

qm'sf]; fobok
-slj tf; a_ux

@^@h]

/fhj

qndM

zx/ / ufpEf laxfg
zx/sf]/ft
qm/sf]; f)okkq
kfygf
w/}dflg; sf]; Em
yS
cd/tfla?4
vt/fk0f{Ps oyfy{
; dosf 7hf gfdx¿
o; sf/0f
v/fa ; Qfsf]0ltxf;
bM/
slj tf arfp
bZo zAb / :j /sf]/fHodf
aè; f06af6 6f9f
bflbl
sf7df08f}afudtl
slj ; E
s?lfqdf xfd 5
l; gdf x}ff
dfofgu/
cdfd xdf
ud
/fd[]]; do
; aS6
3/ uPkI5
laGbX¿
dfs; {f]v; l
ltdlx¿ dfq
klf
Ps xf06\$ slj tf a%g vf[]b}
eTsB}aGb\$
o4
lx6n/sf]pd] 5q
; aSif{
gd\$f]pd]
c; lhnf]slj
uB
; bF
k|t:j/
ux l6kg]; kgfdf
eldsf]hf]vd

o'4df
cfh; Ddsf]ls; fg
of]gu/df aψ
pm klg csf}af0g
s; hf0{yxf 5g
hlQ 6f9f uP klg
l; Qdf cvaf/

zx/ / ufpǝf laxfg

zx/sf]laxfgdf
r/fxǂ af]bǝg\

To; sf/0f ufpǝf]/
oxfFzx/sf]
laxfgdf km/s 5

ufpǝf]
laxfgdf
3/sf vfkfsf r/fxǂ
b]h]cuf]8sf]kǝǝf]afǝdf
em/; sǝf xǝ5g\
/ cǝfgdf
kmf]kmǝ
56ǝf cǝgsf bfgfxǂ
tfls/xǝf xǝ5g\
km/s 5
zx/sf]
/ ufpǝf]laxfg

ufpǝf
laxfg xg]a]Qs}
r/fxǂ af]ǝ] ?vxǂ s/fpg yf]N5g\
cfdfxǂ sf]k]df aRrfxǂ 5fǝ]
8f]ǝfǝf
ufu] xh]
sj flt/
emg{/ pSng yf]N5g\
; b]ǝ/0f
lk9L / th; L d7df
6f]h]f0/xǝf]xǝ5
cǝfgdf
kf7f-kf7L /
3/sf e/fxǂ /df0/xǝf b]vǝ5g\
zx/sf]laxfgdf t
3/-3/sf ; ǝflds 6ǝf0nǝ\sf
kmǝ; xǂ s/fpg yf]N5g\
afxgxǂ wǝ ffp8fpg /
df]g; xǂ kg]M
lbgel/sf]sf]h]fxnsf]tof/L ug{yf]N5g\
km/s 5
zx/sf]
/ ufpǝf]laxfg

ufpǝf
laxfg xg]a]Qs}
r/fxǂ af]ǝ] ?vxǂ s/fpg yf]N5g\
cfdfxǂ sf]k]df aRrfxǂ 5fǝ]
8f]ǝfǝf
ufu] xh]
sj flt/
emg{/ pSng yf]N5g\
; b]ǝ/0f
lk9L / th; L d7df
6f]h]f0/xǝf]xǝ5
cǝfgdf
kf7f-kf7L /
3/sf e/fxǂ /df0/xǝf b]vǝ5g\
zx/sf]laxfgdf t
3/-3/sf ; ǝflds 6ǝf0nǝ\sf
kmǝ; xǂ s/fpg yf]N5g\
afxgxǂ wǝ ffp8fpg /
df]g; xǂ kg]M
lbgel/sf]sf]h]fxnsf]tof/L ug{yf]N5g\
km/s 5
zx/sf]
/ ufpǝf]laxfg

dVotMufpE]laxfgdf
r/fx
/ zx/sf]laxfgdf
afxgsf 06hgx s/fpg yfN5g\

zx/sf]laxfgdf
3/3/sf]5fgf]h]
3/3/nf0{5\$b}
; b[s/0f k/)a; \$f]b]v65
@)%@ sf10s

zx/sf]/ft

k]oM
j l/k/sf]/ft
xq{
3/sf]sf]l p\$ng5'

c]of/f\$]
un]fdf
an] a; \$f
hfhftsf
c3f] aQlx
To; /L dnf0{tf65g\
sf}ldf

To; h]
d
; fEm; hf0; s]k]5
cS; /
p]Sn; s\$]x65'
k]o\$ /ft
sf}ldf

zx/sf]/ft dfq x]
o; /L
c]slif ug]dnf0{
ufpft/sf]
j f kxf8l /ft; E
d To; /L
d]xt x6g
lsgeg]

ufpEf dflg; xz
/ftnf0{
:j feflj s z kdf 5f85g\aflx/
/ zx/sfn]emF
c3f] lahl afn]
/ftnf0{
5\$g vfl]b8g\

/ft ufpFk; k15
tl klg
kf7f, kf7l
dfp, af5f
e8l, ydf
vf] xh]
ln:gf]pSn65g\
lsgeg]
/fts]; fdfl]onf0{
zx/sfn]emF
5\$g ; Sb8g\
ufpEf dflg; xz
@)%@ k'

qm'sf]; f0bo k8]

afh klg d8w 5
of]laxfg

cfknyf g^a\flx z
xfEf8] uf8]
dfl]t
dx; ; ub8]
cfknyf kv8]sf sfk sfkdf
lr; f]l; /8]f]

pm clxn]cfxf/sf]nflu ; lqno 58]
5
plt; sf]xfEf8]f
l:y/
cfgl6bt

To; sf/0f
r/flx z

clxn]lgdlg
pl8/x5g\

va/ 5g pglx;nf0{
glhs\$]of]afhsf]
hf]nfnflot ; b' b]zsf]ko6semf
xl/of kxf8 k5fl8sf]cwplbt ; b{
x05

laxfgsf]of]slnnf]df]stf
x6g]al0s}
km/ em06g5 pm
r/fx;

