

GWX k U`a !9XYf!?fY]g. BUhi fž'?i `hi f'i bX; Ybi gg'Yf`YVYb°

9bhXYW_Yb^G]Y^X]Y^B Uhi fk i bXYfž^\]ghcf]gW\Yb^Gh\XhY^i bX _i^]bUf]gW\Yb^; YbØggY^]a ^GW\k U^a !9XYf!?fY]g"^9f^YVYb^G]Y 5_h]j i f^Ui Vž^HfUX]h]cbYb^i bX^gdUbbYbXY^9j Ybhg^



K]``_ca a Yb'ni 'i bgYfYa '5VYbhYi Yf']a 'GW\k U`a !9XYf!?fY]g°

8]YgY'a U`Yf]gW\Y'FY[]cb']b'< YggYbž'8Yi hgW\`UbXž']gh'Y]b'k U\fYg ik Y`ž'XUg'cZh']a 'GW\UhhYb'gY]bYf'VY_UbbhYfYb'BUW\VUfb'ghY\h" A]h'gY]bYf'UhYa VYfUi VYbXYb'BUhi fž'\]ghcf]gW\Yb'GhÀXhYb'i bX Y]bYf'fY]W\Yb'?i `]bUf]_']gh'XYf'GW\k U`a !9XYf!?fY]g'Y]b'DUfUX]Yg ZØf'9bhXYW_Yf'i bX'; Yb]Y»Yf'[`Y]W\Yfa U»Yb"'9[U`ž'cV'Xi 'Ui Z'XYf Gi W\Y'bUW\']Xm``]gW\Yb'K UbXYfk Y[Ybž'ZUgn]b]YfYbXYb; YgW\]W\hg@VYffYghYb'cXYf'`c_U`'dfcXi n]YfhYb'GdYn]U`]hÀhYb'V]gh \\]\Yf'[]Vh'Yg'gc'j]Y`ni YbhXYW_Yb''

±0 'X]YgYa '5fh]_Y`'bY\a Yb'k]f'X]W\'a]h'Ui Z'Y]bY'FY]gY 'Xi fW\'X]Y <][\`][\hg'XYg'GW\k U`a !9XYf!?fY]gYg"@Ugg'i bg'[Ya Y]bgUa 'X]Y j YfVcf[YbYb'BUhi fk i bXYf'Yf_i bXYbž'X]Y'ZUgn]b]YfYbXYb; YgW\]W\hYb'XYf'U`hYb'Gh\XhY'Yf`YVYb'i bX'X]Y'_i `]bUf]gW\Yb?Ògh`]W_Y]hYb'XYf'FY[]cb'_cghYb"'5i »YfXYa 'k YfXYb'k]f'X]Y j]Y`Z\\handle hT][Yb': fY]nY]ha Ò[`]W_Y]hYb'i bX'X]Y'`YVYbX][Yb'HfUX]h]cbYbYbhXYW_Ybž'X]Y'XYb'7\Ufa Y'X]YgYf'; Y[YbX'Ui ga UW\Yb"'I bXbUhØf`]W\XØfZYb'X]Y'nU\`fY]W\Yb'JYfUbghU`hi b[Yb'i bX': Ygh]j U`gžX]Y'XUg'[UbnY'⅓J\f'ØVYf'ghUhhZ]bXYbž'b]W\h'ZY\`Yb°

6]gh'Xi 'VYfY]hz'XYb'GWkU`a !9XYf!?fY]g'ni 'Yf_i bXYb3'@Ugg'i bg UbZUb[Yb°

9bhXYW_i b['XYf'BUhi fk i bXYf']a 'GWk U`a! 9XYf!?fY]g

8 Yf'GWk U`a !9XYf!?fY]g']ghY]b'k U\fYg'BUhi fdUfUX]Ygž'XUg'a]h Y]bXfi W_gj c``Yb'@UbXgWkUZhYb'i bX'Y]bYf'J]Y`nU\`'j cb BUhi fgWki hn[YV]YhYb'VY[Y]ghYfh'''<]Yf'_ÒbbYb'BUhi f`]YV\UVYf'i bX 5VYbhYi fYf'Ui Z']\fY'?cghYb'_ca a Ybž'k À\fYbX'g]Y'X]Y UhYa VYfUi VYbXYb'5i gV`]W_Y'i bX'X]Y'fY]WkY': `cfU'i bX': Ui bU Yf_i bXYb'''C V'VY]'Y]bYf'K UbXYfi b[ž'Y]bYf'FUXhci f'cXYf'Y]bYa YbhgdUbbYbXYb'D]W_b]W_'''X]Y'BUhi f'XYg'GWkk U`a !9XYf!?fY]gYg \Uh'ZØf'YXYb'Yhk Ug'ni 'V]YhYb"

9]b '\YfUi gfU[YbXYg'BUhi f\][\`][\h']gh'X]Y '6i f[YbghfU» Yž'X]Y g]W\'Xi fW\']Xm``]gW\Y'K À`XYf'i bX'j cfVY]'Ub 'gW\fcZZYb': Y`gYb gW\`Àb[Y`h''8]YgY'a U`Yf]gW\Y'GhfU» Y'V]YhYh'b]W\h'bi f'Y]bY k i bXYfVUfY'5i gq]W\hž'gcbXYfb'ZØ\fh'Ui W\'ni '\]ghcf]gW\Yb

GY\Ybgk ØfX][_Y]hYb`k]Y`XYf`6i f[`K UfhYbVYf[`ibX`XYf`6i f[<YggYbghY]b"`6Y]XY`6i f[Yb`g]bX`]XYU``ZØf`Y]bYb`6Ygi W\žiia g]W\`]b`X]Y`; YgW\]W\hY`XYf`FY[]cb`ni 'j Yfh]YZYb"

9]b'k Y]hYfYg'VYY]bXfi W_YbXYg'BUhi fk i bXYf']gh'XYf'
BUh]cbU'dUf_'? Y``Yfk U`X!9XYfgYYž'XYf']a 'k Ygh`]WXYb'HY]``XYg
?fY]gYg``]Y[h''A]h'gY]bYb'h]YZYb'K À`XYfbž'_`UfYb'6ÀWXYb'i bX
[Y\Y]a b]gj c``Yb'AccfY'ghY``h'X]YgYf'BUh]cbU'dUf_'Y]b
VYXYi hYbXYg'6]cgd\ÀfYbfYgYfj Uh'XUf'''<]Yf'_ÒbbYb'6Ygi WXYf
k Y]hY'K UbXYfi b[Yb'i bhYfbY\a Ybž'X]Y'i bVYfØ\fhY'BUhi f
[Yb]Y»Yb'i bX'j]Y``Y]WXh'gc[Uf'gY`hYbY'H]Yf!'i bX'DZ'UbnYbUfhYb
YbhXYW_Yb'''8]Y'nU\`fY]WXYb'K UbXYfk Y[Y']a 'DUf_'g]bX'[i h
Ui g[YgWX]`XYfh'i bX'j Uf]]YfYb']b']\fYf'GWXk]Yf][_Y]hž'k Ug'g]Y
gck c\``ZØf': Ua]`]Yb'U`g'Ui WX'ZØf'YfZU\fYbY'K UbXYfYf'[YY][bYh
a UWXh''

K UbXYfk Y[Y']a GWXk]Yf][_Y]hg[fUX @Ab[Y BUh]cbU'dUf_ ?Y``Yfk U'X!9XYfgYY

K UbXYfk Y['ni f	A]hhY`gWXkYf	%\$ ·_a
K ØghY[UfhYb!<ØhhY		
FibXkY['ia'XYb	@Y]WXh	%)
9XYfgYY		
DUbcfUa Ufi bXk Y[GW k Yf	&\$`_a
?Y``Yfk U`X		

