

B Yi Yg' ? f]a ]!5VYbhYi Yf']b 'A cbhUVUi f.  
6i W\g][ b]Yfi b[ 'a ]h' =b[ YVcf[ 'GW\Yk ]cf

⊖[ YVcf[ 'GW\Yk ]cf'g][ b]Yfh']\fYb' bYi Yb' A cbhUVUi f! ? f]a ]  
5i Zfi \f']b' A cbg' HUVcf 'Ua ' &( "5i [ i gh&\$&( ' ]b' XYf  
6i W\UbX' i b[ '9f' YgYbYg"

⊖' XYf' a U' Yf]gW\Yb' ? i ' ]ggY' j cb' A cbhUVUi f' ghY\h' Y]bY  
6YfY]W\Yfi b[ 'Z0f' ? f]a ]ZUb'g' VYj cf. '5a ' &( "5i [ i gh&\$&( 'k ]fX' X]Y  
5i hcf]b' ⊖[ YVcf[ 'GW\Yk ]cf']\f' bYi YghYg' K Yf\_ ' 5i Zfi \f']b' A cbg  
HUVcf ' XYf' ? ZZYbh]W\Y]h' d' f' A gYbh]YfYb" '8]YgY' J YfUbghU' h' i b[  
Z]bXYh' ]b' XYf' 6i W\UbX' i b[ '9f' YgYbYg' ]b' XYf' ? ]fW\ghfU» Y' %\* ' ghUhh  
i bX' VY[ ]bbh' i a ' %%' i \f" '8]Y' : cfhgYhni b[ 'XYf' VY' ]YVhYb  
A cbhUVUi f! ? f]a ]!F Y]\Y' i a ' X]Y' : ] [ i f' ; Ycf[ 'K Y][ UbX' j Yfgdf]W\h  
GdUbbi b[ ' i bX' \]ghcf]gW\Y' : cfa [ YVi b[ ' ]ba ]hhYb' Y]bYg  
ZUgn]b]YfYbXYb' ? cbh]bYbhg"

8 Ug' GYhh]b[ 'XYg' j ]YfhY' 6i W\Yg' ]gh' ]b' XUg' : \f' %) \$) ' Y]b[ YVYhhYhž  
U'g' ; Ycf[ 'K Y][ UbXžY]b' Y\ f[ Y]n][ Yf' A U[ ]ghYf' i bX' 8c\_hcfUbX' Ui g  
9fZi fhž' ]b' gY]bY' < Y]a UhghUXh' ni f0W\_\_Y\ fhž' i a ' Ub' gY]bYf  
8c\_hcfUfVY]h' ni ' UfVY]hYb" '8cW\X]Y' gW\Y]bVUf' fi \][ Yb' HU[ Y  
k YfXYb' j cb' Y]bYa ' [ fc» Yb' 9fY][ b]g' 0VYfgW\UhhYh' @Ui h  
\]ghcf]gW\Yb' 6Yf]W\hYb' k ]fX' ? 0b][ 'A UI ]a ]]Ub' '=' a ]h' Y]bYf  
VYY]bXfi W\_YbXYb' ; YZc` [ gW\UZh' j cb' ) \$ \$ ' F ]hhYfb' Yfk UfhYhž  
XUfi bhYf' Ui W\XYf' Hf]YfYf' ? i fZ0fgh' : \\_cV' '=' j cb' 6UXYb" '8]YgYf  
dca d0gY' 9]bni [ 'gc` `a ]h' Y]bYa ' a U' Ygh' A]h]gW\Yb' : Ygmi [ ' [ YZY]Yfh  
k YfXYb' ' Y]b' ZYgh]W\Yf' < 0\Ydi b\_hžXYf' YXcW\ ]b' Y]bY  
[ YZ\ \f' ]W\Y' K YbXi b[ ' i a gW\ ' A [ h"