jf:tjdf
qth/sf]
; f]bo{k}d
:yfol x5g
@)%# sf10s

ky6f

ltdl b]nfp lg d]f]afnf0{:j u{
0Zj / <
pgl d/]
ltdf]cf:yfsf nflu
ltdl b]nfp lg pgnf0{:j u{<
ltdf] nflu
pgl
hljge/ c0wf]eP
ca ltdl pgnf0{
c]f]f b]nfp lg 0Zj / <
0Zj /
olb ltdl st}ns\$]f xf]eg]
pgnf0{
c]k]y]sfnf]cgxf/sf]bzg lbP/
t]t ul/b]p
@)%! r0

w}dflg; sf]; fĕm

; fĕm 3/ k; k|5 d
uf7 k; }f]kzĕmF
rkrfk laxfgl slbġF

tkf0{s]ug{xġ5 <

t/ d
; fĕm 3/ k; k|5
lx; fa-|stfa yf|5' /
emf]f lnP/
kġM|ahf/ em5' /
s}l u}f cfn'
Psb |snf]lrgl, bfn
/ cġ o:t}sg} kmsġ5'

; fĕm 3/ k; k|5
3/leqsf]lghl sf]fxndf 8Ag}k5{
d klg
:j f:gl}sf]cg} kmtkmt, srsr
s}f}s}l}sf]emu8f /
xfġj sġf ; fd]h xġ5'
b0{f/ yk8 6l=el=|t/ dfq 3f]ng vf]g]5f7f]f0{lbg5'
/ clj /fd kmtkmtf0/x}l :j f:gl}nf0{emk5{
v|tl ux}f5 eg]
Psb0{Sj f6/ ; :t}f}x}f]/S; l 36}ofp5'
Tof]klg h/ġ eg]
af; l cvaf/sf kġgf d'; f5{
l/6fo8{k}l}sf]xġsf]:d/of u5{
; /sf/, g}f, k}f; s, Jofkf/L; Ē
l/; p7}f]5 eg]
qmflġtsf/l slj tf klg n}g a:5'
dg zfġt 5 eg]/
v|tldf Sj f6/sf nflu lfdtf 5ġ eg]
sg}klg |stfa k9ġ a:5'
t/ /fhg]f}xġsf]h:tf]
d}f]; fĕm if8ġġk0f{a}7sdf laTbġ
g t :dun/xġ h:tf]
cjw ; ddu| af}f] cfp}h}sf]k}l}l}f}df laT5

j f: tj df w}dflg; sf]; fĕm
d}f]h:t}
s}f}s}l}sf]/8fsf]

:j f:gl sf]kmt kmt
cefj , cefj d}kfs \$f]bfneft
/ dfdhl k}df laT5

; fwf/Of dflg; x}sf]; E m
/fhg]fx
:dun/x
/ uf] k; \$f]kzen f}j Zo x}g

ltgsf]; E m dfdhl xG5
To; df g if8Gq xG5
g t 3fts k}Llff
@)%# df3

ys

oBlk gf-f]xg' ePg
of]cgdlit lb}g j l/kl/sf c}fx
d}dfq gf8laf6 38l kmn}F
/ ; do gl}oPF
bz aHof] afx|aHof] Ps aHof] ; ft aHof]
kmfluOf, kfj, j }fv, h}, c; f/, sfQs
kf7}k':tssf P]txfl; s kj } / ; dox
; a d}lySF
@)\$% k'

cd/tflj?4

d; E
c}ofrf/, z}f}of / c}ofosf]lj klfd nflu]g]
s}l ; r} zAbx, j fSox, lj rf/x, ultx / k[7x 5g\
To; }]
c; a}o aa}tf, c}ofo / bdg
b}y], ; g}
a:g ; Sg]tfut d; E ePg
To:tf]z}Om d; E ePsf]eP
dnf0{nflu/x}
d}f]5ftldf
zf; ssf]k}l:t n}V}of]
/ d h-axfb/sf]lznfkqem}F
df6f}lg cd/ xg]
clezfk efl}u/x}y}F

t/ d]f]h[dn]dnf0{
; a cd/tf]j ?4
o4df
aa{x; ; E
86g nufof]
@)%* jzv

vt/fk0{Ps oyfy{

cfhsf ; a v/fa
0ltxf; df /fd]b]vg]5g\

of]vt/fsf]kf/De
cfh ePsf]5

xdf ; a lg?kfo
6f]fp E}
uGb5fF
v/fax;sf]; a\of

hf]xg5g\c; n eflh
tl v/fax;sf]
cfh ; Qfdf hfg]pkqmd rNb}5
@)%% ebf}

; dosf 7hf gfdx;

; dosf tlg gfd
/ft, laxfg / lbg
dfq p; nf0{yxf 5
c; pm hfCb}

; dob]v cf]l cft^st 5 pm
lsgeg]p; n]latfPsf]; a}; don]
p; nf0{d/] d/] kf/\$f]5

ltgn]p; nf0{cl; gf, af9L, v8]L
clgsfn / dxfdf/ldf
hfs]
8; \$f 5g\
To; sf/Of pm c]kf lat\$flbgx; ; E
gd|5}

To; sf/0f ltgsf]lj gfz ug]nlo xf]d]f]
t/ d xg ; lsbq qm]lGtsf/L
ltdf]kf6lGf geP; Dd

dnf0{yxf 5
zif]sx; n]d]f]hlj g s; /L gfz ul//x5g\
To; sf/0f ltgsf]l]gd]n ug]nlo xf]d]f]
t/ d xg ; lsbq qm]lGtsf/L
ltdf]kf6lGf geP; Dd

d]n]bl6x; sf]sfqg
/; ; /sf/ dfg]sf]5g
u/]sf]5g d]n]ltgsf]bf; tf :jlsf/
t/ d xg ; lsbq qm]lGtsf/L
ltdf]kf6lGf geP; Dd

d; E cyfx lj b]x 5
To:t}; fx; 5
d cfk]nf]cleofgdf clj rn kl]ta4 5'
t/ d xg ; lsbq qm]lGtsf/L
ltdf]kf6lGf geP; Dd

dnf0{nflb5
d ul/a; ; j xf/f, lj b]xl; ; fx; L
qm]lGtsf/L xg ; lsbq
ltdf]kf6l{eP; Dd
@)%\$; fpg

