljj fbx_gsf] km} nf
afE_L /x\$fn] ; {6/n]kQf nufPsf tYo / lgisif{? kf/]Des xg\ c|Gtd kl|t|j}g ; g\@)!*

gkfnst]dtu0fgf klqmf w}]cl3sf lgj f{gblv g}aflemf]/ clt ; !t /x\$]blv65 . ; d; fdlos cj :yf
x{f{/ x/\$ k{zdf rf/j 6f lgj f{gsf]nflu tlgj 6f dtkqsf]k{f] ePsf]ubf{; g\@)!& sf]k{b]zs /
kl|tlglw ; efsf]lgj f{gsf]u0fgfdf rgf]Lx? ylkj]ck]ff ul/Psf]lyof].³ kl|tlglw ; efsf nflu klxnf]xg]
lgj f{rt xgdf Pp6f dtkq, k{b]zs rgfj sf nflu klxnf]xg]lgj f{rt xgdf Pp6f dtkq / b0{j 6f
; dfgkflts klqmf]tkm{Pp6f dtkqsf]k{f] ul/Psf]lyof].

o; cl3sf lgj f{gx?df h:t} lgj f{g lqdf v; \$f ; a}dt lhNnfsf]; b/d\$ddf /x\$ dtu0fgf s|>df
Nof0{ulPsf]lyof].⁴ b] }ylyk]h-4(t)Td()Tj 0.3332w02(h)4(N)w 0.333 0 Td[(@)-3 ; 9-10); .299 d

sf6{ ; {6/sf koj]fsx; ePsf @& lhNnfx; dWb]!^ j 6fdf koj]fsx;nf0{u0fgfdf k0f{kxF kpf g eof]
. ⁵ c6o !! lhNnfx?df sf6{ ; {6/sf koj]fsn]lj leG vfn]k]taGw ; fdgf u/{sf lyP . ; ft koj]fs
6fh]lx;n]uDel/ k]taGw cg6j u/]hxfFsXl ldgdf jf Ps 3G6f; Dd dfq koj]f0fsf nflu cgdlit
lb0of]. ⁶ tlG 6fh]lx;n]ldl>t kxFaf/]hfgsf/L lbP, hxfFkoj]fsx;n]Ps lgj f{g Ifqsf] dtu0fgf
koj]f0fsf]nflu cgdlit kfP t/ cf8\$]sf]fdf ePsf]csf]lgj f{g Ifqsf]dtu0fgf xG\$]nflu cgdlit
kfPgg\cyj f pXL dtu0fgf s{>df km/s lbgdf koj]fssf]kxF km/skm/s /Xof].⁷

Ps lhNnfd -a}8ldf, sf6{ ; {6/ 6fh]ldfly pu|Joj xf/ ul/Psf]lyof]/ dtu0fgsf]; ?j ft xG{lb0Psf]
lyPg . lgj f{g cfof]sf]x:t lfkl5, efl]nk16 kj }zf]cgdlit t lb0of] t/ sd{f/lx?, bnsf k]tlglwx?
/ pkl:yt c6osf]c; xh Joj xf/sf]sf/0f ldzgn]koj]f0f 6fh]lnf0{cs}lqdf v6of].

koj]f0fdf kxF ; lldt ug{sf/0fx; :ki6 lyPg\ kfoh; f]cj :ydf lgj f{g clws[t n]:yfg cejn f0{
sf/0f b]vP . c6o cj :ydf, lgj f{g clws[t n] sg}sf/0f atfPgg\}f lgj f{g cfof]sf] lgb]zsfdf
c6t/fl60 koj]fsnf0{cgdlit kpf g ug{elgP klg slt ; do eGg{f/]gtf]sPsf]atfP . Ps 7fp6f,
bnx?sf k]tlglwalr ljj fb a9\$fn]koj]fsx?nf0{sXl a]sf]nflu dtu0fgf :ynaf6 aflx/ hfg elgof].

