

# ; fc»!; YfUi . '9]b'j YfVcf[YbYg'ik Y`jc``Yf'?i `hi fž'?i `]bUf]\_'i bX'BUhi f

9bhXYW\_Yb'G]Y'; fc»!; YfUi .'Y]bY'W\Ufa UbhY'GhUXh'j c``Yf \_i`]bUf]gW\Yf'; Y\Y]a b]ggYž'\]ghcf]gW\Yf'GW\ÀhnY'i bX bUhi fgW\ÒbYf'9f\c`i b[ g[ YV]YhY"'J YfUbghU`hi b[ Yb'i bX 5i  $gZ\emptyset[ Y'k UfhYb^{\circ}$ 



9bhXYW\_i b[gfY]gY'Xi fW\'X]Y'i bYbhXYW\_hYb'GW\AhnY'X]YgYf
W\Ufa UbhYb'GhUXh'''Jcb'XYb'\_i `]bUf]gW\Yb'? Ògh`]W\\_Y]hYb'XYf
FY[]cb'ØVYf'X]Y'\_i `hi fY``Yb'<][\`][\hg'V]g'\]b'ni 'XYb
k i bXYfgW\ObYb'BUhi fgW\i hn[YV]YhYbž'; fc\*!; YfUi '\Uh'ZØf'YXYb
Yhk Ug'ni 'V]YhYb'''@Uggh'i bg'[Ya Y]bgUa 'Y]bhUi W\Yb'i bX
\YfUi gZ]bXYbž'k Ug'X]YgY'GhUXh'ni 'Y]bYa 'k U\fYb'\$i k Y`']a '<YfnYb
<YggYbg'a UW\h'

# 9bhXYW\_i b[ 'XYf'WX Ufa UbhYb'GhUXh'; fc»!; YfUi

a '< YfnYb'j cb' < YggYb'`]Y[h'X]Y'W\Ufa UbhY'GhUXh'; fc»!; YfUi ž
X]Y'cZh']a 'GW\UhhYb']\fYf'VY\_UbbhYfYb'BUW\VUfb'k]Y'8Ufa ghUXh
i bX'K]YgVUXYb'ghY\h''8cW\'X]YgY'GhUXh'\Uh']\fYb'Y][YbYbž
VYgcbXYfYb'FY]nž'XYf'g]Y'ni 'Y]bYf'ZUgn]b]YfYbXYb'8Ygh]bUh]cb'ZØf
FY]gYbXY'a UW\hž'X]Y'XUg'5i h\Ybh]gW\Y'i bX'I bYbhXYW\_hY'gi W\Yb''
A]h'Y]bYf'A]gW\ib['Ui g'; YgW\]W\hYž'?i `hi f'i bX'bUhØf`]W\Yf
GW\Ob\Y]h'V]YhYh'; fc»!; YfUi 'Y]bY'J]Y`nU\`'j cb
9f`YVb]ga Ò[`]W\\_Y]hYb''</pre>

8]Y'GhUXhž'X]Y'g]W\'ØVYf'Y]bY': `ÀW\Y'j cb'Yhk U'' %ž-\$
EiUXfUh\_]`caYhYfb'YfghfYW\_hž\Uh'Y]bY'6Yj Ò`\_Yfib['jcb'fibX'
&, "\$\$\$'9]bkc\bYfb"'8]Y'nYbhfU`Y'@U[Y'Yfa Ò[`]W\h'Y]bYb
gW\bY``Yb'Ni[Ub['ni'j]Y`Yb'VYbUW\VUfhYb'GhÀXhYbž'k Ug'; fc»!
; YfUi'ni'Y]bYa']XYU`Yb'5ig[Ub[gdib\_h'ZØf'9f\_ibXib[ghcifYb
a UW\h"

6Ygi WXYf'\_ObbYb'Xi fWX'X]Y'a U`Yf]gWXYb'GhfU» Yb'XYf'GhUXh gWX YbXYfbž'X]Y'j cb'hfUX]h]cbY``Yb'\Ygg]gWXYb': UWXk Yf\_\Ài gYfb [YgÀi a h'g]bX"'9]b'<][\`][\h']gh'X]Y'GhUXha ]hhYž'X]Y'Y]bY `YVYbX][Y': i » [Àb[YfncbY'VY\YfVYf[h"'<]Yf'Z]bXYb'g]WX'bYVYb 7UZÅg'i bX'FYghUi fUbhg'Ui WX'nU\`fY]WXY'; YgWX ÀZhYž'X]Y fY[]cbU`Y'DfcXi \_hY'UbV]YhYb"'8]Y'?ca V]bUh]cb'Ui g'a cXYfbYb 5bbY\a`]WX\_Y]hYb'i bX'\]ghcf]gWXYa '7\Ufa Y'j Yf`Y]\h'; fc»!; YfUi Y]bYb'[Ubn'VYgcbXYfYb'7\UfU\_hYf"

9]b'6i a a Y`Xi fW\X]Y'GhUXh'ZØ\fh'Ui W\ni 'XYa 'A Uf\_hd`Uhnž Y]bYf'XYf'nYbhfU`Yb'6Y[Y[bi b[gghÀhhYb'XYf'GhUXh"'<]Yf'Z]bXYb

fY[Y`a À»][ 'K cW\Yba Àf\_hY`ghUhhž'X]Y`Zf]gW\Y`DfcXi \_hY`Ui g`XYf FY[]cb`UbV]YhYb"`8 Ug`j YfZØ\fYf]gW\Y`5b[YVch'j cb`CVghž'; Ya ØgY i bX``c\_U`Yb`8Y`]\_UhYggYb`n]Y\h'b]W\h'bi f`9]b\Y]a ]gW\Yž'gcbXYfb Ui W\`6Ygi W\Yf`Ub"

 $8 ]Y : \sim \ UbbYg_]fWXY ]ghY]b'KY]hYfYg'UfWX ]hY_hcb]gWXYg'<][ \ \ \ ]b'; fc > !; YfUi "'8]YgY'VYY]bXfi W_YbXY'Yj Ub[Y`]gWXY'?]fWXYž'X]Y ]a '%- "'\\ \ f\ i bXYfh'YfVUi h'K i fXYž']gh'ZØf']\ fY'_i bghj c``Yb ; `UgZYbghYf'i bX'X]Y'gWX \ \ \ \ \ bY'6U`_cbYa dcfY'VY_Ubbh'''G]Y']gh'b]WXh bi f'Y]b'C fh'XYf'5bXUWX hž'gcbXYfb'Ui WX'Y]b'VY`]YVhYf JYfUbghU'hi b[gcfh'ZØf'?cbnYfhY'i bX'_i `hi fY``Y'9j Ybhg''$ 

9]b'k Y]hYfYf'ZUgn]b]YfYbXYf'5gdY\_h'XYf'GhUXh']gh'X]Y'6UfcW\_Y; UfhYbUb`U[YžX]Y'6Ygi W\Yf']b'Y]bY'UbXYfY'NY]h'YbhZØ\fh"8]YgY`]YVYj c``'[YghU`hYhY'; fØbZÀW\Y']gh']XYU`'ZØf'YbhgdUbbhYGdUn]Yf[Àb[Y'cXYf'Y]b'D]W\_b]W\_a ]h'XYf': Ua ]`]Y"'8]Y j YfgW\]YXYbYb'6`i a YbVYYhY'i bX'U`hYb'6Ài a Y'V]YhYb'Y]bYZf]YX`]W\Y'CUgYžX]Y'a Ub'g]W\'b]W\hYbh[Y\Yb'`UggYb'gc``hY"

; fc»!; YfUi `\Uh`Ui W\`Y]bY`fY]W\Y`; YgW\]W\hYžX]Y`Xi fW\
j YfgW\]YXYbY`A i gYYb`i bX`5i gghY``i b[Yb`ni a `@YVYb`Yfk YW\_h
k ]fX"`8 Ug`< Y]a Uha i gYi a `nY][h`9I dcbUhYž`X]Y`X]Y``c\_U`Y
; YgW\]W\hY`i bX`X]Y`9bhk ]W\_`i b[`XYf`GhUXh`ØVYf`X]Y`\*J\f\i bXYfhY\
\]bk Y[`fYZY\_h]YfYb"`6Ygi W\Yf`\UVYb`X]Y`A O[`]W\\_Y]hž`h]YZYfY
9]bV`]W\_Y`]b`X]Y`HfUX]h]cbYb`i bX`6fAi W\Y`XYf`FY[]cb`ni
[Yk]bbYb"