v/fa ; Qfsf]0ltxf;

lxhf]sf
; dfrf/sf v/fa dflg; x;]
; Qfdf u0; s]
/fd] e0; s]

o;]n]
cfhsf v/fax; klg
; Qfdf hfg]5g\
/ 0ltxf; df /fd] n]v]g]5g\
/ kb xg]x;

lsgeg]
0ltxf; n]v]g]x;
v/fax; n]af]B]sf]k]bdf 5g\
/ kb xg]x;

v/fa ; Qfsf]0ltxf;
/fdf]nV5g\
@)%% sflQs

blw

k/fgf]kf06sf]
kl5Nnf]vNtlleq
n5fPFd]h]
cfknyf]blw

eNsg]5g ca
ahf, sah
d]f]cgxf/df To; sf]sfnf]5fofF

d xfg ; Sg]5'
tl ; a zq; fd6g]
hf]vff]g]uy[d]f]cgxf/df dff/f]

d
cfkny"vNtlleq ; 7lft blw
knV/ aunldfg{l66g
@)%& c; fh

slj tf arfp

; 6b/L
of]el8df slj tf gk9
df]g; sf]Wofg
slj tfsf]; 6b/tfaf6
ltdldf ; 5{
/ slj tf PSnf]x65

oBlk slj tf k9g
nfos /
/fdf]5 ltdf]:j /
t/ dflg; sf]vff/ Wofg
slj tfaf6 pl5l\$P/
ltdf]; 6b/ gfsdf
ltdf]rkn a8]cfvdf
ltdf]g^df
ltdf]zf/l/s ; fh7j

/ kl/wfgdf kg{: S5
/ ltdln]kl9/x\$]slj tfsf]kpf;
a\$]/ xg; S5

; Gb/l
slj tf arfp
@)%& ebf}

bZ_o, zAb / :j/sf]/flhodf

p; n]k0fzIQmsf ; fy
Pp6f k/fgf]sb{
k0k0df hfslbof]
/ d[o'k0kt u\$of]

ca p; nf0{zAbx_zsf] :j/x_zsf]
/ bZ_ox_zsf]kl8f vkg' kb0g
p; n]oxl rfx\$]lyof]

j iff0]v p; nf0{
zAbx_zn] :j/x_zn] bZ_ox_zn]
; tf0/x\$] lyP
To; h]pm Pp6f ; /lft sb{vflh/x\$]lyof]

cfh laxfg To]sb{kfpg]alQs}
p; n]; xif{
To; sf]; Dk0f{wf/
cfk0g" k0df hfslbof]

To; a]hf
zAbx_zdf
:j/x_zdf
/ bZ_ox_zdf
pm s]b]v/x\$]lyof]
/ tlaf6 p]sg
p; n]lsg sb{k0f]u u\$of]
dnf0{yxf 5g}

t/ d ; flr/x\$'
p; n]tl bZ_ox_zdf
cfzfsf] cfgGbsf] bZ_ox_z klg b]of]ls b]y0g
tl zAbx_zdf
g/d, sf]n, zltN, zAbx_z klg kfof]ls kfPg

tl :j/x¿df
k¿sf] zfl¿tsf] Xbosf]:j / klg ; ¿of]ls ; g¿
olb p; n]ol ; a
tl b¿ox¿, zAbx¿ / :j/x¿af6 kfPsf]eP
sb{vfflg]lyPg

lsgeg]
b¿ox¿sf] zAbx¿sf] :j/x¿sf]/fhodf
cfzfsf] cfg¿bsf]
k¿sf] s?0ffsf]zIQmzfnl j u{klg x65g\
t/ sb{ ¿sf]
p; sf]cl¿td ; Da¿w b¿bf
p; n]
b¿ox¿df, zAbx¿df, :j/x¿df
; ¿b/tfsf] k¿sf] s?0ffsf]j u{
kfPsf]b]vPg

; fob p; nf0{
tl ; a}j u¿¿ qm /
sb{s?0ffdo nfflof]x¿hf

cfkmthf0{
; dftt ug]
j :tx¿; ¿ klg
dflg; nf0{k¿ x¿; Sg]/x\$
©)%& d¿ /

j¿; f06af6 6f9f

of]dflg; sg}klg 86sddf
k:g kfPsf]5¿
; a la¿bx¿
p; nf0{lgif] ul//x\$g\
}

clt lghl s/fx¿df
p; nf0{cNemgk/¿f]5
To; sf/0f
j¿; f06sf]hfndf k; }
p; n]
cfdxlg¿tsf]pkrf/ ug{kfPsf]5¿

cl3Nnf]z¿f]b]sf]
of]lg¿t¿t ; fwf/0f dflg; nf0{
; f0j /kf; n]6f9f kfl//x\$

j f: t j d f
p; s f] s f d
p; s f] 3 6 6 f
p; s f] c l b f d
r f n' o l u s f]
/ g j \$ f] q m / t f a f 6 p l 8 / x \$
@) % & j z f v

bl

bl
v l n / x \$ g \ ; | k f 0 8 j c f i f x
l t d f] g ^ a l o f 0 d f

l t d f] g - g t f s f] r f x g u g I
s g) b j t f 5 g g \
k l o \$ 0 z j / v l l n / x \$ g \ t d f] o f j g

l t d f] g ^ a l o f 0 s f] x f \$ o 4 5
k y d k f 0 8 j x z b j v g }
l t d f] j : q k ? i f x z n] c f i f \$ f 5 g \