o/f]kog ; 3sf]lgj f{g koj]f0f 6fh]ln]klg w}]u0fgf s{>x;df kxFdf ePsf]k]taGwaf/]pNny u/].
/fli60 koj]fsx?n]eg] dtu0fgf s{>x?df sXl nlrnf] u/L kxF kfPsf] b]vof] oBlk, ol ; dx;n]
kxFsf]:t/ jf To; kxFsf]u0f:t/af/]clxn] Dd sXl pNny u/{sf 5gg\

o; dx]jk0f{k]qmfdf koj]fssf]kxF ; lldt ug{c6t/fl60 dfkb08, lgj f{g cfof]sf] lgb]zsfdf
cfzo, / koj]fs cgdlitsf ; t? lj k/Lt xf]. lgj f{gsf]kf/blz{f / k0f{f ; lglZrt ug{ koj]fssf]
pkl:yIt ckl/xfo{5, / koj]fsnf0{; w]kof}t kxF lbg]u/L kfj wfGX? agf0Gk5{.

koj]fsx?dfly kxFdf ; ldf eP klg bnsf k]tlglwx?sf]pkl:yIt dtu0fgf s{>df lg/Gt/ b]vof]. sf6{
; {6/n]dtu0fgf :yndf bnsf k]tlglwx?nf0{cfkny]sfd ug{glb0Psf]kfPg / bnsf k]tlglwn]dtu0fgf
:yndf u0fgf; Da6wL sg}ph/L u/{sf]va/ klg ; gG .

dtu0fgf sfo{/ k]qmf

dtu0fgf s{>sf] ncfp6 / 6fh]lsf] Joj :yfg- lhNnf ; b/dsfdx?df /xsf dtu0fgf s{>sf] ncfp6
; fd]gotof lgj f{g cfof]sf] lgb]zsf]n] tf\$]df]hd g}lyof]. w}]lgj f{g Ifq / dtbfg s{>x; xG]
ePsn] zx/L Ifq;x;df -lj z]f u/L sf7df8f]+pkTosfdf_ lj leG ; /sf/L ejgx;nf0{ dtu0fgf :yn
agf0of]hxfFu0fgsf nflu plrt :yfg pknAw lyof].

;/Iff ansf]pkl:yIt- ; a}dtu0fgf :yndf cIolws ; /Iff an v6f0Psf]lyof]. dtkqnf0{/fhgl]ts
bnsf k]tlglwx?n]gi6 ug{af6 hf]ufpg eG}tf/hfnl nuf0Psf]lyof]lsgeg]l]rtj gdf :yfglo lgj f{gsf]

⁵ sf6{ ; {6/sf koj]f0f 6fh]l a}8L, af6] eQmk/, lrtjg, 88]hw/f, bh]y, wglf, uNdl, emkf, shfnl, sflnsf, s-rGk/,
slknj :t, sf:sl, sf7df8f]+sfe]knfGrf\$, nlnk/, ndh^a, df]a, gj nk/f; L, gj fsf, kfFy/, k; f{ /f}x6, /flkf, l; /xf /
; v]df lyP .
⁶ lrtjg, uNdl, emkf, shfnl, s-rGk/, gj fsf, l; /xf .
⁷ af6] sf:sl ; v] .

dt u0fgfsf]qmdf bnsf k|tlglwn]dtkq gi6 u/kl5 ljj fb pTkGg ePsf]lyof]. ;/Iff ansf]cTolws
pkl:y|t /x] klg, koj]fsx?n]To:tf] pkl:y|tn] dtu0fgf ug{sd{f/L, /fhgllts bn / pDdDj f/sf
k|tlglwx?nf0{cfZj :t agfPsf]kfP . oBlk, ;/Iff ann]sxl cj :yfdf koj]fssf]kxF vDRofpB}cfkmyf]
lhDd]f/leGbf aflx/sf]sfd u/].

/fhgllts bnsf k|tlglwx?sf] pkl:y|t- koj]f0f ul/Psf ;a} dtu0fgf s|>df /fhgllts bnsf
k|tlglwx? pkl:y|t lyP / ;Dk0f{u0fgf k|qmf]sf]cj lwe/ ToxLFa:g cgdlt kfP . lgj f{g cfof]usf]
lj :t{ lgb]zsfx; xBfxB}klg dtu0fgf sd{f/L / bnx?sf k|tlglwx;n] u0fgf ug{cl3 dt u0fgfsf]
k|qmfaf/] ; dembf/L u/]. o; sf]p2Zo ; xdltdf klg' / ; Deflj t ; d:ofx;nf0{cl3 g}; Daf]vg ug{lyof]
. o; n] ; duDf k|qmf / lgj f{gsf] kl/Offdnf0{ :yfglo txdf ;jLsfo{agfof] t/ o; cEof; n] ubf{
lhNnflkR5]km/s tl/sf ckgf0of]/ lj z]fu/L ab/ dtaf/]Ps?ktf gePsf]kf0of].