; fc»!; YfUi ']gh'Ui »YfXYa 'Y]b'Hcf'ni f'I a [YVi b["'8]Y'GhUXh']gh j cb'Y]bYf'gW\ÒbYb'@UbXgW\UZh'i a [YVYbž'X]Y'g]W\'\Yfj cffU[YbXZØf': U\ffUXhci fYb'i bX'K UbXYfi b[Yb'Y][bYh''8]Y bU\Y`]Y[YbXYb'K À`XYf'i bX': Y`XYf'g]bX'dYfZY\_hY'CfhYž'i a 'X]Y BUhi f'ni '[Yb]Y»Yb'i bX'X]Y'j ]Y`ZÀ`h][Y': `cfU'i bX': Ui bU'ni Yf\_i bXYb"

K Ybb'G]Y'X]Y'A Ò[`]W\\_Y]h'\UVYbž'X]Y'GhUXh'ni 'VYgi W\Ybž'gc``hYbG]Y'Ui W\'X]Y'`c\_U`Yb'6fÀi W\Y'i bX': YghY'b]W\h'j YfdUggYb"'8]Y'\A\f`]W\Yb'J YfUbghU`hi b[Yb'k]Y'X]Y'; fc»!; YfUi Yf'? YfV'cXYfXYf'K Y]\bUW\hga Uf\_h'n]Y\Yb'6Ygi W\Yf'j cb'bU\'i bX'ZYfb'Ub

±bg[YgUa h']gh'; fc»!; YfUi 'Y]bY'GhUXh'j c``Yf', VYffUgW\i b[Yb'i bX 7\Ufa Y"'→fY'fY]W\\U'h][Y'; YgW\]W\hYž'X]Y'\_i `hi fY``Yb'<][\`][\hg i bX'X]Y'\Yfn`]W\Y'; UghZfYi bXgW\UZh'a UW\Yb'g]Y'ni 'Y]bYa `c\bYbgk YfhYb'FY]gYn]Y`ž'XUg'XUfUi Z'k UfhYhž'YbhXYW\_h'ni 'k YfXYb"

 $: \emptyset f `k Y] hY fY ` + b Z c fa U h] c b Y b ` \emptyset V Y f ` X] Y ` G hU X h ` i b X ` ] \setminus fY ` 9] b f] W \lambda h i b [ Y b V Y gi W \ Y b ` G] Y ` X] Y ` c \ ZZ] n] Y ` ` Y ` K Y V g Y] h Y . ` [ f c <math>$  \* ! [ Y f U i " X Y "

# $8]Y'_i]bUf]gWXYb; YY]ab]ggY'XYfFY[]cb$

; fc»!; YfUi ']gh'b]Wh'bi f'ZØf'gY]bY'a U`Yf]gW\Yb'GhfU»Yb'i bX
ZfYi bX`]W\Yb'A YbgW\Yb'VY\_Ubbhz'gcbXYfb'Ui W\'ZØf'Y]bY'J]Y`nU\`
j cb'\_i `]bUf]gW\Yb'? Ògh`]W\\_Y]hYbz'X]Y'gck c\`'9]b\Y]a ]gW\Y'U`g
Ui W\'6Ygi W\Yf'VY[Y]ghYfb"'8]Y'FY[]cb'\Uh'Y]bY'fY]W\Y
[Ughfcbca ]gW\Y'HfUX]h]cbz'X]Y'j cb'XYf'\Ygg]gW\Yb'?ØW\Y'[YdfÀ[h]gh'i bX'Xi fW\']bhYfbUh]cbU'Y'9]bZØggY'VYfY]W\Yfh'k]fX"'<]Yf'[]Vh
Yg'ZØf'YXYb'; YgW\a UW\_Yhk Ug'ni YbhXYW\_Yb'

6Y[]bbYb'k]f'a]h'XYb'\_`Ugg]gW\Yb'\Ygg]gW\Yb'GdYn]U`]h\hYb"'9]b
i bVYX]b[hYg'Aigg']gh'XYf'< UbX\_\hat{Ag'a}h'Aig]\_"'8]YgY'\Ygg]gW\Y
8Y`]\_UhYggY'VYghY\h'Uig'Y]bYa'a]`XYfYb'EiUf\_\_\hat{AgYž'XYf'a}h
Nk]YVY`bž'9gg][iibX'²`aUf]b]Yfh'k]fX"'CZh'k]fX'Yf'nigUaaYb'a]h
6UiYfbVfch'ibX'Y]bYa';`Ug'5dZY`kY]b'gYfj]Yfhž'XYf']b'XYf'FY[]cb
YVYbgc'VY`]YVh']gh''<UbX\_\hat{Ag'\Uh'gY}bYb'Y][YbYbž
i bjYfkYW\gY`VUfYb'7\UfaY'ibX']gh'Y]b'dYfZY\_hYf'GbUW\_'ZØf
nk]gW\YbXifW\"

9]b'k Y]hYfYg'VY`]YVhYg'; Yf]W\h']gh'X]Y'; fØbY'Gc» Yž'X]Y']b
: fUb\_Z fh'gY\f'VY\_Ubbh']ghž'UVYf'Ui W\']b'; fc»!; YfUi '[YfbY
[Y[YggYb'k]fX"'8]YgY'?fÀi hYfgUi W'k]fX'Ui g'g]YVYb
j YfgW\]YXYbYb'?fÀi hYfb'ni VYfY]hYhž'XUfi bhYf'DYhYfg]`]Yž
GW\b]hh`Ui W\'i bX'6cffYhgW\ž'i bX'dUggh'\Yfj cffU[YbX'ni
[Y\_cW\hYb'9]Yfb'i bX'?UfhcZZY`b"'5a 'VYghYb'[Yb]Y» h'a Ub'g]Y'Ub
k Ufa Yb'HU[Ybž'k Ybb'X]Y': f]gW\Y'XYf'?fÀi hYf'ni a 'HfU[Yb\_ca a h"

± XYf'FY[]cb'[]Vh'Yg'ni XYa 'nU\`fY]W\Y'6fUi YfY]Ybž'X]Y
Ui g[YnY]W\bYhY'6]YfY'UbV]YhYb"'8]Y'\Ygg]gW\Y'<UbXk Yf\_g\_i bgh
]gh'\]Yf'[i h'Ui g[YdfÀ[hž'i bX'j]Y`Y'6fUi YfY]Yb'`Y[Yb'K Yfh'Ui Z
hfUX]h]cbY``Y'6fUi a Yh\cXYb"'9]b'6Ygi W\`]b'Y]bYf'XYf'`c\_U`Yb
6fUi YfY]Ybž'k]Y'ni a '6Y]gd]Y``XYf'6fUi YfY]'?Ò\`Yfž'V]YhYh'X]Y
; Y`Y[Yb\Y]hž'X]Y'j YfgW\]YXYbYb'6]YfgcfhYb'ni 'dfcV]YfYb'i bX'ni
YfZU\fYbž'k]Y'XUg'6]Yf'\Yf[YghY``h'k]fX"

- 6]ghfc'Fcggc.'6Y\_Ubbh'ZØf'gY]bY'\YfjcffU[YbXYb]hU`]Yb]gW\Yb'; Yf]W\hY'ibX'Y]bY'[Ya Øh`]W\Y'5ha cgd\ÀfY"
- 5dZY`k Y]b'Ghi VY.'9]b'hfUX]h]cbY``Yg'\Ygg]gW\Yg
   K ]fhg\Ui g'a ]h'hmd]gW\'fY[]cbU`Yb'; Yf]W\hYb'i bX'Y]bYf
   hc``Yb'5i gk U\``Ub'5dZY`k Y]bYb"
- FYghUi fUbh'5a 'GW\`c » dUf\_. '6]YhYh'Y]bY'\_fYUh]j Yž gU]gcbU`Y'?ØW\Y'i bX'`]Y[h']b'Y]bYf'gW\`ObYb'l a [YVi b["