5 f n f k l g 5 f \$ f P /
l t d l n f 0 { x g I r f x j o f k t 5
bl
c a l t d f] n f l u o 4 n 8 g]
s g) k f 0 8 j 5 g g \
@) % \$ d f 3

sf7df08f afudtl

v h f k m f 5 / a u / d f e m f
s - r g 5 g
s f 7 d f 0 8 f a f a f u d t l

k m / s 5
s f 7 d f 0 8 f } / a u / d f 3 0 g] a f u d t l

s f 7 d f 0 8 f a f c f P k l 5
c f k m " l ; / d f k m x / s f] a f e m a f \$]
k m x / d l g a l l 5 a f u d t l

sf7df08f0f afudtl
nfk/j fx 3/-3/sf blift hn :gfg u5{
/ ckn"y"s-rg sfof knf{

sf7df08f0f afudtl
oflx; df blift
xhf/f08dx;
ckn"y"efllodf af\$] all5

jf:tj df sf7df08f0f
afudtl
afudtl a6b0
zxl/of a65
@)%% sf0s

slj ; 6

yf]afh]
nfd]3fp lbg; Sg]
k]j ldf alnof]
slj dfq xf]

slj ; 6
knhx; , ls/0fx; , 5fofk; , kfglsf ultx;
blwx; , v; lx;
c]f/f] p]hofnf]; a
e/f] f u56\

k]j lsf]e/f] f nfossf]
hlj g xf]slj

slj ; 6
>dsf kl; gfx;
xftsf 7]hfx;
c]gsf t]0ffx;
em]lsf r/fx;
?em]sf afnsx;
cleJoQm]xg]cfz u56\
@)%* efb]

s?lfqdf xfd 5

hljgsf]cy{
dg{e6g]kf7 x65 s?lfqdf

hljg
s?lfqsf]nflu tof/ ePkI5
d[osf]nflu k|yfg u/fp5g\
zf; sxz

s?lfqsf]nflu
h6dg]/
s?lfqsf]nflu dg[dfg; xzsf]0ltxf;
alg/x\$ clj/n

df;+xf/sf]nflu
dlxgf]kfn]
tof/ kfl/Psf
v; l, af\$ /f6f, au/xz em]kfn]
hjfgxznf0{s?lfqsf]alndf lx8f065

; ldf ; ldfdf
a; \$f zf; sxz
s?lfqdf
cf-cfkn]f hjfgxzsf]
o4-sfzn
d[o] /of /
c; vo 3fpxz / /utsf]cfxfn x]]
d:t /x65g\
d

clxn] Dd
hjfgxz]n]
s?lfqaf6
kmxs, kmcfxf/,
km:j t6qtf
kfPsf 5gg\
tyflk cg6tb]v
s?lfqdf 5g]hjfgxz

zf; gdf l6Sg
vfl]g]hNnfbxzsf]
xjgdf
rfSnf 5ftl ePsf
alni7 ehfsf

:jKglN hjfgx
;ldwf alg/x5g\

Pp6f
b06f bl6sf]
;Qf-kllktdf
s?Ifqdf sf0l sf0l
d[osf]dxfl; j rln/x5

nf; x;
/utsf s08x;
cftx;
ljofvlx;
eQ]xltof/x; /
qmv-bDeafx\$
dflg; n]kllt ugkgI
sxl klg kmsgg\s?Ifqaf6

tyflk s?Ifqdf xfd 5
@)%(: fpg

I; gdf x7fF

hf]clxn]pu|zffs ePsf 5g\
ltgsf]qmf6t xq(l; gdf x7fF

hf]clxn]ctlj ; fl0 5g\
ltgsf]cfsif\$ putf xq(l; gdf x7fF

hf]clxn]; x; |hldgsf dflns 5g\
ltgsf]; fd6t lj/flv xq(l; gdf x7fF

hf]clxn]kln; sf d6ql 5g\
ltgsf]kln; oftgf xq(l; gdf x7fF

hf]clxn]a0dfg 5g\
ltgsf]0df6bf/tf xq(l; gdf x7fF

hf]clxn]zf; gdf 5g\
ltgsf]; Ofbfk xq(l; gdf x7fF

hf]clxn]hg-hgsf]5ftldf ufhl 7f\$5g\
ltgsf]hg-kd xq(l; gdf x7fF

l; gdf x/fF; gdf x/fF; gdf x/fF
l; gdfdf dfq b]v65g\ca
cfbz(, cfb/0flox, qmflGtsf/Lx
@)%\$ df3

dfofgu/

d]dfofgu/df
dfofsf]kbrfk ; lgg

j f: tj df dfofgu/
dfof kj } u/}f]eldh: tf]
lj nsh 5g

s; n]/flvlbof]
dfofgu/sf]o: tf]e]f]gfd

gfd /fd]/fv]
k laufg]
w]}gu/x 5g\

o: t}gu/
lsgeof]dfofgu/

k l; uf/]
dg laufg]
yk}df]g; x 5g\

To: t}df]5]
lsg eof]dfofgu/
@)% (sf]0s

cdfd xbf

cdfd xgxG\of]/
j l/kl/sf ?v /
3/sf v]k]sf r/fx
vfg kfp]

cdfd
xdfLnf0{kl: slbg' cuf]8
klgp]

s; f0laf6
cnslt eft lenSgx6Yof]
/ kft kftdf
sxl efu nufP/
aflx/ ktliff/t
r/fx2nf0{kf0fpg' x6Yof]
/ r/fx2 vfg kfp7]

cdf x'-hjh
ef\$ r/fx2
cfEgdf
cdf sl//x6y]

cdf xgx6Yof]/ t
vfg kfp7]r/fx2

xfdL / r/fx2
sfxl klq 6x7f lyPgF
cdf x'-hjh

cdf eff5fdf kfIVPsf]
ldlNsPsf]
; a h7f vfg\$7f
Ps Ps ; fxf77
k7k' \$ /5dfgdf /Vgx6Yof]/
sfm] v7jh0{
8fsl 8fsl vj fpg' x6Yof]

cdf xgx6Yof]/ t
ef\$ xEgy]
cfj f/f sS/x2

cdf 3/sf c2 cfkm ; fxf77
uf0\$]d\vd
kf7f\$]d\vd
kf8Lsf]d\vd kfllbg' x6Yof]

j f: tj df
cdf xgx6Yof]/ t
sfxl ef\$ lyPgg\

cdf; E
j l/kl/sf ; a hljgsf]

cfz lyof]

cfdf s; h{lg/fz kfg{xlgYof]
; a cdf; E dlq lyP

j f: tj df cdf xBf
hljg hflvddf lyPg
@)%& c; fh

ud

ztfAbl kl/j t{sf]v h x{I
p; sf]pIs6 rfx
PSSf0; fZtfAbl; Dd cf0ku

pm
al; fZtfAblleq}
kVjL; E
labf eof]

j f: tj df
p; sf cfffx
ahfahf
cfkng)z hldf affly]
/ c; a%y]
pm PSSf0; fZtfAbl; Dd
afRg rfxG5

t/ p; sf]
of]
rfx
p; sf]; DklQ
p; sf]8fS6/
p; sf]sb)klg pkrf/, ofrgf / kfygn]; gg\g\
/ pm
al; fZtfAblsf]eofj xleq}ud eof]
/ p; sf]sNkgfsf]
ztfAbl kl/j t{sf]cfsf/
of]ztfAblsf]l8kf6dl6n :6f]af6 cfPg
@)%& j zfv