8]Y'BUhi f']a 'GWkk U`a !9XYf!?fY]g']gh'ni 'YXYf'\J\fYgnY]h'UhhfU_h]j"

a ': fØ\`]b['V`Ø\Yb'X]Y'K]`XV`i a Yb'i bX'X]Y'K À`XYf'YfV`Ø\Yb']b

gUhhYb': UfVYb"'\=a 'Gca a Yf'`UXYb'X]Y'6UXYgYYb\Z'k]Y'XYf'

9XYfgYY\Z'ni '_Ø\`Yb'GWk]a a dUi gYb'Y]b"'5i W\']a '< YfVgh\Z'k Ybb

X]Y'6`AhhYf'g]W\']b'[c`XYbY'i bX'fchY'Bi UbWb'j Yfk UbXY`b\Z']gh'X]Y

; Y[YbX'Y]b'VY`]YVhYg'N]Y`'ZØf'BUhi f`]YV\UVYf"'Ni XYa 'k]fX'XYf

K]bhYf'ni f'dYfZY_hYb'?i `]ggY'ZØf'GW\bYYk UbXYfi b[Yb'i bX'X]Y

Bi hni b['j cb'@Ub[`Ui Zc]dYb"

9]b'k Y]hYfYg'VYa Yf_Ybgk YfhYg'B Uhi fd\Àbca Yb']gh'X]Y' **GW k U`a** ž'X]Y'Xi fW\'XYb'?fY]g'Z]Y» h"'8]YgY'a U`Yf]gW\Y : `i gg`UbXgW\UZh'V]YhYh'b]W\h'bi f'Y]bYb'@YVYbgfUi a 'ZØf'X]j YfgY H]YfUfhYbžgcbXYfb'Ui W.'A Ò[`]W_Y]hYb'ZØf'K UggYfgdcfhUfhYb'k]Y?Ubi ZU\fYb'i bX'GhUbX!I d!DUXX`]b["'8]Y'GW\k U`a '\YVh'g]W\XifW\']\fY'gUbZhYb'?ifjYb'i bX'X]Y'i a [YVYbXY'@UbXgW\UZhž'X]Ygckc\``9f\c`i b['U`g'Ui W\'5VYbhYi Yf'Yfa Ò[`]W\h"

: Øf'Y]bYb'ZUa]`]YbZfYi bX`]W\Yb'5i gZi [']gh'XYf'K]`XdUf_
9XYfgYY']XYU`" <]Yf'_ObbYb'6Ygi W\Yf'\Y]a]gW\Y'H]YfUfhYb']b
Y]bYf'bUhi fbU\Yb'I a [YVi b['VYcVUW\hYb"'J ca 'F chk]`X'V]g'ni a
K]`XgW\k Y]b'[]Vh'Yg'j]Y'Y'H]YfY'ni 'YbhXYW_Ybž'i bX'ZØf'X]Y'?`Y]bYb
[]Vh'Yg'cZh'5b[YVchY'ZØf': Ø\fi b[Yb'i bX': ØhhYfi b[Yb"'8Yf'DUf_
ZÒfXYfh'b]W\h'bi f'XUg'6Yk i gghgY]b'ZØf'X]Y'H]Yfk Y`hž'gcbXYfb
V]YhYh'Ui W\Gd]Y`d`ÀhnY'i bX'D]W_b]W_d`ÀhnY'ZØf'Y]bY'YbhgdUbbhY
NY]h']a ': fY]Yb"

8]Y'J]Y`ZU`h'Ub'BUhi fYf`YVb]ggYb']a 'GWk U`a !9XYf!?fY]g']gh ZUgn]b]YfYbX"'9[U`ž'cV'G]Y'Y]b'fi\][Yf'GdUn]Yf[Ub['cXYf'Y]b Ui ZfY[YbXYg'5VYbhYi Yf'gi W\Yb' 'X]Y'FY[]cb'\Uh'U``Yg'ni 'V]YhYb" 8Yf'GWk U`a !9XYf!?fY]g']gh'b]W\h'bi f'Y]b'Cfh'ZØf'9f\c`i b[ž gcbXYfb'Ui W\Y]b'Cfhž'Ub'XYa 'X]Y'K i bXYf'XYf'BUhi f']b'j c``Ya; `Ubn'YbhXYW_h'k YfXYb'_ÒbbYb"

$<]ghcf]gWXY'GhÀXhY'ibX']\fY'; YgWX]WXhYb$

8 Y f 'G W k U 'a !9 X Y f!? f Y] g '] g h 'b] W k h 'b i f 'Z Ø f 'g Y] b Y 'f Y] n j c ``Y 'B U h i f V Y _ U b b h ž g c b X Y f b 'U i W 'Z Ø f 'g Y] b Y 'Z U g n] b] Y f Y b X Y b '\] g h c f] g W X Y b GhÀ X h Y ž X] Y 'f Y] W \ 'U b '; Y g W] W k h Y b 'i b X 'H f U X] h] c b 'G h À X h Y b ž X Y f Y b F Y [] c b 'Z] b X Y b '6 Y g i W Y f 'Y] b Y 'J] Y `n U \ `'j c b 'G h À X h Y b ž X Y f Y b K i f n Y `b 'V] g '] b g 'A] h h Y `U `h Y f 'n i f Ø W_f Y] W Y b "' X X Y 'G h U X h 'Y f n À \ `h '] \ f Y Y] [Y b Y '; Y g W] W h Y ž X] Y 'g] Y 'a] h Y] b n] [U f h] [Y b '; Y V À i X Y b ž A i g Y Y b i b X '_i `h i f Y ``Y b 'J Y f U b g h U `h i b [Y b ``Y V Y b X] ['k Y f X Y b ``À g g h "

%"'<ca VYf['fl9ZnYŁ

<ca VYf[']gh'X]Y'?fY]gghUXh'XYg'GW\k U`a !9XYf!?fY]gYg'i bX
VYY]bXfi W_h'a]h'Y]bYf'[i h'Yf\U`hYbYb'5`hghUXhž'X]Y'j cb'j]Y`Yb
\]ghcf]gW\Yb'; YVÀi XYb'i bX'Y]bYf'U`hYb'GhUXha Ui Yf'[YdfÀ[h']gh''
8Yf'a Uf_UbhY'<YI Ybhi fa 'i bX'X]Y'[fc» Ufh][Y'GhUXh_]fW\Y'Gh''
\$\time\\Ubb]g'g]bX'k U\fY'GW\a i W_gh\@W_Y'XYf'GhUXh''8Yf
Y]bXfi W_gj c``Y'A Uf_hd`Uhn']gh'b]W\h'bi f'Y]b'Cfh'XYg'<UbXY`gž</pre>

gcbXYfb'Ui W\'XYf'6Y[Y[bib[ž'Ub'XYa 'fY[Y`a À»][JYfUbghU`hi b[Yb'i bX'A Àf_hY'ghUhhZ]bXYb"

&"'GWk U`a ghUXh

GWk U`a ghUXh']gh'Y]bY'Z g]cb]YfhY'GhUXh'Ui g'a Y\fYfYb
Y\Ya U`][Yb'; Ya Y]bXYbž'XUfi bhYf'HfYmgU'i bX'N]Y[Yb\U]b"'8]Y
GhUXh'\Uh'Y]bY'`Ub[Y'HYI h]`hfUX]h]cb'i bX'YXYb'GYdhYa VYf'k]fX
XUg': Ygh'XYf'GWk U`a '[YZY]Yfhž'VY]'XYa '\]ghcf]gWkY
<UbXk Yf_Y'i bX'HfUWkhYb'dfÀgYbh]Yfh'k YfXYb"'8]Y'
7\f]ghi g_]fWkY']b'HfYmgU'i bX'XUg'<Y]a Uha i gYi a 'g]bX
VYgcbXYfg'gY\Ybgk Yfh'i bX'fYZY_h]YfYb'X]Y'gdUbbYbXY
; YgWk]WkhY'XYf'FY[]cb"