8 c W 'b ] W h'bi f'X Ug'9ggY b']gh'Y]b'<][\`][\hžgcbXYfb'Ui W 'X]Y
Y]bn][ Ufh][ Yb'J YfUbghU`hi b[ Ybž'X]Y']b'XYf'FY[ ]cb'ghUhhZ]bXYb"
: YghYž'X]Y'g]W 'XYf'; Ughfcbca ]Y'k ]Xa Ybž'g]bX'gY\f'VY`]YVh''8 Ug'
; fc»!; YfUi Yf'K Y]bZYgh'n]Y\h''YXYg'\J\f'nU\`fY]W Y'6Ygi W Yf
Ubž'i a '`c\_U`Y'K Y]bY'i bX'\_Ògh`]W Yg'9ggYb'ni '[ Yb]Y»Yb''<]Yf
\_`ObbYb'G]Y'a ]h': fYi bXYb'cXYf': Ua ]`]Y']b'[ YgY``][ Yf'Fi bXY'X]Y
J ]Y`ZU`h'XYf'fY[ ]cbU`Yb'K Y]b\_i `hi f'Yf`YVYb''

: Øf:X]Y:BUgWk\_UhnYb:[]Vh'Yg:X]Y:ghÀXh]gWkYb:7UZÅgž:X]Y:Y]bY
VfY]hY:DU`YhhY:Ub:gY`Vgh[Ya:UWkhYb:HcfhYb:ibX:?iWkYb:UbV]YhYb"
9]b'VYgcbXYfYf'; Y\Y]a:h]dd']gh'XUg'7UZÅ'JUfY`Už'kc'G]Y
Ui:h\Ybh]gWkY'\Ygg]gWkY'?iWkYbgdYn]U`]hÀhYb'dfcV]YfYb'\_ObbYb'
j cb'5dZY`\_iWkYb'V]g'\]b'ni'GhfYi:gY`\_iWkYbž'YXYg'GhØW\_']gh'Y]b
; Ybi:qq°

Ni `XYb`\_i`]bUf]gWXYb'; Y\Y]a b]ggYb'[Y\ÒfYb'Ui WX`X]Y``c\_U`Yb A Àf\_hYž'X]Y'Zf]gWXY`DfcXi \_hY`X]fY\_h'j cb'6Ui Yfb'UbV]YhYb''8Yf K cWXYba Uf\_h']b'; fc»!; YfUi `]gh'Y]b'k U\fYg'DUfUX]Yg'ZØf : Y]bgWXa YW\_Yf''8cfh'Z]bXYb'G]Y'U``Yg'j cb'Zf]gWXYa 'CVgh'i bX; Ya ØgY'V]g'\]b'ni `fY[]cbU`Yb'?Ògh`]WX\_Y]hYb'k]Y'K i fgh'i bX?ÀgY'''9]b'6Ygi WX`]gh'Y]b'A i ggži a `XYb'Ui h\Ybh]gWXYb; YgWXa UW\_XYf'FY[]cb'ni `Yf`YVYb''

; Yf]W\h	6YgWXfY]Vib[	9a dZc\`YbY
		6Y[`Y]hi b[
<ubx_àgʻa ]h'a="" g]_<="" i="" th=""><th>9]bʻa ]`XYf</th><th>6Ui YfbVfchž</th></ubx_àgʻa>	9]bʻa ]`XYf	6Ui YfbVfchž
	EiUfÀgY a ]h	5dZY`kY]b
	Nk]YVY`bž'9gg][ 'i bX	
	2 `	
; fØbY'Gc»Y	?fÀi hYfgUi WY'Ui g	; Y_cW\hY`?UfhcZZY`bž
	g]YVYb <sup>:</sup> ?fÀi hYfb	9]Yf
6]Yf'Ui g'XYf'FY[]cb	HfUX]h]cbY``	< Yfn\UZhYgʻ9ggYb
	[YVfUihYg <sup>.</sup> 6]Yf	

8]Y'\_i`]bUf]gWXYb'; Y\Y]a b]ggY'j cb'; fc\*!; YfUi 'i bX'I a [YVi b[k YfXYb'G]Y'g]WXYf`]WX'VY[Y]ghYfb"'9[U`ž'cV'G]Y'Y]b'YfZU\fYbYf
: Y]bgWXa YW\_Yf'g]bX'cXYf'Y]bZUWX'bi f'X]Y'fY[]cbU`Yb
GdYn]U`]hÀhYb'Ui gdfcV]YfYb'a ÒWXhYbž'X]Y'GhUXh'i bX']\fY
I a [YVi b['V]YhYb'i bnÀ\`][Y'A Ò[`]WX\_Y]hYbž'i a 'X]Y
; YgWXa UW\_g\_bcgdYb'ni 'j Yfk Ò\bYb"'@UggYb'G]Y'g]WX'j cb'XYf
J]Y`ZU`h'XYf'5fca Yb'ØVYffUgWXYb'i bX'[Yb]Y\*Yb'G]Yž'k Ug'X]Y
FY[]cb'ni 'V]YhYb'\Uh°

# < ]ghcf]gW\Y'GW\AhnY'i bX'\_i `hi fY``Y < ][ \ `][ \ hg</pre>

• 9j Ub[Y`]gWXY'GhUXh\_]fWXY'; fc»!; YfUi . 8]Y

GhUXh\_]fWXYž'Ui WX`VY\_Ubbh'U`g` GhUXh\_]fWXY'ni a '<Y]`][Yb?fYi n ž']gh'Y]b`VYY]bXfi W\_YbXYg`6Y]gd]Y``ZØf`X]YbYi [ch]gWXY`5fWX]hY\_hi f`XYg`%- "`\*JJ\f\i bXYfhg"`G]Y`k i fXY]b`XYb`\*JJ\fYb`%,, (`V]g`%,, +`YfVUi h'i bX`]gh'b]WXh'bi f`Y]bCfh'XYg`; `Ui VYbgž'gcbXYfb`Ui WX`Y]b`k]WXh][Yg`\_i `hi fY``YgNYbhfi a `XYf`GhUXh"

- 8 Ug'U`hY 'F Uh\ Ui g. '9]b'k Y]hYfYg'UfW\]hY\_hcb]gW\Yg
  < ][\`][\h']gh'XUg'U`hY 'F Uh\ Ui gž'XUg']a '\\\J\f'\%\* +\$'YfVUi h
  k i fXY"'9g'`]Y[h']a '< YfnYb'XYf'GhUXh'i bX']gh'VY\_Ubbh'ZØf
  gY]bY'\]ghcf]gW\Y': UggUXY'i bX'XUg'k i bXYfgW\`ObY
  : UW\k Yf\_"'< Yi hY'VY\YfVYf[h'Yg'j YfgW\]YXYbY'6Øfcg'i bX
  X]Y'J Yfk U`hi b['XYf'GhUXh"</p>
- xi X]gWX Yf: f]YX\cZ. '9]bY'k ]WXh][Y'GhÀhhY'XYf'9f]bbYfi b[ ]gh'XYf''ØX]gWXY': f]YX\cZž'XYf']a '%- "'>J\f\i bXYfh'Ub[Y'Y[h k i fXY"'9f']gh'Y]b'k ]WXh][Yf'HY]''XYf'; YgWX]WXhY'XYf 'ØX]gWXYb'; Ya Y]bXY']b'; fc»!; YfUi 'i bX'V]YhYh'9]bV`]W\_Y ]b'X]Y'\_i 'hi fY'`Y'J]Y`ZU'h'XYf'GhUXh"
- < Y]a Uha i gYi a ; fc »!; YfUi . : Øf X]Y Yb][ Ybž X]Y g]WW ZØf X]Y ``c \_U`Y ; YgWW ]WW hY `]bhY fYgg]Y fYbž ]gh XUg < Y]a Uha i gYi a `Y]b A i gg" < ]Yf k YfXYb '9I dcbUhY ni f GhUXh[ YgWW ]WW hYž XYf ``AbX`]WW Yb 'HfUX]h]cb i bX XYf < UbXk Yf\_g\_i bgh df AgYbh]Yfh"</p>