/fd[]; do

/fd[]nflbfnflb}
x7ft\; do ; lsof]
9n\$ f qm/x; p7]
aQdfgx; dnf leg{yfn]
bl6x; km; nf ug{yfn]
xhf{xhf]
/fd[]; do
el6x; 5f8] p8df]
@)^) knfug

; a\$6

d s]OR5f u/fF
qmfGt l5\$}; km xf] \
ls zflGt l5\$}cfcf] \
s]xf] \56f]bzd

s]xf] \56f]bzd

of]OR5fsf]; a\$6df
d
s]u;F

bzsf]; a\$6df
; aeGbf a9l k5{
slj ; a\$6df
@)%(k;

3/ uPk15

c;nf0{ljZjf; 5g
t/ pmcfkmf0{ljZjf; 5
pm aR5
c:ktfnsf]; 3g z;ofdf aR5' eGg]
ljZjf; g5f\$]
pm cwaxf] 5
/ sl//x\$ c:ktfnaf6 3/ lx8g]; do
t/ 8f\$6/x; eG5g\
sxl lbgkl5
pm d[3flft xg\$

To; sf/0f p; sf lgs6:yx
pm gx6fsf]kl8f v/kg]cEof; df
nflu; s]
t/ pmcw{t}gdf ; flr/x\$
c:ktfnaf6 3/ hfg\$'
/ hljgnf0{
7ls dflg; eP/ ; kfg\$'
pm ; flr/x\$
ahfahf
; DaGw lalupsf
; a}Esf]s6'tf
dw/ ug\$'
/ dfosf w})b[6x
hDdf ug\$'
3/sf]a9f]s6/nf0{
cfkng}xftn]:ofxf5{/
csf]gofF5fp/f]kflng yflng\$'
/ dflg; sf]hljg; E hf]8g]
kzx;sf]kq a%g]
; lj:tf/ sf]; ; ug\$'
pm ; flr/x\$
3/df k:g]alQs}
; aeGbf klxn]
; a lsfax;sf]
whf]emf5{
/ ltgnf0{
; knf sk8fn]k5b}
%ofsdf /fvb}u5{
lj z]f u/l syfsf, lgaGwsf
slj tfsf, :d[tsf k':tsx
rfxgf; fy b]vg] kf0g]t/ /fv5'
/ gofHstfax
5fgl5fgl lsg]
yK5'
/ ; se/ ; a lsfax;nf0{
cfknaf6 cfemh kg{lbcGF
pm ; flr/x\$
of]zøofaf6 3/ uPkI5
; fEmsf
laxfgsf
PsPs k\$[tsf]
:j fb lnG5'
/ ; vf/sf sf]knfx

/ ; Gllöfsf j o:s kmthx 565'
lxpFePsf
gbl hd\$
emgf{af\$}f kxf8x s f]ofqf u5{/
n\$; E
a] L; E
lzv/; E e\$5'
pm ; flr/x\$
3/ uPkI5
/fdl ; fh / zAbsf
Xbon]ag\$ / ufPsf
; a}wgx / ultx ; lg/x65'
/ aRg\$:]j fb a/fa/ ln65'

t/ 3/ uPkI5
@)%& k'

Ij Gbx

Pp6f Ij Gbdf
ultx sf]sfofsNk ePsf]5

; f/f s/fx
Ij Gbx n]lgwf{Of ug{yfn\$}f 5g\

ol pQ/cfwlgs Ij Gbx
cl:tIj sf]b]ofsf/ 2k
Wj :t kfb\$g\
@)^) krfug

dfs; \$]v' L

sd/\$
dnf0{g}k5fl8 5f87
d7f]gfddf w7}cuf18 a9\$}f}
/ olQ w7}hlluf-hdlg
3/ 387l
l6el, 8\$, lkrh, hdg sf/
z\$ /, Jofkf/, 7\$sf, k\$
; Qdf uPkR5]hf\$}f}
dnf0{rflxRh]ePklg
cfkng"a7sdf en080fPs}5f}

oIQ eg] dS; {kn|/
cfkn|"lrxfglt/ kn|sP
@)^) kn|ufg

ltdlx; dfq

ha slj
h]ndf lyof]
j ftfj /of v'; L ePenF
dfq lyof]

ze]5s
sf]L gePh:tf]
dfq lyof]
slj n]
oftgf vk\$]lbg

qm|'tfsf]
eofgs c]bf/fl]eq
tf8gsf d; nx;
bf/fx;, g^auf]x;, ; 0/fx;
slj ; lx/xbf
af]x/
cfsfzdf 8Ng]x;
dfq lyP
slj sf]PSnf]o4df
dfq lyP ; a
hf]clxn]
slj sf]d[odf
/f0/x\$g\
/ cf]sf]s; /t
ul//x\$g\
of]s; /tdf
d xff'ls
s]u/fF
d klg
oftgfsf]
nf0gdf 5'
dk|t klg
nRr]fx; clxn]dfq 5g\
hf]kl5 ?g\$gV

d7f]nf; nf0{bg5g\cfF'