' ": f]hn`Uf

8]Y'GhUXh': f]hn`Uf']gh'VY_Ubbh'ZØf']\fY'[ih'Yf\U`hYbY'5`hghUXh'a]h j Yfk]b_Y`hYb'; UggYb'ibX'VYY]bXfi W_YbXYb': UW\kYf_\ÀigYfb" 8]Y': f]hn`UfYf'8ca ž'UiW\'VY_Ubbh'U`g'Gh"'DYhfig'ibX'Gh" A Uf]Ybž'[]`h'U`g'Y]bY'XYf'À`hYghYb'?]fW\Yb'8YihgW\`UbXg'ibX n]Y\h'gckc\`; YgW\]W\hg]bhYfYgg]YfhY'U`g'UiW\
5fW\]hY_hifVY[Y]ghYfhY'Ub"'9g'`c\bh'g]W\ž'X]Y'GhUXhaUiYf'ibX'X]YU`hYb'KY\fUb`U[Yb'ni'Yf_ibXYbž'X]Y'9]bV`]W_Y']b'X]Y'; YgW\]W\hY

("'6cf_Yb

 $8]Y ``]ghc f]gWX Yb `GhÀXhY `XYg `GWX k U`a !9XYf!? fY]gYg `g]bX `YVYbZU``g VY_Ubbh `ZØf']\ fY `A i gYYbž'X]Y `c Zh'X]Y ``c_U`Y '?i `hi f'i bX'; YgWX]WX hY k]XYfgd]Y[Y`b" `6Ygi WXYf'_\ObbYb `Y]bY `J]Y `nU\``j cb `H\Ya Yb YbhXYW_Yb.$

• < Y]a Uha i gYYb. G]Y V]YhYb 9]bV] W_Y]b XUg hfUX]h]cbY Y

@YVYb'i bX'X]Y'6fÀi WXY'XYf'FY[]cb"

- HYI h]`a i gYi a . '=b 'GW\k U`a ghUXh'Z]bXYh'a Ub
 DZcfa Uh]cbYb 'ØVYf'X]Y 'HYI h]`]bXi ghf]Yž'X]Y 'X]Y 'FY[]cb
 j]Y`Y'\U\fY'[YdfÀ[h'\Uh"
- : f]hn`UfYf'GhUXh[YgWX]WXhY. =a 'GhUXha i gYi a 'YfZU\fYb 6Ygi WXYf'a Y\f'ØVYf'X]Y'; YgWX]WXhY'XYf'GhUXh'j ca A]hhY`U`hYf'V]q'\Yi hY"

6YgcbXYfg`\Yfj cfni \YVYb`g]bX.

JYfUbghU`hi b[Cfh	AcbUh
: Ygh XYf GWk U`a	GWXk U`a ghUXh	GYdhYa VYf
: f]hn`UfYf	: f]hn`Uf	8YnYa VYf
K Y]\bUW\hga Uf_h		
6cf_YbYf~GhUXhZYgh	6cf_Yb	[´ k
5`hghUXhZYgh	<ca fpznył<="" td="" vyf[=""><td>5i[igh</td></ca>	5i[igh
<ca td="" vyf[<=""><td></td><td></td></ca>		

A]h'X]YgYb'J YfUbghU'hi b[Yb'k]fX'X]Y'; YgWX]WXhY''YVYbX]['i bX 6Ygi WXYf'_ObbYb'X]Y'_i 'hi fY''Yb'K i fnY'b'i bX'HfUX]h]cbYb'X]YgYf WXUfa UbhYb'GhÀXhY'\Ui hbU\'Yf'YVYb"'Ni a '6Y]gd]Y''XUg' 5`hghUXhZYgh']b'<ca VYf[ž'kc'X]Y'GhfU»Yb'a]h'@YVYb'YfZØ'`h g]bXž'i bX'X]Y'; YgWX]WXhY'XYf'GhUXh'Ui Z'Ui ZfY[YbXY'K Y]gY [YZY]Yfh'k]fX"

Ni gUa a YbZUggYbX``Àggh'g]W\'gU[Ybž'XUgg'X]Y`\]ghcf]gW\Yb'GhÀXhY]a 'GW\k U`a !9XYf!?fY]g'b]W\h'bi f'Xi fW\']\fY'VYY]bXfi W_YbXY

5fW\]hY_hi f'VYghYW\Ybž'gcbXYfb'Ui W\'Xi fW\'X]Y'h]YZ'j Yfk i fnY`hY

; YgW\]W\hYž'X]Y'j cb'8Yb_a À`Yfbž'A i gYYb'i bX'JYfUbghU`hi b[YbYfnÀ\`h'k]fX"'8]YgY'GhÀXhY'g]bX'Y]b'k U\fYg'GW\Uhn_ÀghW\Yb'ZØf

; YgW\]W\hg]bhYfYgg]YfhYž'X]Y'Ui Z'XYf'Gi W\Y'bUW\'Ui h\Ybh]gW\Yb

9f`YVb]qqYb'q]bX"

 $: \emptyset f `k Y] h Y f Y ` + b Z c f a U h] c b Y b ` \emptyset V Y f ` X] Y ` Y] b n Y ` b Y b ` G h A X h Y ` i b X `] \backslash f Y \\$

5b[YVchY``c\bh'g]W\`Y]b`6Ygi W\`Ui Z`XYb`cZZ]n]Y``Yb`K YVgY]hYbž k]Y`ni a `6Y]gd]Y``Ui Z'gW\k\U`a !YXYf!_fY]g"XY"

?i`]bUf]gWXY'; YbØggY'XYf'FY[]cb

8 Yf 'GW\k U\a !9XYf!?fY]g 'V]YhYh'Y]bY'J]Y\nU\\ j cb'_i \]bUf]gW\Yb? Ogh\]W_Y]hYb\Z'X]Y 'gck c\\ '9]b\Y]a]gW\Y'U\g'Ui W\ '6Ygi W\Yf VY[Y]ghYfb"'8]Y 'Zfi W\hVUfY'@UbXgW\UZh']gh'b]W\h'bi f'Y]b'; Ybi gg ZØf'X]Y'5i [Yb\Z'gcbXYfb'Ui W\ 'ZØf'XYb'; Ui a Yb"'<]Yf'k]fX'HfUX]h]cb [fc»[YgW\f]YVYb\Z'i bX'j]Y\Y'XYf'fY[]cbU\Yb'GdYn]U\]h\AhYb'\UVYb]\fYb'I fgdfi b[']b'\J\f\i bXYfhYb'U\hYb'FYnYdhYb"

Ni 'XYb'VY_UbbhYghYb'; Yf]WkhYb'XYf'FY[]cb'nÀ\`h'XUg'; fØbYGc»Yž'Y]bY'_Ògh`]WkY'A]gWkib['Uig'Zf]gWkYb'?fÀihYfbž'X]Y'[YfbYni'\Ygg]gWkYb'?UfhcZZY`b'gYfj]Yfh'k]fX"'8]Y'[Y\Y]aY'A]gWkib[jUf]]Yfh'cZh'jcb':Ua]`]Y'ni':Ua]`]Yž'XcWk'X]Y'k]Wkh][ghYb'?fÀihYf'k]Y'GWkb]hh`UiWkž'DYhYfg]`]Y'ibX'6Àf`UiWk''g]bX'g]Wk']b']\fYfJYfkYbXib['ghYhg'À\b`]Wk"