9]b'k Y]hYfYf'VYa Yf\_Ybgk YfhYf'C fh']gh'XUg'< Ygg]gWX Y @UbXYgh\YUhYf. Bi f'Y]bY'\_i fnY': U\fh'j cb'; fc\*!; YfUi 'YbhZYfbh ]b'8 Ufa ghUXhž'n]Y\h'XUg'H\YUhYf'\_i `hi fY```\*bhYfYgg]YfhY'Ui g'XYf [YgUa hYb'FY[]cb'Ub"'9g'V]YhYh'Y]bY'J]Y`nU\``j cb'5i ZZØ\fi b[Ybž XUfi bhYf'CdYfbž'GWXUi gd]Y`Y'i bX'A i g]WU`g"'8]Y'\_i `hi fY``Yb JYfUbghU`hi b[Yb']a 'H\YUhYf'g]bX'cZh'Ui gj Yf\_Ui Zhž'XU\Yf']gh'Yg fUhgUa ž']a 'JcfUi g'ni 'Vi WXYb"

### ?i `hi fY``Y J YfUbghU`hi b[ Yb i bX : YghY

 $8 ] Y `GhUXh'; fc > !; YfUi `]gh'Ui W\ `VY_Ubbh'ZØf'] \ Y `YVYbX] [ Y ?i `hi fgnYbYž'X] Y `g] W\ `]b `Y]bYf'J ] Y `nU\ `'j cb 'J YfUbghU`hi b [ Yb 'i bX : YghYb'k ] XYfgd] Y [ Y`h'' Ni 'XYb' < <math>O$  Ydi b\_hYb'nÀ\ `Yb.

• ; fc»!; YfUi Yf'K Y]bZYgh. '\XXYg'\J\f']a 'GYdhYa VYf

j Yfk UbXY`h'g]W\'X]Y'GhUXh']b'Y]b'GW\Ui ZYbghYf'ZØf
fY[]cbU`Y'K Y]bY'i bX'\_i `]bUf]gW\Y'?Ògh`]W\\_Y]hYb"
6Ygi W\Yb'G]Y'X]Y'GhÀbXY'`c\_U`Yf'K ]bnYf'i bX'[Yb]Y»Yb
G]Y'XUg'Ni gUa a Ybgd]Y`'j cb'[i hYa 'K Y]b'i bX'\Yfn\UZhYb
GdY]qYb"

- : f]hn`UfYf`8fUW\YbZYgh. '9]b`k Y]hYfYg`ZUgn]b]YfYbXYg
  9fY][ b]g`]gh`XUg`8fUW\YbZYghž`XUg`: Ua ]`]Yb`i bX`?]bXYf
  Ubn]Y\h"'9g`k YfXYb`nU\`fY]W\Y`5\_h]j ]hÀhYb`i bX`K cf\_g\cdg
  Ub[ YVchYbž`VY]`XYbYb`[ fc»Y`i bX`\_`Y]bY
  8fUW\Yb`]YV\UVYf`]\fY`gY`Vgh[ YVUi hYb`8fUW\Yb`ghY][ Yb
  `UggYb`\_ÒbbYb"
- ?i bgh! i bX ?i `hi fZYgh]j U`. '8]YgYg'VY`]YVhY : Ygh]j U` Vf]b[h?Øbgh`Yf'i bX ?i bgh`]YV\UVYf'ni gUa a Yb"'<]Yf k YfXYb ``c\_U`Y'?Øbgh`Yf'dfÀgYbh]Yfhž'Yg'[]Vh'@j Y!A i g]\_ž H\YUhYfUi ZZØ\fi b[Yb'i bX'\_fYUh]j Y'K cf\_g\cdg'ZØf'¾ b[ i bX'5`h"

8]Y`\]ghcf]gWXY`5`hghUXh'j cb; fc»!; YfUi ža ]h']\fYb`WXUfa UbhYb; UggYb'i bX'[i h'Yf\U`hYbYb'; YVÀi XYbž'`ÀXh'ni 'Y]bYa
YbhgdUbbYbXYb'GdUn]Yf[Ub['Y]b"'<]Yf'\_ÒbbYb'6Ygi WXYf'X]Y
5ha cgd\ÀfY`XYf'JYf[Ub[Yb\Y]h'gdØfYb'i bX'X]Y'; YgWX]WXhY
X]YgYf'VYgcbXYfYb'GhUXh']b'g]WX'Ui ZbY\a Yb"'9]b][Y'XYf'GhfU»Ybž
X]Y`G]Y'i bVYX]b[h'Yf\_i bXYb'gc``hYbž'g]bX.

- ? ]fWX ghfU» Y. '8 ]YgY 'GhfU» Y ']gh 'VY\_Ubbh 'ZØf']\fY
  a U`Yf]gWX Yb ': UWX k Yf\_\Ài gYf'i bX 'X]Y '\ ]ghcf]gWX Y
  GhUXh\_]fWX Yž'X]Y 'Y]bYb 'gWX ÒbYb '5bV`]W\_'V]YhYh"
- 5 a 'A Uf\_hd`Uhn.'8Yf'nYbhfU`Y'A Uf\_hd`Uhn']gh'Y]b

  HfYZZdi b\_h'ZØf'9]b\Y]a ]gWXY'i bX'; ÀghY'i bX'k ]fX'j cb

  nU\`fY]WXYb'7UZÅg'i bX'; YgWXÀZhYb'i a [YVYbž'X]Y'ni a

  JYfk Y]`Yb'Y]b`UXYb"
- FÒa YfghfU» Y. '8]YgY'\]ghcf]gW\Y'GhfU» Y'YfnÀ\`h'X]Y ; YgW\]W\hY'XYf'fÒa ]gW\Yb'6Yg]YX`i b[']b'XYf'FY[]cb'i bX

### : Un]h

8]Y`\]ghcf]gw\Y`i bX`\_i`hi fY``Y`J]Y`ZU`h'j cb; fc»!; YfUi 'a UW\h'X]Y GhUXh'ni 'Y]bYa 'Y]bn][ Ufh][ Yb`N]Y``ZØf`FY]gYbXY"'9[ U`ž`cV`G]Y`g]W\ZØf'; YgW\]W\hYž'?i bgh'cXYf`Y]bZUW\'bi f`ZØf`X]Y``c\_U`Y`?i`hi f]bhYfYgg]YfYbž'; fc»!; YfUi '\À`h'i bj Yf[ Ygg`]W\Y'9f`YVb]ggY`ZØf YXYb`VYfY]h"'9]b`6Ygi W\`]gh'Y]bY`k i bXYfVUfY`; Y`Y[ Yb\Y]hž']b`X]Y JYf[ Ub[ Yb\Y]h'Y]bni hUi W\Yb`i bX`X]Y`\_i`hi fY``Yb`GW\ÀhnY`X]YgYf W\Ufa UbhYb`GhUXh'ni 'YbhXYW\_Yb"

# B Uhi fgW\AhnY. DUf\_g'i b $X'9f\c$ i b[g[YV]YhYYf\_i bXYb

; fc»!; YfUi ']gh'b]Wh'bi f'Y]bY'GhUXh'j c``Yf'; YgWk]WkhY'i bX
\_i `]bUf]gWkYf'? Ògh`]Wk\_Y]hYbž'gcbXYfb'V]YhYh'Ui Wk'Y]bY'J]Y`nU\`
Ub'bUhi fgWk ÒbYb'DUf\_g'i bX'9f\c`i b[g[YV]YhYbž'X]Y'Yg'k Yfh'g]bXž
Yf\_i bXYh'ni 'k YfXYb"'9[U`ž'cV'G]Y'Y]b'9]b\Y]a ]gWkYf'g]bX'cXYf'X]Y
GhUXh'VYgi WkYb' 'X]Y'[fØbYb'CUgYb']b'i bX'i a '; fc»!; YfUi 'g]bX
]XYU`Y'CfhYž'i a 'g]Wk'ni 'Yf\c`Yb'i bX'X]Y'BUhi f'ni '[Yb]Y»Yb"