To; a]hf d xfF'ls
s]u/f]Sj

d cfp65'
x]df} dl df0x;
dnf0{clxn]glbg]eP
kl5 d7f]nf; nf0{s; \$f]
cfF' rflx6g

d nfvf5f]
dlQmf0{
oftgdf qmdzldf/g5'
of]qm/ df0af6 labf xg5'

ltdlx; df0
cf0 -c_ hk
@)%(c; f/

klf

cfF' klg bfXl/G5
?j f0 klg bfXl/G5
j hf klg bfXl/G5
3fd klg bfXl/G5
x/L klg bfXl/G5
em/L klg bfXl/G5
v87L klg bfXl/G5
; j f; klg bfXl/G5
:j fb klg bfXl/G5
af9L klg bfXl/G5
xfFf]klg bfXl/G5

hlj gsf]nflu
bfXl/G5,
cfF'; kl8f; ; j f; cfg6b
@)%(k;

Ps xf06\$ slj tf; a%g vfljb}

sfnf, df0f kfgfx;df
rf\$0f, lqs0f, ; lwf, af-f, df0f /yfx; el/Psf 5g\
ol sg clf/x; xg\
ol sg zAbx; xg\
cr0dn]Ps slj tf; a%g sf kfgfkfgf kN6fp5}
uflxsx; ddf;t ; fl5g\
ol s]xg\
.b uflhP/ kf06kas ; kl sl n0; f el65g\
tl xf06\$ slj tf xg\
d klg ; fl5'
sf]k95g\tl <
sf]a%5g\tl <
n0; f el65g\
Vj }Tof]t dnf0(yxf 5g)
t/ tl slj tfx; xg\
ltgdf slj n]b]y\$]f]Dofgxf6gsf]hlj g
pQ/kflj fbsf]; -hfn /
pRr cfwlgs ; j]x; 5g\
Ps xf06\$; dlfs P]eg] lg:s]
sl0n]lsg] klg nu]
t/ tl s]a%5g\dnf0(yxf 5g)
d t olQ e6g ; S5- tl slj tfx; xg\
h; /l c; slj tfx; d al%bgF
tl slj tfx; klg d al%bgF
d]f]nflu ; a slj tfx; xf06\$ slj tfx; xg\
ol k'ts a]f]fkt
d]f]tna a9f0of]eg]
Toxl g)d]f]nflu
Pp6f ; lhnf]slj tf xg\$
e)^! jzv

e]s5}a6}5

df]nstf ud\$]of]cgxf/e6f
elg cgxf/df
snfsf]lghTj xg; S5

yk}k'/fgf s'/fx; 5g\of]cgxf/df
ltgnf0{lryf]]
lghl / cyk0f{agfpg ; l65

t/ 8l/8fsf]gfs /
/fhfFafy\$]cfFf hf]fpg
b[6x; eTsfp}5
pQ/cfwlgs k[fm] /
e)^) krfug

o4

a6b5x;
lug}x;
adx;
vf]h/x}g\ngb}x;

h; nf0{df/kI5
s}L b}f} x}g
To:tf]lgb}f}
vf]h/x}g\
cZqx;

s; sf]klfdf
sg cZqn]
slxn]lhT5 yxf 5g

t/ cZqsf]klfdf
df]g; x;
k}j}L udfp}g\
e)^) c;f/

lx6n/sf]pd] 5g

lx6n/sf]pd] d[okI5 slt xf]
pm 0ltxf; df kOf}M slxn]kms}5
lx6n/ tl ; a dh5 slxn]5f}5
hxfFgd km]L km]L
pm /fho ub}5
t/ xf8e/ k[fm] / e}5
lx6n/ hl}d/xg]hft xf]
s}f]j if}v d slffdf
k}hft}g, :j t}qt, pbf/j fb k9fp}5'
t/ lx6n/ hl}d/x}g
lx6n/ hl}d/xg]hft xf]
e)^) krfug

; a\$if{

7ls /fϕlh:tf]uf]h]f]
cfuf\$]n]ksf]h:tf]nfn
clϕtd r]s]l]gdϕ laxfg cfh
xhf/l wfg\$sf]
kfs\$]f]; g]h]f]ux\$]v]af6
; b{pbfof]

>dk0f{hlj gn]
k]mk0f{kf/\$]f]
kl/k\$] ; g]h]f]ux\$]f]cgϕt kmf6af6
; b{lj :tf/-lj :tf/
df]l:t/ p7b}5
cfk]m]l/kl/sf]k[7
/Stfe kfb}f
; b{
ux\$]f]cgϕt :j 0fϕbf d]lw x}f]f
p7b}5
dfly-dfly
/
cfnl-cfnl lx8b}
xhf/l ; f]b}5
kfx/h:tf]o; k]fn
3/ cϕg zϕo xg]5g
cf0df0{sϕfsϕl
; a c3fpg]5g\
s; \$]f]klg ef\$]f]snϕl
b]gkg]5g
v]x}df
pd] ku\$]f ; g]h]f ux\$]f
x\$]f of klv{x\$]g\
xhf/l cfnl-cfnl
ub}b\
n]s}5

df]lg; sf]
o:tf]v'l; f
af}b}cfPsf]5 ; a\$if{
@)%(k'

gd\$]pd]

pm al; fZt fAbLsf
c; s/fP fP
; fdfco lyof]

pm; E
bM/sf
yk}bfux; lyP,
a}f-a}f
ltgnf0{x}}
pm kUnGyof]

pm kUnGf
p; sf cff klg
/; fpg tof/ xGy]

Pp6f ; fdfco dflg; sf]
; a}ldtf
pm; E lyof]
t/ lyPg
pm; E qmfW
To; h}cfnk}k; lgf r'gk; E
pmgd|lyof]

Toxl gd}fn]
pm
k}j ldf
w}j if{
/xg kfPg
@)%& j}fv

c; lhnf]slj

d?6f}hsf]Pp6f uNnLsf]
8}f sf}fdf hlgdPsf]
/fdfigh v/bf/sf]5f}f pm
uNnLsf]:shdf k9b}v}b}
slj aG}r}gdf kf]klof]

/fdfigh v/bf/sf]5f}f]pm
slj ag\$]
tlg bzs, t} f}xktf eof]
t/ pm slj ag}lv otf

p; n]rf/k6s h]h /
yk}t/:sf/ kfPsf]5
t}kg 5f}sf]5g
/dfgh v/bf/sf]5f]f]h]
slj tf n]g