- ŸdZY`ibX'Acgh.'8]Y'5dZY`d`UbhU[Yb'g]bX'Y]b'ZYghYf
 6YghUbXhY]`'XYf'`ÀbX`]WXYb'?i`hif"'<]Yf'_ÒbbYb'G]Y'b]WXh
 bif'Zf]gWXY'ŸdZY`ž'gcbXYfb'UiWX'_Ògh`]WXYb'Acgh
 jYf_cqhYb"
- K]`X[Yf]WX hY. '⇒ 'XYb'K À`XYfb'XYf'FY[]cb']gh'K]`XVfYh
 Y]bY'\Ài Z][Y'8Y`]_UhYggY"'CV'FY\ž'K]`XgWXkY]b'cXYf
 : UgUb' 'X]Y'K]`X[Yf]WXhY'g]bX'gWXa UW_\UZh'i bX
 bUWX\U`h]["
- 6]Yf_i `hi f. '7fUZhl6]Yf']gh'Ui W\']a 'GW\k U`a !9XYf!?fY]g Y]b'[fc»Yg'H\Ya U"'?`Y]bYfY'6fUi YfY]Yb'V]YhYb']bbcj Uh]j Y 6]YfYž'X]Y'Ybhk YXYf'_`Ugg]gW\'cXYf'a]h'Y]bYf'_fYUh]j Yb BchY'[YVfUi h'k YfXYb"

8]Y'FY[]cb']gh'Ui W. ZØf']\fY'C VghVUi Yfb'VY_Ubbh''J]Y'Y'XYf
C VghVUi Yfb'\UVYb']\fY'Y][YbYb'<cZÀXYbž']b'XYbYb'G]Y'b]Wh'bi f
Zf]gWXYg'C Vghž'gcbXYfb'Ui W. 'gY'Vgh[Ya UWXhY'A Ufa Y'UXYbž'GÀZhY
i bX'fY[]cbU'Y'GdYn]U`]hÀhYb'_Ui ZYb'_ÒbbYb'''8]Y'9fbhYnY]h'j cb
ŸdZY`bž'6]fbYb'i bX'?]fgWXYb']gh'VYgcbXYfg'VY`]YVhž'i bX'j]Y'Y
@UbXk]fhY'V]YhYb'ni XYa '9f`YVb]ghU[Y'Ubž'VY]'XYbYb'G]Y'a Y\f
ØVYf'X]Y'DfcXi _h]cb'YfZU\fYb'_ÒbbYb''

Ni gàhn`]W\`ni `hfUX]h]cbY``Yb'; Yf]W\hYb'[]Vh'Yg']a `GW\k U`a !9XYf! ?fY]g'Ui W\`Y]bY``YVYbX][Y'7UZÅ!'i bX'HYY_i `hi f"'<]Yf'_ÒbbYb'G]Y g]W\']b'[Ya Øh`]W\Yb'7UZÅg'a]h'Y]bYf'5i gk U\``Ub'\Ui g[Ya UW\hYb HcfhYb'i bX'?i W\Yb'j Yfk Ò\bYb'`UggYbž'k À\fYbX'G]Y'XYb'6`]W_'Ui Z X]Y'\ØVgW\Y'@UbXgW\UZh'[Yb]Y $^{\circ}$ Yb"'6YgcbXYfg'\Yfj cfni \YVYb g]bX'X]Y'fY[]cbU`Yb'6À\W_YfY]Ybž'X]Y'bUW\'U`hYb': Ua]`]YbfYnYdhYb VUW_Yb'i bX' $^{\circ}$ bYb'X]Y'VYghYb'6fÒhW\Yb'i bX'6fchY'UbV]YhYb"

FY[]cbU`YJYfUbghU`hib[YbZØf:Y]bgW\aYW_Yf

 $9]bY'k i bXYfVUfY'A O[`]WX_Y]hž'X]Y'_i `]bUf]gWXY'J]Y`ZU`h'ni YbhXYW_Ybž'g]bX'X]Y'nU\`fY]WXYb': YghY'i bX'A Af_hYž'X]Y'ØVYf'XUg $U\f'j YfhY]`h'ghUhhZ]bXYb'''9]b][Y'<][\`][\hg'g]bX.$

JYfUbghU`hi b[8 Uhi a	6YgWkfY]Vib[
GWkÀ`a Yf	5df]`	9]b'AUf_hžXYf'[Ubn
?ÀgYa Uf_h]a 'NY]WXYb'XYg'?ÀgY
		ghY\hž'a]h
		?cghdfcVYbiibXi <yf< td=""></yf<>
		ghY``i b[gXYa cbghfUh
]cbYb"
C V ghY fb hY ZY gh	GYdhYa VYf	: Y]Yfb'G]Y'X]Y
		9fbhYnY]h [·] a]h
		Zf]gWX Y b
		CVghghÀbXYbž
		`YW <u>Y</u> fYb'GdY]gYb
		i bX [.] Y]bYa [.] Vi bhYb
		FU\a Ybdfc[fUa a "
FY[]cbU`Yf	8YnYa VYf	; Yb]Y»Yb'G]Y'X]Y
K Y]\bUW\hga Uf_h		ZY gh`]WX Y

JYfUbghU`hib[8 Uhi a	6YgW\fY]Vi b[
		5ha cgd\ÀfYibX
		`c_U`Y`GdYn]U`]hÀhYb
]b XYf
		jcfkY]\bUWXh`]WXYb
		NY]h"

8]YgY'JYfUbghU'hi b[Yb'V]YhYb'b]W\h'bi f'X]Y'A Ò[`]W_Y]hž fY[]cbU'Y'? Ògh']W_Y]hYb'ni 'dfcV]YfYbž'gcbXYfb'ZÒfXYfb'Ui W\'XUg 6Yk i gghgY]b'ZØf'bUW\\U'h][Y'i bX'`c_U'Y'DfcXi _h]cb"

K Yf'Y]bYb'5i ZYbh\U`hi]a 'GW\k U`a !9XYf!?fY]g'd`Ubhž'gc``hY'g]W\Ui W\'X]Y'NY]h'bY\a Ybž'X]Y'_`Y]bYb'; Ugh\Ài gYf'i bX'FYghUi fUbhg ni 'Yf_i bXYbž'X]Y'cZh'a]h'@]YVY'i bX'<]b[UVY'hfUX]h]cbY``Y'; Yf]W\hY ni VYfY]hYb"'<]Yf'YbhghY\Yb'b]W\h'bi f'; Yf]W\hYž'gcbXYfb'Ui W\9fZU\fi b[Ybž'X]Y'XYb'6Ygi W\'i bj Yf[Ygg`]W\'a UW\Yb"

I a 'a Y\f'ØVYf'X]Y'_i `]bUf]gW\Yb'<][\`][\hg'XYf'FY[]cb'ni
YfZU\fYbž'`c\bh'g]W\'Y]b'6Ygi W\'XYf'cZZ]n]Y``Yb'K YVgY]hY'XYg'
GW\k U`a !9XYf!?fY]gYg"'8cfh'Z]bXYb'G]Y'nU\`fY]W\Y

♣bZcfa Uh]cbYb'ni 'fY[]cbU`Yb'GdYn]U`]hÀhYbž'J YfUbghU`hi b[Yb'i bXH]ddgž'k c'G]Y'XUg'6YghY'XYf'`c_U`Yb'?ØW\Y'[Yb]Y»Yb'_ÒbbYb"