 $9]b VYgcbXYfg VY`]YVhYf Cfh ZØf GdUn]Yf[Ab[Y'ibX:fY]nY]hU_h]j ]hAhYb ]gh XYf GhUXhd Uf_; fc »!; YfUi "8]YgYf dUf_Ufh][Y'6YfY]W ]gh XYf dYfZY_hY F ØW_ni [gcfh ZØf : Ua]`]Yb z <math>\approx$  [[Yf i b X'B Uhi f`]YV\UVYf A]h gY]b Yb j YfgW ]YXYb Yb K Ub XYfk Y[Yb z Y]b Ya Gd]Y`d`Uhn i b X'n U\`fY]W Yb G]hn[Y`Y[Yb\Y]hYb ``AXh Yf XUni 'Y]b z X]Y Zf]gW Y @ Zh ni [Yb]Y » Yb i b X'g]W ]b XYf B Uhi f ni 'Yb hgd Ub b Yb "=a :: fØ\`]b ['j Yfk Ub XY`h g]W XYf DUf\_']b Y]b '6`i a Yba YYf i b X'n]Y\h n U\`fY]W Y 6 Ygi W Yf Ub z X]Y `ZY GW Òb Y]h XYf B Uhi f vYk i b XYfb 'a ÒW hYb"

VY`]YVhYf`Gdch`ZØf`<i bXYVYg]hnYfž`X]Y`]\fY`J]YfVY]bYf`Ui gZØ\fYba OW\hYb"

 $: \varnothing f^*X]Y^*Yb][Yb\check{z}^*X]Y^*Yhk Ug^*5VYbhYi Yf^*gi WkYb\check{z}^*]gh^*XYf^*K U^*X^*j cb ; fc **!; YfUi ^*XYf^*f]Wkh][Y^*Cfh^**8]Y^*i a ^*]Y[YbXYb^*K Å^*XYf^*V]YhYb nU\^*fY]WkY^*K UbXYf!^*i bX^*F UXk Y[Y\check{z}^*X]Y^*g]Wk^*Xi fWk^*a U^*Yf]gWkY @UbXgWk UZhYb^*gWk^*Ab[Y^*b^**<]Yf^*_ObbYb^*G]Y^*b]Wkh^*bi f^*X]Y^*Fi \Y^*XYf BUhi f^*[Yb]Y^*Yb\check{z}^*gcbXYfb^*Ui Wk^*X]Y^*\Y]a ]gWkY^*: `cfU^*i bX^*: Ui bU YbhXYW_Yb^**<U^*hYb^*G]Y^*5i ggWkUi ^*bUWk^*J^*O[Y^*b\check{z}^*<]fgWkYb^*i bX UbXYfYb^*K ]^*Xh]YfYb\check{z}^*X]Y^*]b^*X]YgYa ^*gWk^*ObYb^*K U^*X^*YVYb^*$ 

## : fY]nY]ha Ò[`]WX\_Y]hYb i b X 5\_h]j ]hÀhYb

±b; fc»!; YfUi '[]Vh'Yg'nU\`fY]W\Y': fY]nY]ha Ò[`]W\\_Y]hYbž'X]Y'Yg 6Ygi W\Yfb'Yfa Ò[`]W\Ybž'X]Y'BUhi f'U\_h]j 'ni 'Yf`YVYb"'8Uni [Y\ÒfYb.

- K UbXYfi b[Yb. '9bhXYW\_Yb'G]Y'X]Y'[i h'Ui g[YgWX]`XYfhYb K UbXYfk Y[Y'Xi fWX'XYb'GhUXhdUf\_'i bX'X]Y'i a `]Y[YbXYb K À`XYf"
- FUXZU\fYb.; Yb]Y»Yb`G]Y`Y]bY`YbhgdUbbhY`FUXhcif Ybh`Ub[`XYf`FUXkY[Yž`X]Y`gckc\``ZØf`5bZÀb[Yf`U`g`UiW\ ZØf`YfZU\fYbY`FUXZU\fYf`[YY][bYh`g]bX"
- D]W\_b]W\_Yb. DUW\_Yb G]Y → fY @YW\_YfY]Yb Y]b i bX [Yb]Y» Yb G]Y Y]b D]W\_b]W\_ ]b Y]b Yf XYf j ]Y Yb; fØbUb`U[Yb"
- H]YfVYcVUW hi b[Yb. '<U`hYb'G]Y' ⇒ fY'?Ua YfU'VYfY]hži a gY`hYbY'H]YfUfhYb'ni 'Zchc[fUZ]YfYbž'X]Y']b'XYf'I a [YVi b[ 'YVYb"

8]Y 'GhUXh'j YfZØ[ h'Ui WX 'ØVYf'a Y\fYfY'GdcfhY]bf]WX hi b[ Yb'i bX Gdcfhd'ÀhnYž'X]Y 'U\_h]j Y '9f\c`i b[ ']b'XYf'BUhi f'Yfa Ò[ `]WXYb"'9[ U`ž cV'G]Y'[ YfbY': i » VU``ž'HYbb]g'cXYf'UbXYfY'GdcfhUfhYb'Ui gØVYbž X]Y'A Ò[ `]WX\_Y]hYb'g]bX'j ]Y`ZÀ`h][ 'i bX'V]YhYb'Ui WX'X]Y; Y`Y[ Yb\Y]hž'bYi Y'@Yi hY'\_YbbYbni `YfbYb"

## 6YgcbXYfYBUhifgWXihn[YV]YhY

BYVYb`XYb`GhUXhdUf\_g`[]Vh`Yg`]b`XYf`I a [YVi b['j cb'; fc»!; YfUi Ui W\`gdYn]Y``Y`BUhi fgW\i hn[YV]YhYž`X]Y`Y]bYb`6Ygi W\`k Yfh g]bX"`8Uni `nÀ\`h`VY]gd]Y`gk Y]gY`XUg`BUhi fgW\i hn[YV]Yh K cc[VUW\ ž`k Y`W\Yg'j YfgW\]YXYbY`@YVYbgfÀi a Y`ZØf`: `cfU i bX`: Ui bU`gW\Øhnh"`9g`]gh`Y]b`<chgdch`ZØf`BUhi f`]YV\UVYf`i bX Cfb]h\c`c[Ybž`X]Y`X]Y`5fhYbj]Y`ZU`h`gck]Y`X]Y`i bVYfØ\fhY

BUhifgWkihn[YV]Yh	$K \ ]WX h][ Y \ 5fhYb$	6YgcbXYf\Y]hYb
K cc[VUW	JÒ[Y`ž'5a d\]V]Yb	≠XYU`ZØf
		Jc[Y`VYcVUW\hib[Y
		b
< ]b hY fY 'Ÿ W_Y f	DZUbnYbUfhYbž	K ]YgYb`UbXgW\UZhž
	GWNa YhhYf`]b[Y	@Y\fdZUXY

K Yf'X]Y'BUhi f'`]YVhž'\_Ubb'Ui W\'Ub'[YZØ\fhYb' BUhi fk UbXYfi b[Yb'hY]`bY\a Ybž'X]Y'j cb'YfZU\fYbYb BUhi fgW\i hnZØ\fYfb'Ub[YVchYb'k YfXYb"'8]YgY'Hci fYb'[YVYb 9]bV`]W\_Y']b'X]Y'`c\_U`Y': `cfU'i bX': Ui bU'i bX'V]YhYb'Y]bY'hc``Y ; Y`Y[Yb\Y]hž'a Y\f'ØVYf'XYb'BUhi f!'i bX'I a k Y`hgW\i hn'ni YfZU\fYb"