/dfgh v/bf/sf]5f]f]pm
c; lhnf]slj xf]

j f: tj df
; Qfnf0{ qm/nf0{
bnfnnf0{ u2f/nf0{
c; lhnf]x65 0df6bf/ slj
e)^) k;

u8

; a r/fx;n]
k}t a/f}a/ aB}f 5g\

cf-cfkn}u8nf0{
s; h]5]sf] s; h]Tof6bf]
s; h]kts/ /f]h}f 5g\

r/fx;n]sf]blgof}f
u8sf]emu8f 5g

al4sf]blgof}f t
aa{tf 5
o4 5
/ u8x;n] Wj :t 5g\
e)^) c; f/

; b}f

dnf0{nf}b}5
c;n] lgw}g en}f
d]f]af klg
elj iosf ; dox;n]
/fd]cfpg}5g\e}g]
cfdlbnf; fdf
hlj g xsf0/xgePsf]lyof]

To; h]pxfF
vIk/xgèPsf]lyof]
cufw cfly\$ j hgf

/ d[oko(t
lknf0/xgèPsf]lyof]dnf0{
hlj g3bl

t/ cfknh]
cfp5 eg] lrtfPsf]
Tof]j hgf/lxt ; do
geh}

pxfFof]k]l]sf]xfj fkgLaf6 lj bf xgèof]

otf afnf0(enF
dnf0{klg nflb}5
ol ; don]vk\$F
adj iff\$F dxdf/L
; qmfs ; fdlhs hlj f0fx¿ /
lx; \$ /fhglltsf
cfdw6o /fhgllt1
/ eofgs zf; ssf qm/td zf; gaf6
afkg ; sFeg]
d]f]afpn]rxf\$F]
; vdo ; do
d cjZo ehgF'
@)%% df3

kl:t:j/

a0dfgx¿sf]of]el8df
Pp6fn]klg lj bfx u/g
sf]L klg 0df6bf/ b]vPg

lj Zjf; sf
cf:yfsf
0dfgsf
e/f] fsf kfgfx¿
k':tsaf6 uB 5f\$]
c1ft nf\$lt/ pl8/x\$g\

k]l]laf6
; a g]tstfx¿

kϕixϷ, khixϷ
cfsfzdf a; f0 ; l//xϕg\
df6fϕf s; f0 al9/xϕg\
@)%* jϷfv

PSnf]r/f]
a/sf]6kϕfϕf a; Ϸ k5tf]uf0/xϕ M
aϕdfgnf0{7^aϷ ; lSPg
Odfgnf0{/fϕg ; lSPg
aϕdfgxϷ; sf]el8df
Pp6f klg lj bϕxl b]VPG
@)%* jϷfv

ux l6kg]; kgfdf

PSsf0; fϕztfaBlsf]
klxnf]bzssf]dϕf]oj s
cfqmfϷ, qmfϷ, 3ϕffn]/GylgP/ xlnn/xϕ

; Dk0f{pQ/cfwlgs lzlff rf6Ϸ
; 8ssf]qm# gful/s agϕf]dϕf]oj f
vft]afnsenϕ
bϕf]bϕfϕf qm/ gϕf /
ktlt /fhg]fxϷ; ϕ
/fϕuf/lSF]el1ff6gaf6 xf/Ϸ
PS]kmln -fϕf aNg]ePsf]5

rfal; j ifϕf]e0; sϕf]
dϕf]oj fnf0{
dtbftf gdfj nldf
kmngfd bt{ug{dg 5Ϸ
lgj fϕg cfofϕsf]cfx]fgnf0{pm
kmNj bϕx sϕ ug]; /sf/l if8Ϸq dfϕbϕ
cfufdl dtkϕlnf0{pm
ySg]ofϕhgdf 5
jf: tj df p; nf0{clxn]
/fϕuf/lSF]kl/0ffd lg:sg]
lj Zj lj Bfnosf]kϕf0fkq /fVg]
9ϕfa rlxPsf]5

p; sf cfIdofϕhgfsf
>dk0f{; f/f sMkgfxϷ
lj Zj lj Bfnosf]sfnf]ufpg le/Ϸ lg:sϕl5
va/Æ ePsf 5g\
@)%* jϷfv

ca pm cknj k]dsf; 6 klg e0 ub0
kfs6f kmhx; 560
lbgf]k]08 3fddf
pu|tf]QP/
pm u6tJo v]b5

t/ sxlFklg 50 p; sf]u6tJo
p; n]htf uP klg x65
lsgeg]st}klg p; n]k]t ug]kmn 50
6'f]agfsf dfux; df pm
cd]sf, hfkfg, a]hfof, hd0, sf]ofsf]le; f sl//x5
sxlFcsfzdf p80 kf0of]eg]
Pp6f /fd]ux l6kg]; kgfdf 5 pm
@)%* h7

e]dsf]h]f]vd

cfknj"z]Qm b]y]fpg
k]j ldf c]f]l
af9L
e5Dk
a/f] / cfp5g\
/ hljg, jg / e]dsf]z]f]f/
e]sf0/xg]u50\
@)%* df3

To; h]
q:t /x65g\cfknj}/lfs; 6
hljgx;

jf: tj df hljg
k]j lb]v, cfsfz]b]v, j fob]v, hnb]v
kfp5, udfp5
/ q:t /x65
@)%* df3

o4df

kmfd /
To; sf 7]f]x; dfq
cft' 5g\
o4df sb0

0:kft /
To; sf j fxgx; dfq
cft/ 5g\
o4df p8fg eg{

shlj, lghlj
vlgh nj 0dfq tof/ 5g\
o4df h0g

xhf/fdfg; sf 5ftldf
vr{ePsf ufhlslf vfx;
cjfs\5g\
w7}sfnb|v o4n]
dfg; sf]cfzf
7lu/x\$
e)^) k;

cfh; ldsf]ls; fg

wt{x;n]enF
p; n]hljg
/fhglltdf nufPg

yxf ePg p; nf0{
sg sg kbfy{
j/0f u/k15
; Eo e005 e0g]s/f]
p; n]hfg0
hljg ; fy\$ kfgI
tyfslyt snf, clego / c\bfld