5_h]j i f`Ui V i b X : fY]nY]ha Ò[`]WX_Y]hYb

8 Yf'GWk U`a !9XYf!?fY]gžY]b'a U`Yf]gWkYg'DUfUX]Yg'a]hhYb']b
8 Yi hgWk`UbXž']gh'Y]b'HfUi a n]Y`'ZØf'5_h]j i f`Ui VYf'i bX
B Uhi f`]YV\UVYf'[`Y]WkYfa U» Yb"'8]Y'FY[]cbž'[YdfÀ[h'j cb'gUbZhYb
< Ø[Y`bž'X]WkhYb'K À`XYfb'i bX'nU\`fY]WkYb'; Yk ÀggYfbž'V]YhYh'Y]bY
J]Y`nU\`'Ub': fY]nY]ha Ò[`]Wk_Y]hYbž'X]Y'ZØf''YXYg'5`hYf'i bX
9fZU\fi b[qb]j YUi '[YY][bYh'q]bX"

9]b VY`]YVhYf'C fh'ZØf'K UbXYfYf']gh'XYf'I d`UbXghY][ž'Y]b
Fi bXk UbXYfk Y[ž'XYf'Xi fW\ 'X]Y'fY]nj c``Y'@UbXgW\UZh'XYg
GW\k U`a !9XYf!?fY]gYg'ZØ\fh"'5i Z'Y]bYf'; YgUa h`Àb[Y'j cb'fi bX'*(
?]`ca YhYfb'_`ObbYb'K U`_Yf'X]Y'GW\Ob\Y]h'XYf'BUhi f'YbhXYW_Yb
i bX'UhYa VYfUi VYbXY'5i gV`]W_Y'[Yb]Y»Yb"'8Yf'K Y[']gh']b
a Y\fYfY'9hUddYb'i bhYfhY]`hž'qcXUqq'a Ub'X]Y'K UbXYfi b[Yb'[i h

 $: U``g`G]Y``]YVYf`Ui Z`nk Y]`F ÀXYfb`i bhYfk Y[g`g]bXž``cW_h`X]Y`FY[]cba]h`Y]bYa`[i h`Ui g[YVUi hYb`FUXk Y[YbYhn":8Yf`FUXfi bXk Y[GW k U`a `VY]gd]Y`gk Y]gY`ZØ\fh`Xi fW\`]Xm``]gW\Y`8 ÒfZYfž`V`Ø\YbXY: Y`XYf`i bX`Ybh`Ub[`j cb`a U`Yf]gW\Yb`: `ØggYb"`8]Y`GhfYW_Y`Y][bYhg]W\`gck c\``ZØf`: Ua]`]Yb`U`g`Ui W\`ZØf`gdcfh`]W\Y`FUXZU\fYfž`X]YX]Y`<YfUi gZcfXYfi b[`gi W\Yb"$

B]Wkhini ij Yf[YggYbi]ghiX]YiK UggYfgdcfha Ò[`]Wk_Y]hYbžiX]YiXYf GWkk U`a !9XYf!?fY]gini iV]YhYbi\Uhi'5bij YfgWk]YXYbYbiGYYbik]Y XYa i9XYfgYYicXYfi]biXYbi: `ØggYbiGWkk U`a iibXi: i `XUi_ÒbbYb6Ygi WkYfi? Ubi ZU\fYbži5b[Y`bicXYfiY]bZUWkibi fiYbhgdUbbYbiibXX]YiFi\Yi[Yb]Y»Yb"i9]b][YiÒfh`]WkYi5bV]YhYfiV]YhYbiUi Wkii[YZØ\fhYHcifYbicXYfi5i gfØghi b[gj YfiY]\iUbžigcXUggiYXYfiX]YibÒh][Y5i qfØqhi b[i\Uhži a i]bqiK UqqYfini i[Y\Yb"

 $: \emptyset f'X]Y'5VYbhYi Yf'i gh][Yb'i bhYf' \Rightarrow bYb'[]Vh'Yg'nU `fY]WXY' Ci hXccf!5_h]j]hÀhYbž'X]Y'GdU `i bX'5XfYbU`]b'j YfgdfYWXYb''5a 9XYfgYY'VYZ]bXYb'g]WX'VY]gd]Y`gk Y]gY'a Y\fYfY'5bV]YhYf'j cb' K UggYfgdcfh'k]Y'GhUbX!I d!DUXX`]b['i bX'K]bXgi fZYb''8UfØVYf \]bUi g'VY[Y]ghYfb'?`YhhYfdUf_g'i bX'<cW\gY]`[ÀfhYb']b'XYf I a [YVi b['X]Y'[UbnY': Ua]`]Y''<]Yf'_Ubb'a Ub'b]WXh'bi f'gY]bYb A i h'hYghYbž'gcbXYfb'Ui WX'HYUa[Y]ghi bX'; YgWX]W_`]WX_Y]h'i bhYf 6Yk Y]g'ghY``Yb''$

5b VYk O`_hYb 'HU[Yb 'cXYf']b 'XYb '_À`hYfYb 'A cbUhYb 'V]YhYb 'g]WX Ui WX 'j YfgWX]YXYbY *\D\Xcf!5_h]j]h\AhYb 'Ub" *\D\XYf'FY[]cb '[]Vh'Yg a Y\fYfY'GdcfhY]bf]WX hi b[Yb\ZX]Y'j cb 'GWX k]a a \U``Yb 'V]g'\ØVYf :]hbYggghi X]cg'fY]WXYb"'9]bY 'VYgcbXYfg'VY`]YVhY '5hhfU_h]cb ']gh'X]Y 9]ggdcfh\U``Y']b'K]``]b[g\Ui gYb\Z'k c'X]Y'[UbnY': Ua]`]Y GWX`]hhgWXi\``Ui ZYb'cXYf'qc[Uf'9]q\cW_Ym'qd]Y`Yb'_Ubb"

5_h]j]hÀh	Cfh	6YgcbXYf\Y]hYb
K UbXYfb	I d`UbXghY][* ('_a
		FibXk UbXYfk Y[ž
		9hUddYb'j YfZØ[VUf
F UXZU\fYb	FUXfi bXk Y[-Xm``]gWXY′8ÒfZYfž
	GWX k U`a	V`Ø\YbXY': Y`XYf
K UggYfgdcfh	9XYfgYY	?Ubiž5b[Y`bž
		GWk]a a Yb
CihXccf!5VYbhYiYf	?`YhhYfdUf_g	< c WX gY]`[À fhY b ž
		HYUa Vi]`X]b[
±bXccf!Gdcfh	9]ggdcfh\U``Y	GWX`]hhgWXi\``UiZYbž

5_h]j]hÀh	Cfh	6YgcbXYf\Y]hYb
	K]``]b[g\UigYb	9]g\cW_Ym

Ni gàhn`]W\ 'V]YhYb'j]Y`Y'CfhY'Hi fbYf'i bX'Gdcfhj YfY]bY
j YfgW\]YXYbY'?i fgY'i bX'9j Ybhg'Ubž'X]Y'g]W\ 'dYfZY_h'ZØf'5_h]j Y
Y][bYb"'6YgcbXYfg'X]Y'J YfY]bY'ZØf'@Ui Zgdcfh'g]bX']b'XYf
FY[]cb'ghUf_'j YfhfYhYb'i bX'cf[Ub]g]YfYb'fY[Y`a À»][Y'
@Ui Zk YhhVYk YfVY'i bX'A UfUh\cbj YfUbghU`hi b[Yb"'<]Yf'_ObbYb
gdcfh`]W\Y'< OW\gh`Y]ghi b[Yb'j cb'5bZ\b[Yfb'V]g'ni 'YfZU\fYbYb
@\alpha ZYfb'[Ya YggYb'k YfXYb"