Ni gàhn`]W\ k YfXYb fY[Y`a à»][Y'J YfUbghU`hi b[Yb']b XYb DUf\_g j YfUbghU`hYhžj cb CdYb!5]f!?cbnYfhYb ØVYf?]bXYfZYghY'V]g`\]b ni ?i bgha Àf\_hYb"8]YgY'9j Ybhg ZÒfXYfb b]W\ h'bi f'XUg; Ya Y]bgW\ UZhg[YZØ\`žgcbXYfb 'Ui W\ X]Y'K YfhgW\ àhni b['ZØf'X]YBUhi f'i bX'X]Y'I a [YVi b['j cb'; fc»!; YfUi "

K Ybb'G]Y'; fc»!; YfUi 'VYgi WXYbž'j Yf[YggYb'G]Y'b]WXhž'Y]b][Y'NY]h]b'XYb'[fØbYb'CUgYb'XYf'GhUXh'ni 'j YfVf]b[Yb"8]Y'A]gWXib['Ui g 9f\c`i b[ž'gdcfh`]WXYb'5\_h]j]hÀhYb'i bX'BUhi f'a UWXh'XYb'6Ygi WXXYf'DUf\_g'i bX'9f\c`i b[g[YV]YhY'ni 'Y]bYa 'i bj Yf[Ygg`]WXYb 9f`YVb]g"

# GdUbbYbXY'J YfUbghU`hi b[ Yb'i bX': YghY']a >U\fYgj Yf`Ui Z

; fc»!; YfUi žY]bY'GhUXh'[YdfÀ[h'j cb'\]ghcf]gW\Yf'i bX'\_i `hi fY``Yf J]Y`ZU`hž'V]YhYh'XUg'[UbnY'\\f\ØVYf'Y]bY'J]Y`nU\``j cb JYfUbghU`hi b[Yb'i bX': YghYbž'X]Y'gck c\``9]b\Y]a ]gW\Y'U`g'Ui W\6Ygi W\Yf'Ubn]Y\Yb"'\\XYg'9j Ybh']gh'Y]b': YbghYf']b'X]Y'`c\_U`Y?i `hi fž'HfUX]h]cbYb'i bX'XUg'`YVYbX][Y'; Ya Y]bgW\UZhg`YVYb"'<]Yf g]bX'Y]b][Y'XYf'\Yfj cfghYW\YbXghYb'JYfUbghU`hi b[Ybž'X]Y'G]Y']b; fc»!; YfUi 'b]W\hij YfdUggYb'gc``hYb.

• ; fc»!; YfUi Yf'GhUXhZYgh. '8]YgYg'A\f`]W\Y': Ygh'Z]bXYh ]a '5i [i gh'ghUhh'i bX'j Yfk UbXY`h'X]Y'=bbYbghUXh']b'Y]bY `YVYbX][Y': Ygha Y]`Y"A]h'Aig]\_ž'j YfgW\]YXYbYb 9ggYbgghAbXYb'i bX'I bhYf\U`hi b['ZØf'U``Y'5`hYfg[fi ddYbV]YhYh'XUg'GhUXhZYgh'Y]bY'ki bXYfVUfY'; Y`Y[Yb\Y]hž'X]Y `c\_U`Y'; Ya Y]bqW\UZh'ni 'Yf`YVYb"

- K Y]\bUWk hga Uf\_h. \*\D`XYf`5Xj YbhgnY]h`YfghfU\`h`; fc»!
   ; YfUi ']a 'ZYgh`]WkYb'; `Ubn`XYg`K Y]\bUWk hga Uf\_hYg" < ]Yf
   \_\ObbYb`6Ygi WkYf`\UbX[YZYfh][hY'; YgWkYb\_Yž'; `Ø\kY]b
   i bX`hfUX]h]cbY``Y'@YW\_YfY]Yb'[Yb]Y»Ybž'k À\fYbX'g]Y'g]Wk
   ]b`XYf`ZYgh`]WkYb`5ha cgd\ÀfY'j Yf`]YfYb"</li>
- : fØ\`]b[gYfk UW\Yb. '8]YgYg': Ygh'a Uf\_]Yfh'XYb'6Y[]bb XYf'k Àfa YfYb'A cbUhY'i bX'Z]bXYh'YXYg'\\f']a 'A Àfn'cXYf 5df]``ghUhh" A ]h'Y]bYa 'Vi bhYb'Dfc[fUa a 'Ui g'?cbnYfhYbž GhÀbXYb'j cb'`c\_U`Yb' < ÀbX`Yfb'i bX'5\_h]j ]hÀhYb'ZØf'?]bXYf ]bhY[f]Yfh'Yg'X]Y'ghÀXh]gW\Y'; Ya Y]bgW\UZh'Ui Z'VYgcbXYfY K Y]qY"
- : Yf]Ybgd]Y`Y. '6YgcbXYfg']b'XYb'Gca a YfZYf]Yb'k YfXYb
  ]b'; fc»!; YfUi 'Y]bY'FY]\Y'j cb'J YfUbghU`hi b[Yb'ZØf'?]bXYf
  i bX'≯[YbX`]WXY'Ub[YVchYb"'8]YgY': Yf]Ybgd]Y`Y'V]YhYb
  j YfgWX]YXYbY'5\_h]j ]hÀhYbž'j cb'Gdcfh'ni '\_fYUh]j Yb
  K cf\_g\cdgž'i bX'ZÒfXYfb'X]Y'gcn]U`Y'♣bhYfU\_h]cb'i bhYf'XYb
  'Øb[YfYb'6Yk c\bYfb"
- ?i `hi fk cWX Yb. =a '< YfVgh'VY[Y\Yb'X]Y'?i `hi fk cWXYb Y]bY'NY]h'XYg'5i ghUi gWX Yg'i bX'XYf'?fYUh]j ]hÀh']b'; fc»!; YfUi "'8]Y'J YfUbghU`hi b['j YfV]bXYh'`c\_U`Y'?Øbgh`Yf'a ]h XYb'6Øf[Yfb'i bX'VY]b\U`hYh'j YfgWX]YXYbY'\_i `hi fY``Y 8UfV]Yhi b[Ybž'5i gghY``i b[Yb'i bX'K cf\_g\cdg"</p>

9]bY'VYgcbXYfY'HfUX]h]cbžX]Y']b'; fc»!; YfUi '[YdZY[h'k]fXžg]bX X]Y'GhfU»Yb!'i bX'GW\ØhnYbZYghYžX]Y'X]Y'; Ya Y]bgW\UZh ni gUa a YbgW\kY]»Yb'i bX'XYb'Ni gUa a Yb\U`h'gh\Af\_Yb"'5i W\'X]Y'\A\f`]W\Yb'A \Af\_hYž'k]Y'XYf'K cW\Yba Uf\_hž'V]YhYb'b]W\h'bi f'Zf]gW\Y DfcXi \_hYž'gcbXYfb'Ui W\'Y]b'Vi bhYg'HfY]VYbž'VY]'XYa 'g]W\AYbgW\Yb'Ui ghUi gW\Yb'i bX'XUg``c\_U`Y'@YVYb'[Yb]Y»Yb"

9]bY'VYY]bXfi W\_YbXY', VYfg]W\h'ØVYf'X]Y''À\f`]W\'ghUhhZ]bXYbXYb J YfUbghU`hi b[Yb'Z]bXYb'G]Y']b'XYf'Zc`[YbXYb'HUVY``Y.