p; n]u/0
e}l / ufa/afx\$sf]
sg)0Zj /sf]; jf
vt / sf]fnlsf]; -tafx\$
Clif, k/flxt, g]f, Jofkf/L
cflb hfnlx; E p; n]u/0 ldqtf

p; sf]gfd
cfEgaf6 vt
/ vt]af6 cEgafx\$
st)ku0, km]nPg

rfg p; n]gdfs]lj :tf/

vf]h p; n]
7hf df65]af6
kn]gdfs]pRrf/0f

Wbfg:y hl6/xdf]pm
df6f]f
@)%% df3

of]gu/df j]v

d; E
of]r/d gu/ 5
o; sf]p]kft lj sf; df
ud]f]df]g; sf]oftgf 5
cf]fdf bof gePsf
df]g; x]sf ult 5g\
xf]afhldf un]f
gz]vf] dx]j fsf^Nfx] 5g\
b]f]gb]y]f
ak]j f] hl]gx] 5g\
; dfrf/dfly r9]f
cvaf/x] 5g\
dg]k]k]t ; ^Nksf
pu]Jofj ; flos hfnx] 5g\
k]f]sf nlnf / lj e]sf
hldgcfsfz 5g\
tk]g of]gu/df cfsif] 5
lanfpg ox]fd]g; x] k]] ul//x]g\
@)^! j]zv

pmk]g csf]af]g

laxfg p7]k]5
afxgsf]bf]bf]l
/ t]tf]sk]sf]:jfbafx]
csf]dl7f]s/f]
/ gj hft ; b]f]ult x]g{kf0Gg
yk}; Gb/tf df/]
ag]f]of]r/d-gu/df
g leh]f s]f]s]l b]V65g\
g cf]: nfu]f df65]b]V65g\
@)^! j]zv

af0g e65
oxfCf] st}kf05g
o:tf]7fp8f s]a:g'
hf65' d1b; db]t/
j f kxf8lt/ j f t/f0{t/
vå dhfn]; 8f]o x5{x:c:tfrn x5{x
em/ldf ?en5'
/ft, laxfg / lbg]sf]cfg6b lng'5'
hf65' r/fx; ePsf]7fp8f
hf65' df6f]b]vg]7fp8f
/ v]x; df c6gafnlx; sf]nrxnxf8f]k x5{x
wtl6f6 j fddf
whf]s; /l p85
dhfn]x5{x
j f:tj df dnf0{
gu/n]gvfPsf]k\$[t 5f0g' 5
/ d6'; Dd klj]cge]t lng' 5
af0g dxfgu/sf]Jo:tfn]ylnPsf]5
p; nf0{xkf8sf]j lj] b c]lnf0
/ t/f06f]; 3g ;k
/ d?el'dsf]pRrf6 cf]dfs]1fg 5g
p; n]wtl6f]df]nstf hfg6f]5g
laxfg p7kl5
la5df]v bf]E dfenb}
afy?dleg k;]
lg:skl5
x8a8lsf]nluf le/]
sf/sf]ult /6sfpg]af0g
af6f6f]sg}sknl ; k' df k:5
Toxf6f6 skel/ al; cfpF sknl lsg]
knl/ sf/sf]a]t]8 ultdf tftf]sknl r':b}
d]bogu/sf]c; l tn]ejgsf]
tl; f]fnfsf]clkm; sf]fdf l5/kl5 af0gsf]
k]o6 lbg
8n/ p]kfbgdf Toxlfa]5
zx/ lahhln]ph]nPk]5
6f]psf]la; fpg sg}; De]t kj' df k:5 /
Psfb 306f ToxlFcf]6b lsg] latfp5
To; kl5 af0g
sf]ofusf]gzfdf dl:tP/
8f]6/sf]cfkn]ckf6df u8lnsg kl5,
lat6f]t]j if]v af0g oxl ul//x5,
ahfahf c]t lb]sSp/ e65
d; 6 sg}hljg 5g

oxl xfd]h]g
s]5 o; df <
t]t]skn
sf]ofus]g; f
æcd]/sg l:kφ Pnf] r'/fφ
00kfφφ l8cf]8/φ6sf]j f; gf
8n/ ; r] sfdsf]qm/ afφm
/, gj hft sf/
olQ xf]
olQ xf]
olQ xf]h]g
d j l-rt xφ}5'
tfhf slj x;
lhdl ; fl66ofuf]afsf,
dfs{sf\$; , l/6f 8fφ, l:6knφ 8g, lj ln sf]n6;
8]e8 n]Dofg, gfcfφl l; xfj gfo, 0/f ; f8f]km
n0; uhu / 6f]l 6f]6sf slj tfx; / dln; f
0j] kφφ 0:s/ ; f/f /φ, Pl/s j]6
/ dfs{P8ls6; sf /usf t/φ / ; tdtfx;af6
d
j l-rt xφ}5'
; a dfl]nstfaf6
d]f lbgx;
v/f]8n/df lglvφ}5g\
d slxn]af]hfpφ' 8fS6/ <
t/ pQ/cfwlgs 8fS6/ hg a]l af]bφ
pm klg csf]af]0g xf]
@) ^) dφ; /

s; nf0{yxf 5φ

b]zsf]; ae6bf 7hf]7u sf]xf]
of]k]g
d; φ nuff/ hj fkm dflu/xφ

; fRr sf]xf]
b]zsf]; ae6bf 7hf]7u
hgtfx;nf0{yxf 5φ
zf; sx;nf0{yxf 5φ
; fdf601fgdf p]n]y 5φ
d k]g ; f]b}
hj fkm dflu}
lxφ/xφ'

t/ cvaf/
ltdf]kf6L\$
j f blif0fkyL
/ jfdkyLsf kf]6/ xf0gg\

; f\$] sf ; f8Lx; emF
ol k; ndf em08df0Psf cvaf/x;df
5flkPsf
tfhf ; dfrf/x;
s; \$f]v/f]>dn]n]vPsf 5g\
ltdl l; Qdf kl9/x\$}

cTofrf/sf]; dfrf/ k9nk9n}
ltdl cTofrf/ ul//x\$}
l; Qdf cvaf/ kl9/x\$}
@)%& c; f/