8]Y ZUa]`]YbZfYi bX`]WX Y D`Ubi b['V]YhYb'j]Y`Y
: fY]nY]hY]bf]WX hi b[Yb'gdYn]Y``Y'Dfc[fUa a Y'ZØf'?]bXYf'i bX
\$\forall [YbX`]WXY'Ubž'i a 'g]Y'Ub'X]Y'j YfgWX]YXYbYb'GdcfhUfhYb
\YfUbni ZØ\fYb"'Gc'\UVYb'b]WX hibi f'9fk UWXgYbYž'gcbXYfb'Ui WX
X]Y'__Y]bghYb'; AghY'GdU» i bX'_ObbYb'bYi Y': A\][_Y]hYb'Yf`YfbYb"

8 Yf'GW\k U\a !9XYf!?fY]g']gh'XU\Yf'b]W\h'bi f'Y]b'F\@W_ni [gcfh'Z\@fFi\Y'i bX'9f\c\i b[\z'gcbXYfb'Ui W\Y]b'Cfh'j c\'Yf'9bYf[]Y'i bX 5_h]j]h\and hYb'''CV'VY]a 'K UbXYfb\z'FUX\z\U\fYb\z'K UggYfgdcfh'cXYf GdcfhYj Ybhg' 'YXY'5_h]j]h\and h'V]YhYh'X]Y'A \(\overline{O}[\cdot\)]\w_Y]h\z'X]Y'GW\\Ob\Y]h X]YgYf'Y]bn][Ufh][Yb'FY[]cb'U_h]j 'ni 'Yf'YVYb'''9bhXY\W_Y'XUg 5\YbhYi Yf'i bX'`Ugg'X]\w'j cb'XYf'BUhi f']bgd]f]YfYb''

JYfVcf[YbYg'<UbXkYf_'i bX'`c_U`Y HfUX]h]cbYb</pre>

9]bY'XYf'VYa Yf_Ybgk YfhYghYb'HfUX]h]cbYb']gh'X]Y' HYl h]`\YfghY``i b["'8]Y'Ni [Y\Of][_Y]h'ni f'GWk U`a !FY[]cb'\Uh Y]bY'`Ub[Y'; YgWk]WkhY']b'XYf'K YVYfY]'i bX'GWka]YXY_i bghž'X]Y V]g']bg'A]hhY`U'hYf'ni fØW_fY]Wkh'' <]Yf'g]bX'Y]b][Y'XYf ZUgn]b]YfYbXghYb'\UbXk Yf_`]WkYb': A\][_Y]hYbž'X]Y'6Ygi WkYf']b XYf'FY[]cb'_YbbYb`YfbYb'_ObbYb.

• K YV_i bgh. *\darkarrow XYf'GW\k U\a 'Z]bXYb'G]Y'j]Y\Y\\UbX[Yk YVhY'DfcXi _hY\darkarrow XUfi bhYf'hfUX]h]cbY\\Y'HØW\Yf\darkarrow GW\U\\q'i bX'H]qW\XYW_Yb"\8]Y'A i qhYf'q]bX'c\darkarrow Zh']bqd]f]Yfh

- j cb XYf B Uhi f'i b X XYf ``c_U `Yb ': c `_ `cfY"
- GWW b]hn_i bgh. '8]Y '< c`ngWW b]hn_i bgh'\ Uh'Y]bY '`Ub[Y HfUX]h]cbži bX'j]Y`Y'`c_U`Y'? Øbgh`Yf`gWX UZZYb VYY]bXfi W_YbXY'G_i `dhi fYb'i bX'?i bghk Yf_Y'Ui g'< c`n"
- HÒd ZY fY]. '9]b][Y 'HÒd ZY fVY hf]Y VY 'V]Y hY b 'K cf_g\cdg'Ubž']b XY bY b '6Ygi W\Yf'X]Y '; fi bX\`U[Yb 'XY f' HÒd ZY fY] 'Y f`Y fbY b _\ObbYb" '<]Y f 'Y b hghY\Yb 'gh]\`j c\``Y '? Y fUa]_Ybž'X]Y 'c Zh'j cb XY f I a [YVi b[']bqd]f]Y fh'g]bX"

8]Y'GWX b]hnYfY]']gh'VYgcbXYfg'j YfVfY]hYh']b'XYf'FY[]cb"'A UbZ]bXYh'A Y]ghYfk Yf_Yž'X]Y'j cb'XYb'HU`YbhYb'`c_U`Yf'GWXb]hnYf
[YgWX UZZYb'k i fXYb"'C Zh'k YfXYb'\Ò`nYfbY'9f]bbYfi b[gghØW_Y'cXYf; YVfUi WXg[Y[YbghÀbXY']b'a]bi h]ÒgYf'<UbXUfVY]h'[YZYfh][h"'J]Y`YX]YgYf'_i bghj c``Yb'GhØW_Y'Z]bXYb'g]WX']b'XYb'_`Y]bYb'; YgWXÀZhYbcXYf'k YfXYb'Ui Z'AÀf_hYb'i bX'5i qghY``i b[Yb'Ub[YVchYb"

8 UfØVYf`\]bUi g`]gh'X]Y; `UgV`ÀgYfY]`Y]bY'?i bghžX]Y`]b`XYb
`YhnhYb`\J\fYb`Ub`Dcdi `Uf]hÀh`[Yk cbbYb`\Uh''<]Yf`_ÒbbYb
6 Ygi W\Yf`XYb; `UgV`ÀgYfb`ØVYf`X]Y`GW\i `hYf`gW\Ui Yb`i bX`X]Y
ZUgn]b]YfYbXYb`HYW\b]_Yb`VYcVUW\hYbža]h`XYbYb`Ui g`\Y]» Ya
; `Ug`k i bXYfgW\ÒbY`CVY_hY`YbhghY\Yb"`9g`k YfXYb`?i fgY
Ub[YVchYbž'X]Y`Yg`Yfa Ò[`]W\Ybž'gY`Vgh'<UbX`Ubni `Y[Yb'i bX`Y]b
Y][YbYg`?i bghk Yf_'ni '_fY]YfYb"

8]Y?YfUa]_hfUX]h]cb:]ghYVYbZU``g'ghUf_'j YfhfYhYb"' =b'_`Y]bYb5hY`]Yfg'_ÒbbYb'G]Y'kibXYfVUfY'?YfUa]_Yb'YbhXYW_Ybž'X]Y'a]h@]YVY'ibX';YgWX]W_'\Yf[YghY``h'kYfXYb"'CZh'\UVYb'X]YgY'GhØW_Yžjcb';YgWX]ffghØW_Yb'V]g'\]b'ni'XY_cfUh]jYb'CV'Y_hYbž'Y]bY]bX]j]XiY``Y'BchYž'X]Y'g]Y'Y]bn][Ufh]['aUWXh"

9]b'k Y]hYfYg'<][\`][\h']gh'X]Y'GWk À`a Yf'HfUWk hž'X]Y'a]h Vi bhYb'Gh]\\[\W_YfY]Yb'i bX'hfUX]h]cbY``Yb'A i ghYfb'j Yfn]Yfh'k]fX" 8]YgY'HfUWk hYb'g]bX'b]\[\W_h'bi f'HY]`'XYg'_i `hi fY``Yb'9fVYgž'gcbXYfb Ui \W_Y]b'NY]\[\W_Yb'XYf'\Rightarrow Ybh]h\[\Ah'XYf'A Ybg\[\W_Yb']b'XYf'G\[\W_k U`a'' \FY[Y`a \[\Angle A]['\]Z]bXYb': Ygh`]\[\W_Y]hYb'ghUhhž'\[\Y]'XYbYb'X]YgY HfU\[\W_hYb'ghc`n'[YhfU[Yb'k YfXYbž'i a 'X]Y'fY]\[\W_Y'HfUX]h]cb'ni \ZY]Yfb''

