

# : f]hh`]b[Yb'j YfUVgWX]YXYh'`Ub[^A\f][Y ; Ya Y]bXYfAhY'a ]h'8Ub\_'i bX'9\fi b[

GYWXg'j YfX]YbhY'; Ya Y]bXYfUhga ]h[`]YXYf'j cb': f]hh`]b[YbkifXYb']b'Y]bYf'9\fib['XifWX'6Øf[YfaY]ghYf'8ca]b]W6ihnjYfUVgWX]YXYh"

±0:: f]hh`]b[Yb`ZUbX`Y]bY`VYgcbXYfY`JYfUbghU`hi b[`ghUhhž`VY]`XYf
j YfX]YbhY`A]h[`]YXYf`XYg`; Ya Y]bXYfUhg`[YY\fh`i bX
j YfUVgW\]YXYh`k i fXYb"`6Øf[Yfa Y]ghYf`8 ca]b]W6i hn`ZØ\fhY`X]Y
9\fi b[Yb`k À\fYbX`XYf``YhnhYb`G]hni b[`XYg`U`hYb`; fYa]i a g`Ui g
XYf`@Y[]g`Uhi fdYf]cXY`&\$%-`V]g`&\$&(`Xi fW\"`8]Y`FUhgW\`À[Y`i bX
XUg`9b[U[YaYbh`XYf`gW\Y]XYbXYb`FUhga]h[`]YXYf`k i fXYb
VYgcbXYfg`[Yk ØfX][hž`k cXi fW\`XYfYb`JYfX]YbghY`i a `X]Y
; YaY]bXY`]b`XYb`JcfXYf[fi bX`fØW\_Yb"

8]Y'G]hni b['VY[Ubb'a]h'XYf': YghghY``i b[ž'XUgg'Yg'ZØf'X]Y'bYi [Yk À\`hYb'A]h[`]YXYf'\_Y]bY'<]bXYfi b[g[fØbXY'ZØf']\fYb'9]bhf]hh ]b'XYb'; Ya Y]bXYfUh'[]Vh''8]Yg'YfÒZZbYhY'XYb'5bk YgYbXYb'X]Y A Ò[`]W\\_Y]hž'g]W\'Ui Z'XYb'BYi UbZUb[']b'XYf'\_ca a YbXYb 5a hgnY]h'ni 'ZfYi Yb''6Øf[Yfa Y]ghYf'6i hn'bU\a 'g]W\'YXcW\'X]Y NY]hži a 'XYb'gYW\g'V]g\Yf][Yb'FUhga]h[`]YXYfb'ZØf']\fY `Ub['À\f][Y'A]hUfVY]h'ni 'XUb\_Yb''

### $9\$ fi b[YbZØf``Ub['À\f][YJYfX]YbghY

'6YgcbXYfg']a 'FUa dYb`]W\h'ghUbXYb'?`Ui g'Fch\'i bX'FU]a i bX 6UXYfž'XYfYb'9b[U[Ya Ybh'i bX'`Ub['À\f][Y'HÀh][\_Y]h']a; Ya Y]bXYfUh'\Yfj cf[Y\cVYb'k i fXYb"'Fch\'k Uf'&\$'划\fY'U`g; Ya Y]bXYfUh'i bX'ni XYa 'U`g'nk Y]hYf'ghY``j YfhfYhYbXYf 6Øf[Yfa Y]ghYf'hÀh]["'5i W\'FU]a i bX'6UXYf'\Uh'g]W\'nY\b'划\fY'Ub[']a 'FUh'Yb[U[]Yfh'i bX'k Uf'k À\fYbX'Y]bYf'\_f]h]gw\Yb'D\UgY

U`g`YfghYf`ghY``j YfhfYhYbXYf`6Øf[Yfa Y]ghYf`YbhgWXY]XYbXž VYgcbXYfg`k À\fYbX`XYf`5Vk YgYb\Y]h`XYg`Yf\_fUb\_hYb 6Øf[Yfa Y]ghYfg`A Ufh]b`@Yc`A U]Yf"