JYfUbghU`hi b[	AcbUh	< ][ \`][ \ hg
; fc»!; YfUi Yf	5i [igh	Aig]_ž'9ggYbž
GhUX hZY gh		lbhYf\U`hib[
K Y]\bUW\hga Uf_h	8YnYa VYf	; `Ø\kY]bž
		?i bgh\UbXk Yf_ž
		ZYgh`]W\Y
		5ha cgd\ÀfY
: fØ\`]b[gYfkUW\Yb	AÀfn#5df]`	?cbnYfhYžGhÀbXYž
		?]bXYfU_h]j]hÀhYb
: Yf]Ybgd]Y`Y	Gca a YfZYf]Yb	Gdcfhž'K cf_g\cdgž
		gcn]U`Y`+bhYfU_h]cb
?i`hifkcWXYb	< Y f V g h	?Øbgh`Yfž
		5i gghY``i b[Ybž

9]b'k Y]hYfYg'VYa Yf\_Ybgk YfhYg'9fY][ b]g']gh'XYf' HU[ 'XYf'c ZZYbYb HØf 'XYf'X]j YfgYb'J YfY]bY']b'; fc»!; YfUi "'<]Yf'ÒZZbYb'`c\_U`Y Gdcfh!ž'Aig]\_!'ibX'?i`hifgWXUZZYbXY']\fY'HØfYb'ibX'`UXYb'X]Y 2 ZZYbh`]WX\_Y]h'Y]bž']\fY'5\_h]j ]hÀhYb'\_YbbYbni 'YfbYb''8]Yg']gh'b]WXhbif'Y]bY'k]``\_ca a YbY'; Y`Y[Yb\Y]hž'bYiY'<cVVmg'ni 'YbhXYW\_Ybž gcbXYfb'Ui WX'Y]bY'\Yfj cffU[YbXY'A Ò[`]WX\_Y]hž'g]WX'a]h'XYf; YaY]bgWXUZh'ni 'jYfV]bXYb"

 $= JYf[\ Y]WX \ ini \ [\ fO) \ YfYb \ GhÀXhYb \ V]YhYh; \ fc > !; \ YfUi \ Y]bY \ WX Ufa UbhY \ = bh]a ]hÀhi bX \ X]Y \ A O[\ ]WX _Y]hŽ \ Ub \ JYfUbghU \ hi b[ YbhY] \ ini bY \ a YbŽ \ X]Y \ cZh Y]bYb \ dYfgOb \ ]WX \ YfYb \ Hci WX \ \ UVYb \ CZh \ g]bX \ X]Y \ JYfUbghU \ hi b[ Yb j cb : fY]k ] \ \ [\ Yb cf[ Ub]g]YfhŽ \ k Ug \ XUg \ ; \ Ya Y]bgWX \ UZhg[ YZØ\ \ k Y]hYf \ ghÀf_h \ 8 Yg\ U \ V \ g]bX \ X]Y \ 9]b\ Y]a ]gWX \ Yb \ ghc \ n \ XUfUi \ ZŽ \]\ fY \ GhUXh \ i bX \]\ fY \ HfUX]h]cbYb \ ini \ ZY [Yfb \ \]$ 

K Ybb 'G]Y 'U`gc 'XUg'bÀW ghY 'A U` ']b 'XYf FY[]cb 'g]b Xž'dfØZYb 'G]Y XYb 'J YfUbghU`hi b[g\_U`YbXYf'j cb '; fc»!; YfUi "'5i Z[fi bX XYf XmbUa]gWXYb'; Ya Y]bgWX UZh'\_ÒbbYb 'g]WX 'D`ÀbY 'ÀbXYfbž'U`gc \U`hYb 'G]Y '5i ggWX Ui 'bUWX '\_i fnZf]gh][Yb '5b\_ØbX][i b[Yb": Øf k Y]hYfY \*\DZcfa Uh]cbYb 'ni 'VYj cfghY\YbXYb 'J YfUbghU`hi b[Yb'i bX ni f'X]fY\_hYb '6i WXi b[ž'VYgi WXYb 'G]Y 'X]Y 'cZZ]n]Y``Y 'K YVgY]hY 'j cb'; fc»!; YfUi "

CVAig]\_ZYgh]j U`gž\_i`hi fY``Y`8UfV]Yhi b[Yb`cXYf`hfUX]h]cbY``Y
: YghY`; fc»!; YfUi`\Uh`ZØf`YXYb`Yhk Ugʻni `V]YhYb"`8Ug`[UbnY
\U\f`ØVYf`k]fX`\]Yf`X]Y`J]Y`ZU`h`XYg`@YVYbg`[YZY]Yfhži bX`YXYf
6Ygi W\Yf`]gh`\Yfn`]W\`Y]b[Y`UXYbž'HY]``X]YgYf``YVYbX][Yb
; Ya Y]bgW\UZh`ni `k YfXYb"`

# I bj Yf[ Ygg`]WXY 5i gZ`i [ gn]Y`Y ]b XYf I a [ YVi b[ 'YbhXYW\_Yb

; fc»!; YfUi ']gh'b]W\h'bi f'Y]bY'W\Ufa UbhY'GhUXh'Z $\emptyset$ f'g]W\ž'gcbXYfbUi W\'Y]b']XYU'Yf'5i g[Ub[gdi b\_h'Z $\emptyset$ f'j YfgW\]YXYbY'gdUbbYbXY5i gZi [gn]Y'Y']b'XYf'I a [YVi b["'9[U'ž'cV'G]Y'BUhi fž'; YgW\]W\hYcXYf'?i `hi f'gi W\Ybž'X]Y'FY[]cb'V]YhYh'Z $\emptyset$ f'YXYb'Yh\Ug"'<]Yf'g]bXY]b][Y'i bj Yf[Ygg`]W\Y'CfhYž'X]Y'G]Y']b'XYf'B\A\Y'j cb'; fc»!; YfUi Yf\_i bXYb'\_ $\emptyset$ bbYb"

 $F \setminus Y]b!A \cup [b!; YV]Yh. 9]b'_i `hi fY``Yg'9d]nYbhfi a$ 

 $8 \ Ug`F \ Y]b!A \ U]b!; \ YV]Yh`VY \ YfVYf[ h`nU \ `fY]WX Y`GhÀXhY ž`X]Y`fY]WX Ub `; \ YgWX]WX hY `i b X`? i `hi f`g]b X"`9]b`6 Ygi WX`X]YgYf`GhÀXhY``c \ b h a]WX`Ui Z`YXYb`: U``.$ 

- : fUb\_Zi fh'Ua 'A U]b. '8]Y '6Ub\_Yba Yhfcdc`Y']gh'bi f'Y]bY \_i fnY'Ni [ ZU\fh'YbhZYfbh"'6Ygi W\Yb'G]Y'XYb'F Oa Yfž'X]Y 5`hY'CdYf'i bX'X]Y'UVk YW\g`i b[ gfY]W\Y'A i gYi a gi ZYf"
- K ]YgVUXYb. 6Y\_Ubbh ZØf gY]bY H\Yfa U`ei Y``Yb'i bX X]Y VYY]bXfi W\_YbXY 5fW ]hY\_hi f"'9]b'6i a a Y``Xi fW X]Y K ]`\Y`a ghfU» Y']gh'Y]b'A i gg°
- K cfa g. '9]bY'XYf'À`hYghYb'GhÀXhY'8Yi hgW\`UbXgž'VYfØ\a h ZØf'XYb'K cfa gYf'8ca 'i bX'X]Y'[YgW\]W\hghfÀW\h][Yb GhÀhhYb'fi bX'i a 'X]Y'B]VY`i b[Yb!GU[Y"

### BUhifgW\Ob\Y]hYb. 8]YIa[YVib[YbhXYW\_Yb

 $: \emptyset f `B Uhi f`] Y V \setminus U V Y f `V ] Y h Y h `X ] Y `I a [ Y V i b [ `j cb'; fc » !; Y f U i n U \ `f Y ] W X `A O [ `] W _Y ] h Y b ž `X ] Y `Z f ] g W Y `@ Zh' i b X `X ] Y `i b V Y f Ø \ f h Y B Uhi f `n i `[ Y b ] Y » Y b " < ] Y f `q ] b X `Y ] b ] [ Y `Y a d Z Y \ `Y b g k Y f h Y `C f h Y .$ 