K cf_g\cd	Cfh	HYfa]b

K cf_g\cd	Cfh	HYfa]b
K YVYfY]	<uuf!ibx< th=""><th>≯XYb GUa ghU[</th></uuf!ibx<>	≯XYb GUa ghU[
	HiWkkYVYfaigYiaž	
	GhUXhU``YbXcfZ	
< c`ngW\b]hnYb	?i bgh\Ui g˙GW\k U`a ž	AcbUh`]W
	GWXk U`a ghUXh	
; `UgV`ÀgYfY]	; `UgV`ÀgYfY] ⁻]b	HYfa]bY bUW
	6cf_Yb	JYfY]bVUfib[

 $\pm 0.'j \]Y`Yb`X]YgYf`K \ Yf_ghÀhhYb`g]bX`X]Y`< UbXk \ Yf_Yf`VYfY]hž'] \ fY \\ ; \ YgWX \]WXhYb`ni \ 'hY]`Yb`i bX`XUg`Di V`]_i a \ ']b`X]Y`; \ Y\Y]a b]ggY`] \ fYf \\ ?i bghY]bni \ ZØ\fYb"`9g`]ghY]bY`[fc >> Ufh][Y`; Y`Y[Yb\Y]hž'X]Y \\ @Y]XYbgWX UZh`i bX`<]b[UVY`XYfYb][Yb`ni `Yf`YVYbž'X]Y`]b`X]YgYf \\ FY[]cb``YVYb`i bX`UfVY]hYb"`8]Y``c_U`Y`< UbXk \ Yf_g_i bgh`]gh`b]WXh \\ bi f`Y]b`6]YbbU`Y`ni f`9f\U`hi b[`XYf`HfUX]h]cbYbž'gcbXYfb`Ui WX`Y]b``YVYbX][Yf`5i qXfi \ W_`XYf`fY[]cbU`Yb``=XYbh]hÀh"$

9j Ybhgʻi bXʻ: Ygh]j U`gʻ]a ʻGWk U`a !9XYf! ?fY]q

8 Yf'GWk U`a !9XYf!?fY]gžY]bY'XYf'gWk ObghYb'FY[]cbYb']b < YggYbž'V]YhYhY]bY'J]Y`nU\`j cb'JYfUbghU`hi b[Yb'i bX': Ygh]j U`gž X]Y'XUg'_i `hi fY``Y'9fVY'i bX'X]Y'`YVYbX][Y'; Ya Y]bgWk UZh'X]YgYf; Y[YbX'nY`YVf]YfYb"'¾XYg'¾\f'ghfOa Yb'6Ygi WkYf'Ui g'XYf Ia [YVi b['i bX'XUfØVYf'\]bUi g'\YfVY]ž'i a 'Ub'gdUbbYbXYb : Ygh`]Wk_Y]hYb'i bX'hfUX]h]cbY``Yb'9j Ybhg'hY]`ni bY\a Ybž'X]Y'ZØf U``Y'5`hYfg[fi ddYb'[YY][bYh'g]bX"'<]Yf'g]bX'Y]b][Y'XYf < O\Ydi b_hYž'X]Y'G]Y'b]Wkh'j YfdUggYb'gc``hYb"

%"'GWk U`a a Uf_h

 $8 \ Yf'GW \ k \ U`a \ a \ Uf_h']gh'Y]b \ Y]b \ U`'A \ f`]W \ 'ghUhhZ]b \ XYb \ XYg'9fY][\ b]g \]b \ XYf'GhUXh'GW \ k \ U`a \ ghUXhz'XUg'gck \ c \ ``9]b \ Y]a \]gW \ Y'U`g'Ui \ W \ Hci \ f]ghYb \ 'Ubn]Y \ h'' \ 8 \]YgYg'hfUX]h]cb Y``Y'Jc`_gZYgh'Z]b \ XYh']a \ GYdhYa \ VYf'ghUhh'i \ b \ X'V]YhYh'Y]b Y'Vi \ b hY'A \]gW \ i \ b['Ui g.$

• FY[]cbU`Yb'DfcXi_hYb

- ?i bgh\UbXk Yf_
- ?i`]bUf]gWXYb? Ògh`]WX_Y]hYb
- I bhYf\U`hi b['ZØf'; fc » 'i bX'? `Y]b

 $8 \ Yf'A \ Uf_h']gh'VY_Ubbh'ZØf'gY]bY``YV \setminus UZhY'5ha \ cgd \setminus AfYž'X]Y'XifWA \ ig]_ž'HUbn'ibX'nU \setminus `fY]W\ Y'GhAbXY'YbhghY \setminus h'' <]Yf' \setminus UVYb'X]Y \ 6 \ Ygi W\ Yf'X]Y'A O[`]W_Y]hž'`c_U`Y'GdYn]U`]hAhYb'ni 'dfcV]YfYb'ibX \ UbXk Yf_`]W\ Y'9fnYi[b]ggY'ni 'Yfk YfVYb''$

&"KY]\bUW\hga Àf_hY

± XYf'5Xj YbhgnY]h'j Yfk UbXY`h'g]W\ XYf'GW\k U`a !9XYf!?fY]g']b'Y]b k U\fYg'K]bhYfk i bXYf`UbX"'J]Y`Y'GhÀXhY'i bX'8 ÒfZYf'j YfUbghU`hYb gh]a a i b[gj c``Y'K Y]\bUW\hga Àf_hYž'X]Y'Xi fW\'Zc`[YbXY 9`Ya YbhY'VYgh]W\h.

- : $i b_m'@WhbghU``UhcbYb$
- @YV_i WXYb i bX ; `Ø\k Y]b
- $< UbXkYf_`]WXY'; YgWXYb_Y$
- K Y]\bUW\h`]W\Y`A i g]_'i bX`5i ZZØ\fi b[Yb

6YgcbXYfg'VY`]YVh'g]bX'X]Y'K Y]\bUW\hga Àf_hY']b'CfhYb'k]Y
: f]hn`Uf'i bX'A Y`gi b[Yb"'<]Yf'_Ubb'a Ub'g]W\']b'XYf'ZYgh`]W\Yb
Gh]a a i b['j Yf`]YfYb'i bX'X]Y'JcfZfYi XY'Ui Z'XUg'K Y]\bUW\hgZYgh
[Yb]Y»Yb"

'"?i`hi fZYgh`]b GWk U`a ghUXh

9]b k Y]hYfYg'<][\`][\h']a 'J YfUbghU`hi b[g_U`YbXYf']gh'XUg?i `hi fZYgh']b 'GWk U`a ghUXhž'XUg'YXYg' \forall J\f']a '5i [i gh'ghUhhZ]bXYh" 8]YgYg': Ygh'n]Y\h'?i bgh`]YV\UVYf'i bX'?i `hi f]bhYfYgg]YfhY'Ui g'XYf [UbnYb'FY[]cb'Ub"'9q'VY]b\U`hYh

- $\bullet \ ? \varnothing bgh`Yf]gWXY`8 UfV]Yhi b[Yb$
- A i g]_Ui ZZØ\fi b[Yb j YfgW\]YXYbYf; YbfYg
- ?i `hi fY``Y K cf_g\cdg
- GhfYYh: ccXibXfY[]cbU'Y'8Y`]_UhYggYb

8 Ugʻ?i`hi fZYghʻ]ghʻY]bYʻ[fc» Ufh][Yʻ; Y`Y[Yb\Y]hž'X]Yʻ`c_U`Y ?i bghgnYbYʻni 'Yf`YVYbʻi bXʻghÀf_hʻX]Yʻ; Ya Y]bgWXUZhgV]bXi b[Xi fWX 'XYbʻ5i ghUi qWX'j cbʻ\\XYYbʻi bX'?fYUh]j]hÀh"

("< ØhhYbnUi VYf K]bhYfa Uf_h

=a 'K]bhYf'k]fX'XYf'< \emptyset hhYbnUi VYf']b'j YfgWX]YXYbYb'GhÀXhYb'XYg GWXk U`a !9XYf!?fY]gYg'Ui g[Yf]WXhYh''8]YgY'A Àf_hY'g]bX'VY_Ubbh

ZØf]\fY'[Ya Øh]W\Y'5ha cgd\AfY'i bX'XUg'5b[YVchi]cb.