: Øf']\fY'JYfX]YbghY'k i fXYb'?`Ui g'Fch\ž'H\]`c'K Ybn`Yf'f%) '\\J\fY\\ZYb'K U``Uh'i bX'FU]a i bX'6UXYf'flYk Y]`g'\%\\J\fY\\Z'gck ]Y
6\fbX'<\Af]b['i bX'7`Ui X]U'?fYi h\f'flYk Y]`g') '\\J\f\\\\cZZ]n]Y``
j \text{YfUVgW}.]\text{YXYh''6\OMF[Yfa Y]gh\f'6i hn'\OMF[YfY]W\h\text{hY'XYb}
Ui g\text{W}\text{Y}]\text{XYb'X}\text{A} ]h[']\text{XXYfb'X]Y'9\fYbbUXY`'XYg'; Ya Y]\text{bXYhU[g}
6\UX\text{b!K \OMFh\f\a} V\text{Yf['i bX'Y]\text{bY}; `Uggh\f\'Ya ]h'Y]\text{bYa 'CfbUa Ybh'U`g}
5\text{bYf\_Ybbi b[']\f\f'\@\f']\text{ghi b[Yb''8]Y'9\fi b[Yb'k i fX\f\text{b'VY['Y]\h\f\h}
j cb'd\f\g\Omeg\f\g\f\b'\\S\Ub\_\f\g\f'?ca a i bU`dc`]\h]\_'\text{V\f\cbh\f''}

#### 8 Ug 9b [ U[ Ya Ybh j cb 9\fYbUa h`]WX Yb

6Øf[Yfa Y]ghYf'6i hn'\cV'YVYbZU``g'XUg'9b[U[Ya Ybh'j cb'7`Ui X]UGW,Y``\cfb'i bX'GhYZZYb'K U``Uh'\Yfj cfž'X]Y'g]W\'ØVYf'nY\b'\\J\fY\'Ub[']b'XYb'j YfgW\]YXYbYb'5i ggW\ØggYb'XYf'; Ya Y]bXY
Y]bVfUW\hYb'' \(\psi \text{X}\)YgYb'\YfUi gZcfXYfbXYb'NY]hYb'k ]ggYb'k ]f'Yg
VYgcbXYfg'ni 'gW\\AhnYbž'XUgg'g]W\'9\fYbUa h`]W\Y']b'XYb
\_ca a i bU`Yb'; fYa ]Yb'Yb[U[]YfYb'i bX'XUg'; Ya Y]bXY`YVYb'U\_h]j
a ]h[YghU`hYb ž'gU[hY'6i hn"

8]Y '6YXYi hi b[ 'XYg'9\fYbUa hYg'i bX'X]Y '5bYf\_Ybbi b[ 'XYf [ Y`Y]ghYhYb '5fVY]h'g]bX'YggYbn]Y``Y '5gdY\_hY 'ZØf'XUg': i b\_h]cb]YfYb Y]bYf'; Ya Y]bXY"; YfUXY']b'Y]bYf'NY]hž']b'XYf'X]Y < YfUi gZcfXYfi b[ Yb'Ub'X]Y'?ca a i bU`dc`]h]\_'ni bY\a Ybž']gh'XUg 9b[ U[ Ya Ybh'j cb'6Øf[ Yfb'i a gc'k Yfhj c``Yf"'8U\Yf'k ]fX'Yg'j cb XYf'; Ya Y]bXY'Ui W'k Y]hYf\]b'[ YgW\Ahnhž'k Ybb'g]W\'A YbgW\Yb b]W\h'bi f'gdcfUX]gW\ž'gcbXYfb'ØVYf'j ]Y`Y'\J\fY'\]bk Y[ 'ZØf'X]Y 6Y`Ub[ Y']\fYf'A]hVØf[ Yf'Y]bgYhnYb"

8]Y J YfUVgWk]YXi b[ 'i bX'9\fi b[ 'X]YgYf``Ub[ 'À\f][ Yb 'A ]h[ `]YXYf XYg; Ya Y]bXYfUhg'j cb: f]hh`]b[ Yb 'ghY``h'b]Wk h'bi f'Y]bYb '5VgWk]YX XUfž'gcbXYfb 'Ui Wk 'Y]bYb 'A ca Ybh'XYf'FYZYI ]cb 'ØVYf'XUgž'k Ug']a @Ui ZY 'XYf'\J\fY 'YffY]Wk h'k i fXY"'9g']gh'Y]bY; Y`Y[ Yb\Y]hž'X]Y K Y]Wk Yb 'ZØf'X]Y 'Ni \_i bZh'ni 'ghY``Ybž'k À\fYbX'bYi Y'A ]h[`]YXYf']b