9]b' GW\ UhhYb' 0VYf' XYa ' : Ygh

A ]hhYb' ]a ' ž VY' XYg' : Ygmi [ Yg' k ]fX' X]Y' ZY]Yf' ]W\Y' Gh]a a i b[

Xi fW`Y]bYb`g\_UbXU`OgYb`J cfZU`` [ YghO`fh"9]bY`i bVY\_UbbhY  
DYfgcb`gcf[ h`a`h]`fYa``Ui hYb`J Yf\U`hYb`Z0f`5i ZgY\Yb`i bX` ; Ycf[  
K`Y][ UbX`\Uh`gW`bY``XYb`J YfXUW`hZ`XUgg`a`O[ `]W`Yfk`Y]gY`Y]b  
5hhYbhUh[ Yd`Ub`h]gh"8]YgY`U`Ufa`]YfYbXY`9bhXYW`i b[ `n]Y`h]`b`]b  
X]Y`i bXi fW`g]W`h][ Yb`A UW`YbgW`UZ`hYb`Y]bYg`?ca`d`chhgZ`XUg  
A`Yi W`Y`a`cfXY`i bX`9bhZ0`fi b[ Yb`VYhf]Zh" `a`a`Yf`k`Y]hYf`]b`X]Y  
: `Ab[ Y`XYf`b`hf][ Y`j`Yfghf]W`hZ`k`]fX` ; Ycf[ `gY`Vgh`ni`a`N]Y`i bX  
a`i`gg`i`a`gY]b`@YVYbg`Z0fW`hYb`"

8]Y`9fn`A`i`b[ `YbhZU`hY`h`g]W`0VYf`%+\$`GY]hYb`i bX`V]YhYh`Y]bY  
gdUbbYbXY`A`]gW`i`b[ `Ui`g`g`]ghcf]gW`Yf` : ]\_h]cb`i bX`?f]a`]"8`Ug  
6i W`]gh]b`Y]bYf`\UbX`]W`Yb`6fcgW`i`f!5i`g[ UVY`Z0f`%&`9i`fc  
Yf\`A`h]W`"6Y]`XYf`6i`W`df`A`gYb`hUh]cb`\_0bbYb`X]Y`6Ygi`W`Yf`b]W`h  
bi`f`XYa`Z`ggY`bXYb`J`cfhfU[ `Ui`gW`Yb`Z`gcbXYfb`Ui`W`Ub`Y]bYf  
VYgcbXYfYb`@Ygi`b[ `hY]`bY`a`Yb`Z`VY]`XYf`Ui`g[ Yk`A`\`hY`HYY!GcfhYb  
gYfj`]Yfh`k`YfXYb"5b`U`A`0`YfZ`X]Y`6i`W`\`Ab`X`Yf]b`Z`c`Vh`XYb`Gh]`j`cb  
b[ YVcf[ `GW`Yk`]cf`i`bX`j`Yf[ `Y]W`h]`b`a`]h`XYb`\_`Ugg]gW`Yb`?f]a`]g  
Y]bYf`5[ Uh`U`7`\f]gh]Y`Z`k`Ug`X]Y`J`cfZYi`XY`Ui`Z`X]Y`@Ygi`b[ `bcW`  
ghY][ Yfh`"

## 9]b`9fY][ b]g`Z0f`@]hYfUhi`fZfYi`bXY

8]Y`J`YfUbghU`hi`b[ `Ua`GUa`ghU[ `b]W`h`bi`f`Y]bY` ; Y`Y[ Yb`Y]hZ`Y]b  
bYi`Yg`6i`W`ni`YbhXYW`Yb`Z`gcbXYfb`Ui`W`Z`]b`Y]bY`K`Y`h`j`c`Yf  
 ; Y`Y]a`b]ggY`i`bX`GdUbbi`b[ Yb`Y]bni`hUi`W`Yb" : Ub`g`j`cb  
\]ghcf]gW`Yb`?f]a`]g`X0fZYb`g]W`Ui`Z`Y]bY`Ub`fY[ Yb`XY`i`bhYf`U`hi`b[  
ZfYi`Yb`Z`X]Y`gck`c`\`XUg`i]hYfUf]gW`Y`U`g`Ui`W`X`Ug`[ YgW`]W`h]W`Y  
b`hYfYggY`Ub`gd`f]W`h"8`Ug`D`Ui`XYfb`a`]h`XYf`5i`hcf]b`i`bX`XUg  
[ Ya`Y]bgUa`Y`HYYhf]b`\_Yb`fi`bXYb`XUg`9f`YVb]g`UV`i`bX`a`UW`Yb  
XYb`HU[ `ni`Y]bYa`i`bj`Yf[ Ygg`]W`Yb`9fY][ b]g`Z0f`X]Y` ; Ya`Y]bgW`UZ`h  
XYf`60W`Yf]YV`UVYf`]b`A`cb`hUV`Ui`f`"