- B Uhi fgWX i hn[YV]Yh? Ø\\_cdZ!?bcV`cWXgUi Y. '9]b
   DUfUX]Yg'ZØf'Jc[Y`VYcVUWXhYf'i bX'K UbXYfYf"'<]Yf
   \_ÒbbYb'G]Y'Y]bn][Ufh][Y': `cfU'i bX': Ui bU'VYk i bXYfb"</li>
- $8Yf^*CddYb\Y]aYf^*KU^*X.^=XYU^*Z\emptysetf^*Y]bYb^*YbhgdUbbhYbHU[^]b^*XYf^*BUhif^*; Yb]Y^*Yb^*G]Y^*X]Y^*Fi\Y^*ibX^*aUWXYb^*G]YY]bYb^*GdUn]Yf[Ub[^*XifW^*X]Y^*gWXUhh][Yb^*KY[Y"$
- 8 Y f '; f]a a gi W Y k U ` X . '9]b '\_ `Y]b Y f ž 'U V Y f 'Z Y]b Y f 'K U ` X ž X Y f 'd Y f Z Y \_h 'Z Ø f ': Ua ] `]Y b U i g Z Ø [ Y '[ Y Y] [ b Y h ']g h " ' 9 g '[ ] V h n U \ `f Y ] W Y ' K U b X Y f k Y [ Y 'i b X 'D] W \_b ] W \_d ` À h n Y "

# : cgg]`]YbghÀhhY'; fi VY'A YggY`.'9]b'l bYgWc! K Y`h\_i `hi fYfVY

 $\label{eq:bifiv} BifY]bY'\_i fnY'5i hcZU\fh'j cb'; fc*!; YfUi 'YbhZYfbh'VYZ]bXYh'g]WXX]Y'; fi VY'A YggY`ž'X]Y'U`g'Y]bY'XYf'VYXYi hYbXghYb: cgg]`]Yb`U[YfghAhhYb'XYf'K Y`h'[]`h''<]Yf'\_ObbYb'G]Y.$ 

- 8]Y'ZUgn]b]YfYbXY'; YgWX]WXhY'XYf'9fX[YgWX]WXhY'i bX9j c`i h]cb'Yf\_i bXYb"
- 8 Ugʻ6 Ygi WX Yfn Ybhfi a 'VYg] WX h] [Ybž'X Ugʻ] bhYfU\_h] j Y 5 i gghY``i b[Yb'V] YhYh"
- 5b'gdYn]Y``Yb': Ø\fi b[Yb'hY]`bY\a Ybži a 'a Y\f'ØVYf'X]Y : cgq]`]YbZ bXY'ni '`YfbYb"

HYW b]\_ibX; YgW ]W hY 8 Ug HYW b]\_a i gYia ]b

### G]bgY]a

 $8 \ Ug'HYWXb]_a \ i \ gYi \ a \ ']b'G]bgYY]a \ ']ghY]b'UVgc'i \ hYf'<]h'ZØf \\ HYWXb]_VY[Y]ghYfhY''A ]h'ØVYf'' "$$$ 'YI dcb]YfhYb'HY]Yb'V]YhYh'XUg \\ A i gYi a 'ZUgn]b]YfYbXY'9]bV']W_Y']b'X]Y'K Y'h'XYf'HYWXb]_'i bX \\ A cV]`]hAh'''<]Yf'_ObbYb'G]Y.$ 

- 5YfcgdUWY!HYWXb]\_`\Ui hbU\`Yf`YVYbž`XUfi bhYf`XUg VYfØ\a hY`7cbWcfXY!: fUWXhZi [nYi ["
- : U\fnYi [ Y'Ui g'j YfgW\]YXYbYb'9dcW\Yb'VYghUi bYbž'j ca \_`Ugg]gW\Yb'5i hc'V]g'\]b'ni 'a cXYfbYb'@\_k "
- 5b'j YfgWX]YXYbYb']bhYfU\_h]j Yb'5i gghY``i b[YbhY]`bY\a Ybž'X]Y'ZØf'\$\dig b['i bX'5`h'[YY][bYh'g]bX"

### 5 VYbhYi Yf ]a : fY]nY]hdUf\_. 9f`YVb]gdUf\_ Hf]dgXf]``

9]b'k Yb]['k Y]hYf'YbhZYfbhž'UVYf'Ui Z'YXYb': U```Y]bYb'6Ygi WX'k Yfhž ]gh'XYf'9f`YVb]gdUf\_'Hf]dgXf]``']b'XYf'BÀ\Y'j cb'7`YYVfcbb"'8]YgYf ZUa]`]YbZfYi bX`]WXY'DUf\_'V]YhYh'Y]bY'J]Y`nU\`'j cb'5hhfU\_h]cbYb.

- VYf'%\$\$:: U\f[YgW\AZhYž'X]Y'ZØf'GdUbbib['ibX'GdU\ gcf[Yb"
- 9]b'h]Yf]gW\Yf'9f`YVb]gVYfY]W\'a ]h'GhfY]W\Y`ncc'i bX'j ]Y`Yb UbXYfYb'H]YfYb"
- H\Ya Uh]gWXY'6YfY]WXYž'X]Y'XYi hgWXY'?i `hi f'i bX ; YgWX]WXhY'`YVYbX][ 'k YfXYb'`UggYb"

# K Y]bfY[]cb'F\Y]b\YggYb.'9]b': Ygh'ZØf'XYb ; Ui a Yb

 $8 ]Y K Y]bfY[]cb F Y]b YggYb ]ghVY_UbbhZØf] FY Yfj cffU[YbXYb K Y]bY i bX a U Yf]gWXYb K Y]bVYf[Y"9]b 5 i gZi [ '\]Yf\Yf'`c\bh g]WX Z k Ybb G]Y [YfbY K Y]b dfcV]YfYb i bX X]Y ``AbX`]WXY GWX Ob\Y]h [Yb]Y <math>Y$  Yb a OWX hYb.

- 6Ygi WXYb'G]Y'Y]b'Òfh`]WXYg'K Y]b[i hž'i a 'Ub'Y]bYf K Y]bdfcVY'hY]`ni bY\a Yb"
- GdUn]YfYb'G]Y'Xi fW\'X]Y']Xm``]gW\Yb'K Y]bVYf[Y'i bX
  [Yb]Y\'Yb'G]Y'X]Y'5i qq]W\h"
- Bi hnYb'G]Y'X]Y'; Y`Y[Yb\Y]hž'Ub'Y]bYa 'XYf'j]Y`Yb fY[]cbU`Yb'K Y]bZYghY'hY]`ni bY\a Yb"

### $HUVY^Y XYf 5i gZi [gn]YYibX] fYf < ][ \ ][ \ hg$

.5i gZi [ gn]Y`	_< ][ \`][ \ hg
	AigYia gi ZYf
K ]YgVUXYb	H\Yfa U`ei Y``Ybž'K ]`\Y`a ghfU»Y
; fi VY A YggY`	: cgg]`]Ybž'6Ygi W\YfnYbhfi a ž
	: Ø∖fi b[Yb
HYWNb]_aigYia'G]bg\Y]a	HYWXb]_YIdcbUhYž <sup>*</sup> 7cbWcfXYž
	]bhYfU_h]j Y'5i gghY``i b[Yb
9f`YVb]gdUf_'Hf]dgXf]``	: U\f[YgWXÀZhYžh]Yf]gWXY
	9f`YVb]ggYž'h\Ya Uh]gW\Y
	6YfY]WXY
K Y]bfY[]cbF\Y]b\YggYb	K Y]bdfcVYbž <sup>·</sup> K Y]bVYf[ Yž
	KY]bZYghY

; Ubn'[`Y]W\ž'cV'G]Y'Ub'; YgW\]W\hYž'BUhi f'cXYf'\_i`]bUf]gW\Yb; YbØggYb']bhYfYgg]Yfh'g]bXž'X]Y'FY[]cb'ia'; fc»!; YfUi '\Uh'ZØf YXYb'Yhk Ug'ni 'V]YhYb"'J Yf[YggYb'G]Y'b]W\hž'X]Y UhYa VYfUi VYbXYb'@UbXgW\UZhYb'i bX'X]Y'\_i`hi fY``Yb'GW\ÀhnYž'X]Ybi f'Y]bYb'GhY]bk i fZYbhZYfbh'g]bXž'ni '[Yb]Y»Ybž'k À\fYbX'G]YX]YgYb'HY]``8Yi hgW\`UbXg'Yf\_i bXYb'

#### 8 Y hU]`c

6Ygi WXYb G]Y i bg Ui Z Y]bY!fY]gY "XY