 $XYb `F Uh `Y]b hf Yh Yb `i b X `Zf]g W Yb `K ]b X `a ]h V f]b [Yb "`8]Y `; Ya Y]b XY g W Ui h b i b c d h]a ]gh]g W `Ui Z `X]Y `_ca a Yb X Yb `Df c Y_h Y i b X J c f \ UV Y b ž `X]Y `U ``Y `6 Ø f [Yf `V Yhf Y ZZY b `k Yf X Yb "$ 

# BUWX\U`h][\_Y]h'XYf'\_ca a i bU`Yb'K YfhY

8]Y'8Ub\_gU[i b[Yb'i bX'9\fi b[Yb'i bhYfghfY]W\Yb'X]Y'K]W\h][\_Y]h
XYg'9b[U[Ya Ybhg']b'XYf'?ca a i bU'dc`]h]\_"'\dot\5bVYhfUW\h'XYf
gW\bY``Yb'JYf\\bXYfi b[Yb']b'XYf'; YgY``gW\UZh']gh'Yg
YbhgW\Y]XYbX\\dot\XZXUgg'A YbgW\Yb'VYfY]h'g]bX\\dot\JYfUbhk cfhi b['ni
\@VYfbY\\a Yb"'8]Y'; Ya Y]bXY': f]hh`]b[Yb'nY][h'a]h'X]YgYf
JYfUbghU`hi b[\dot\dot\B]Y'k Yfhj c```XYf'6Y]hfU['j cb'Y\fYbUa h`]W\Yb
A]h[`]YXYfb']gh\\dot\X]Y'g]W\'\_cbghUbh'i a 'XUg'; Ya Y]bk c\``\_\@a a Yfb''
\dot\fYBUW\Zc`[Yf'ghY\Yb'Yhnh'j cf'XYf'5i Z[UVY\\dot\X]Y'[YghY\\\_hYb
N]Y`Y'i bX'K YfhY'Zcfhni Z\@\fYb\\dot\fYb\\dot\fYb\\dot\fYa Y]bgW\UZh'k Y]hYf\]b
dcg]h]j 'ni '[YghU`hYb''

# 8 Ug 'Y\fYbUa h`]W\Y '9b[ U[ Ya Ybh']b : f]hh`]b[ Yb

 $8 \ Ug'Y \setminus fYb \ Uah']WXY'9b[U[YaYbh'gd]Y'h'Y]bY'k YgYbh']WXY'Fc'`Y']a gcn]U'Yb'ibX'dc']h]gWXYb'; YZØ[Y'jcb':f]hh']b[Yb'''8]Y; YaY]bXYfÀhYž'X]Y'bib'jYfUVgWX]YXYh'kifXYbž'\UVYbaU*[YV']WX'nif'; YghU'hib['ibX'9bhk]W_`ib['XYf'; YaY]bXYVY][YhfU[Yb'''=\fY'5fVY]h'iaZUggh'b]WXh'bif'X]Y'A]hUfVY]h']b5iggWX ØggYbž'gcbXYfb'UiWX'X]Y'8ifWXZØ\fib['jcb'Dfc'Y_hYb'ibX+b]h]Uh]jYbž'X]Y'XUg'@YVYb'XYf'6Øf[Yf'bUWX\U'h]['jYfVYggYfb''$ 