- < Y]» Yf'GWXc c`UXY'i bX'Di bqWXY
- ; `Ø\kY]b'i bX'k]bhYf`]W\Yb'GbUW_g
- < UbX[YZYfh][hYb'K Y]\bUW\hg[YgW\Yb_Yb

6Ygi WXYf'_ObbYb'g]WX'Ui Z'Y]b'j]Y`ZÀ`h][Yg'FU\a Ybdfc[fUa a ZfYi Ybž'XUg'j cb'@j Y!A i g]_'V]g'ni 'j YfgWX]YXYbYb'5_h]j]hÀhYb'ZØf?]bXYf'fY]WXh"'9g']gh'XYf']XYU'Y'Cfhž'i a 'g]WX'ni fØW_ni `Y\bYbž'X]Yk]bhYf`]WXY'Gh]a a i b['ni '[Yb]Y»Yb'i bX'X]Y'J cfk Y]\bUWXhgnY]h'ni j YfVf]b[Yb"

) " <]ghcf]gWXY : YghY

 $8 \ Yf'GWXkU`a!9XYf!?fY]g'\ Uh'Y]bY'fY]WXY; YgWX]WXhYž'X]Y'UiWX']b nU\ YfY]WXYb'\]ghcf]gWXYb': YghYb'[Yk ØfX][h'k]fX'''8]YgY': YghYž'k]Y XUg'DZUbb_i WXYbZYgh']b'6cf_Yb'cXYf'XUg'A]hhY`U`hYfa Uf_h']b A Y`gi b[Ybž'V]YhYb'XYb'6Ygi WXYfb'X]Y'A <math>O[`]WX_Y]hz']b'Y]bY UbXYfY'NY]hY]bni hUi WXYb.$

- <]ghcf]gWXY?cghØa]Yfi b[Yb
- HfUX]h]cbY``Y'Gd]Y`Y'i bX'K YhhVYk YfVY
- JcfZØ\fib[Yb'jcb'<UbXkYf_Yb'ibX'?ibghZYfh][_Y]hYb

Gc`WXY'JYfUbghU`hi b[Yb'Vf]b[Yb'X]Y'; YgWX]WXhY'`YVYbX]['i bX V]YhYb'Y]bYb'ZUgn]b]YfYbXYb'9]bV`] W_- ']b'XUg'@YVYb'j Yf[Ub[YbYf NY]hYbž'k À\fYbX'g]Y'[`Y]WXnY]h]['GdU» i bX'l bhYf\U`hi b['ZØf'X]Y [YgUa hY': Ua]`]Y'V]YhYb"

* "CdYb!5]f!?cbnYfhYibX:Ygh]j U`g

 $= a \cdot Gca \cdot a \cdot Yf \cdot Z]b \times Yb \cdot nU \setminus fY]W \cdot Y \cdot C \cdot dYb! 5]f!? cbnYfhY \cdot i \cdot bX \cdot : Ygh]j \cdot U \cdot g \\ = a \cdot [YgUa \cdot hYb \cdot GW \cdot k \cdot U \cdot a \cdot !9XYf!?fY]g \cdot ghUhhž \cdot X]Y \cdot A \cdot i \cdot g]_ \cdot [YV \setminus UVYf \\ VY[Y]ghYfb \cdot U \cdot J \cdot cb \cdot F \cdot cW_ \cdot \emptyset VYf \cdot Dcd \cdot V]g \cdot V]b \cdot ni \cdot Ugg]gW \cdot Yf \cdot A \cdot i \cdot g]_ \cdot [Yh \cdot Yg \cdot Z\emptysetf \cdot YXYb \cdot Yhk \cdot Ug'' \cdot 8]Y \cdot U \cdot Yg \cdot YgYf \cdot 9j \cdot Yb \cdot hg \cdot gcf[h \cdot Z\emptysetf.$

- 5hhfU_hjj Y'@bY!I dg'a]h'fY[]cbU`Yb'i bX'ØVYffY[]cbU`Yb
 ?Øbgh`Yfb
- GWX ObY @cWUh]cbg]b XYf BUhi fi bX]b XYb GhAXhYb
- 8] Y 'A O[`] W _ Y] hž 'X] Y '_i `hi fY ``Y 'J] Y `ZU `h `X Y f 'F Y [] c b 'n i [Y b] Y » Y b

 $6 YgcbXYfg`Yfk \ \grave{A}\bYbgk \ Yfh`g]bX`X]Y`?cbnYfhY`]a \ \ : fY]`i \ Zh[Y`\grave{A}bXYžX]Y`b]W\&h`bi f`a i g]_U`]gW&Y`<][\ \ `][\ \ hg`V]YhYbž`gcbXYfb`Ui W&`X]Y A \grave{O}[`]W&_Y]hž`a]h`: fYi bXYb`i bX`: Ua]`]Y`Y]b`i bj Yf[Ygg`]W&Yg 9f`YVb]g`ni `hY]`Yb"$

+ GdcfhYj Ybhg i bX K Yhh_Aa dZY

Ni 'XYb'<][\`][\hg']a 'GW\k U`a !9XYf!?fY]g'[Y\ÒfYb'Ui W\gdcfh`]W\Y'JYfUbghU`hi b[Ybž'X]Y'A YbgW\Yb'U``Yf'5`hYfg[fi ddYb ni gUa a YbVf]b[Yb''CV'VY]a 'hfUX]h]cbY``Yb'GhUXh`Ui Z']b':f]hn`Uf cXYf'VY]'XYb'j YfgW\]YXYbYb'FY]hhi fb]YfYb']b'XYf'I a [YVi b[ž X]YgY'9j Ybhg'ZÒfXYfb'XYb'; Ya Y]bgW\UZhgg]bb'i bX'X]Y'`c_U`Y Gdcfh_i `hi f"

 $8]Y'J]Y`nU```Ub'9jYbhg'nY][hžXUgg'XYf'GWkkU`a!9XYf!?fY]g'b]WkhbifY]bY'FY[]cb'jc``Yf'BUhifgWkOb\Y]hYb']ghžgcbXYfb'UiWk'Y]bCfhžUb'XYa'_i`hifY``Y'ibX'hfUX]h]cbY``Y'KYfhY'\cWk'[Y\U`hYbkYfXYb'''D`UbYb'G]Y'gca]h'\Rightarrow fYb'6YgiWk'nif'<UidhgU]gcbž'iaY]bYf'XYf'j]Y`Yb'JYfUbghU`hib[Yb'VY]nikc\bYb'ibX']b'X]Y5hacgd\AfY'X]YgYf'`YVYbX][Yb'FY[]cb'Y]bnihUiWkYb°$

8 YhU]`g

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'Y]bY!fY]gY "XY