dtu0fgf k|qmf- ahfahfdf dtu0fgf lgb]zsf]sf]; xl kfngf gul/P klg cyj f Ps?ktf ; lxt nfu"gul/P
klg sf6{ ; {6/sf koj]fsx?n] koj]f0f ug{kfPsf dtu0fgf s|>df dtu0fgf k|qmf]nf0{ ; fdfotof
; sf/fTds dflgPsf] lyof]. sf6{ ; {6/sf koj]fsx?n] koj]f0f ug{kfPsf dtu0fgf s|>df}dW0 (^
k|tzt dtu0fgf s|>df ; duDf k|qmf ; sf/fTds lyof] vf; u/L u0fgf lj Zj ; glo / ; xl lyof]. oBlk,
koj]fsx;sf] k|talGwt kxFn] ubf{ k|qmf]sf] ; du|kf/blz{fnf0{sdhf] kf/\$f] 5 . sf6{ ; {6/sf
koj]fsx;n]cgdlt gkfPsf jf

lt				
2Bf/L	T(j 59Tw	0.667	000.0;) (ks) 3 (w).

u0fgf s[>n]dt u0fgfsf]cflzs kl/0ffd 3f]f0ff ; fj flgs ?kdf lglZrt ; dosf]c[lt/fndf u/\$f lyP .
klxnf]xg]lgj f[r-t xg]dt u0fgf ; dfgk e0; skl5 / ; dfgkflts tkm[sf]u0fgf rfn' /x[bf u0fgf qmd
cgf]krf]/s a[6of]/ sxl u0fgf s[bdf /fhgllts bnsf kl[t]glwsf]; Vof 36[sf]lyof].

ab/ dt 3f]f0ff- dtu0fgf klqmfdf dt ; b/ of ab/ ubf{lgod / sfo]j lwdf Ps?ktf xg; s] x/\$
dtbftfsf] ; dfg dtflwsf/sf]xssf] ; Af0fdf d2t k05 . o; ; DaGwdf lj Bdfg sfgg tyf lgj f'g
cfof]usf lgb]zgx? lj :t[Pj +:ki6 5g\^8 k]om kfj wfgx? cGt/f]6[dfkb08sf]txsf 5g\eg]sxl cln
s8f vfnsf 5g\ . vf; u/l :j|:ts 5fk kpf]u ePsf]dtkqnf0{dfq}; b/ dflg65, c? 5fk df6o x[6g] .
o; sf]tflko{dtbftfsf]cfzo :ki6 bl]vP klq dtkq ab/ x[65 .

cfof]un] dt ; b/ of ab/ egl lglZrt ug{u0fgf clwsf/lx?sf nflu dfkb08sf] ; Hft ?k ; lxtsf
kf]6/x?sf]Joj :yf u/]klg o:tf]lg0f[eg]:yfglo txd fcfk; L ; xdltdf g}ul/Psf]kf0of]. o; n]ubf{
slxn\$fxLFpxl u0fgf s[>leq klq Ps?ktf gePsf]e]6of]. dt bftfsf]cfzonf0{; Ddfg ug]/ u0fgf
klqmfnf0{cem}; dfj zl ug]nf0{o; ; DaGwl lgodfj nl / Joj xf/ ; wfg{cfj Zos bl]v65 .

tflnsls/of Pj -klxnf]xg]lgj f[r-t xg]kl/0ffdsf]3f]f0ff

klxnf]xg]lgj f[r-t xg]sf]u0fgf dt+ / @& df ; lsof] hg tfl]sPsf]ldlteGb}rfB}lyof]. ; dfgkfltsf]d
dtu0fgf k; @ df ; lsof] z [10 Idst u/(|l)(f)2(5Tlc 0.0Tlw j 0.00)]3; Daf /gdfj]