# 8]Y 6YXYi hi b[ 'XYf'; Ya Y]bXYcfXbi b[ ']b 6UXYb!K ØfhhYa VYf[

8]Y; Ya Y]bXYcfXbi b[ 'ZØf'6UXYb!K ØfhhYa VYf[ ']gh'Y]b
YbhgWXY]XYbXYg'FU\a Ybk Yf\_ž'XUg'X]Y'fYWXh`]WXYb'; fi bX`U[ Yb
ZØf'X]Y'5fVY]h'XYf'; Ya Y]bXY!'i bX'GhUXhfÀhY'ZYgh`Y[ h'''G]Y'fY[ i `]Yfh
b]WXh'bi f'X]Y'K U\`'i bX'X]Y'5i Z[ UVYb'XYf'; Ya Y]bXYfÀhYž'gcbXYfb
Ui WX'X]Y'Ghfi \_hi f'XYf'\_ca a i bU`Yb'JYfk U`hi b[ "'+b': f]hh`]b[ Ybž
k]Y'Ui WX']b'UbXYfYb'; Ya Y]bXYbž'a ØggYb'X]Y'A]h[`]YXYf'XYg
; Ya Y]bXYfUhYg'g]WXYfghY``Ybž'XUgg'g]Y']a 'VYghYb'+bhYfYggY']\fYf
6Øf[Yf'\UbXY`b'i bX'XUVY]'X]Y'[ YgYhn`]WXYb'J cf[ UVYb'Y]b\U`hYb"

8]Y'9]b\U`hi b['XYf'JcfgWkf]ZhYb'XYf'; Ya Y]bXYcfXbi b['[UfUbh]Yfh HfUbgdUfYbn'i bX'FYWkYbgWkUZhgdZ]Wkhž'X]Y'ZØf'XUg'JYfhfUi Yb'XYf 6Øf[Yf']b']\fY'[Yk À\`hYb'JYfhfYhYf'j cb'nYbhfU`Yf'6YXYi hi b[g]bX"'Ni XYa 'ZÒfXYfh'g]Y'Y]bY'U\_h]j Y'6YhY]`][i b['XYf'6Øf[Yf'Ub\_ca a i bU`Yb'5b[Y`Y[Yb\Y]hYb"

# 8]Y'ni\_ØbZh][Y'9bhk]W\_`ib[':f]hh`]b[Ybg

A ]h'XYa 'K YW\gY`']b'XYf'; Ya Y]bXY`Y]hi b['ghY\Yb'ZØf': f]hh`]b[Yb bYi Y'< YfUi gZcfXYfi b[Yb'i bX'7\UbW'b'VYj cf"'8]Y'bYi '[Yk À\`hYb A ]h[`]YXYf'XYg'; Ya Y]bXYfUhgž'XUfi bhYf'A Uf\_i g'GY``'i bX'7`Ui X]U GW\Y``\cfbž'g]bX'[YZcfXYfhž'X]Y'5b`]Y[Yb'XYf'6Øf[Yf']b'XYb A ]hhY`di b\_h']\fYf'5fVY]h'ni 'ghY``Yb"'8]Y'< YfUi gZcfXYfi b[Yb fY]W\Yb'j cb'XYf'GW\UZZi b['j cb'K c\bfUi a 'ØVYf'X]Y JYfVYggYfi b['XYf' $\pm$ ZfUghfi \_hi f'V]g'\]b'ni f': ÒfXYfi b['j cb': fY]nY]h''i bX'?i `hi fUb[YVchYb"

I a 'X]YgY'N]Y`Y'ni 'YffY]WXYbž'k]fX'Yg'YbhgWXY]XYbX'gY]bž'Ui WXkY]hYf\]b'X]Y'6Øf[Yf'U\_h]j']b'9bhgWXY]Xi b[gdfcnYggYY]bni V]bXYb"'8]Y'♣bhY[fUh]cb'j cb
6Øf[YfVYhY]`][i b[ga Ò[`]WX\_Y]hYbž'k]Y'6Øf[YfZcfYb'cXYf
I a ZfU[Ybž'\_ÒbbhY'XUni 'VY]hfU[Ybž'X]Y'AY]bi b[Yb'i bX
6YXØfZb]ggY'XYf'6Yj Ò`\_Yfi b[']b'X]Y'D`Ubi b['i bX'I a gYhni b[\_ca a i bU`Yf'Dfc'Y\_hY'Y]bZ]Y»Yb'ni '`UggYb"

### $GWX i gqZc [Yfib[.'9]b'6]W_ib'X]Y'Ni_ibZh$

 $8]Y'JYfUVgWX]YXib['XYf``Ub['A\f][Yb'; YaY]bXYfAhY']b$ 

8 Y hU]`g

6Ygi WXYb G]Y i bg Ui Z b!U[ "XY