b[ YVcf[ `GW`Yk`]cf`g`?f]a`]g`g]bX`b]W`h`bi`f`i`bhYf`U`hgUa`Y  
 ; YgW`]W`hYb`Z`gcbXYfb`Ui`W`Y]b` : Yb`ghYf`]b`X]Y`J`Yf[ Ub[ Yb`Y]h"  
`fY` : A`][ `Y]hZ`Z]\_h]j`Y` ; YgW`]W`hYb`a`]h`\]ghcf]gW`Yb`9`Ya`YbhYb`ni  
j`Yfk`YVYb`Z`n]Y`h`@YgYf`]b`X]Y`H]Y`Z`b`X`Y`g`%\*`" `Z`f`i`b`XYf`hg`i`b`X  
`A`ggh`g]Y`]b`X]Y`5`ha`cgd`\`A`fY`Y]bYf``Ab[ gh]j`Yf[ Ub[ Yb`Yb`NY]h  
Y]b`hUi`W`Yb"8`Yf`9fZc`[ `X]YgYf`F`Y]\`Y`nY][ h`XUg`ghYh][ `k`UW`gYb`XY

ϻhYfYggY`Ub`X]YgYa` ; YbfY`i bX`X]Y`5bn]Y\i b[ g\_fUZh] cb` : ][ i fYb  
k ]Y` ; Ycf[ `K Y][ UbXž`XYf`b]W`h`bi f`? f]a ]bU`ZÀ`Y`Òghž`gcbXYfb  
Ui W`X]Y`@YgYf`Ui Z`Y]bY`gdUbbYbXY`NY]hfY]gY`a ]hb]a a h"

## 9]b`6`]W\_`]b`X]Y`Ni`\_i`bZh

8]Y`VYj c fghY`YbXY`6i W`g][ b]Yfi b[ `]b`A cbhUVUi f`\_ÒbbhY`U`g  
K Y[ k Y]gYf`ZØf`Y]bY`bYi Y` ; YbYfUh]cb`j cb`? f]a ]!5i hc fYb`X]YbYbž  
X]Y`g]W`j cb`\ ]ghcf]gW`Yb`6Y[ YVYb`Y]hYb`]bgd]f]YfYb`UggYb"  
G`Yk ]cf g`? i bghž: ]\_h]cb`i bX`F YU`]h`h`ni`\_ca`V]b]YfYbž]gh`Y]b  
YfZf]gW`YbXYf`5bgUhnž`XYf`a`Ò[ `]W`Yfk`Y]gY`XUg` ; YbfY`XYf  
\ ]ghcf]gW`Yb`? f]a ]g`bYi`X`YZ]b]Yfh`Gck`c`\`@YgYf`U`g`Ui`W`? f]h]\_Yf  
Yfk`UfhYb`a ]h`GdUbbi b[ `X]Y`\_ca`a`YbXYb`K`Yf`\_Y`i`bX`X]Y  
9bhk ]W\_`i b[ Yb`fi bX`i`a` ; Ycf[ `K Y][ UbX`i bX`gY]bY`5VYbhYi`Yf"  
8Ug`ϻhYfYggY`Ub`\ ]ghcf]gW`Yf`? f]a ]bU`hYfUhi`f`V`Y]Vh  
i b[ YVfcW`Yb`i bX`X]Y`@YgYf`g]bX`[ YgdUbbhž`k`Y`W`Y` ; Y`Y]a`b]ggY  
ϻ[ YVcf[ `GW`Yk ]cf`]b`Ni`\_i`bZh`ØZhYb`k ]fX"

## 8]Y`6YXYi`hi`b[ `j`cb`\ ]ghcf]gW`Yb ? f]a ]bU`fca`UbYb

< ]ghcf]gW`Y`? f]a ]bU`fca`UbY`V]YhYb`b]W`h`bi f`gdUbbYbXY  
l bhYf`U`hi b[ ž`gcbXYfb`Yf`Ui VYb`Ui W`Y]bYb`9]bV`]W\_`]b  
j Yf[ Ub[ YbY`9dcW`Yb`"G]Y`\Y`ZYbž`XUg`gcn]U`Y`i bX`dc`h]gW`Y  
?`]a`U`Y]bYf`VYgh]a`a`hYb`NY]h`ni`j`YfghY`Yb`"ϻ[ YVcf[ `GW`Yk ]cf g  
6i W`5i Zfi`f`]b`A`cbg`HUVcf`j`YfgYhnh`X]Y`@YgYf`]bg`ϻ\`f`%)`\$)`ž  
U`g`A`cbhUVUi`f`nYi`[`h]`cb`Y]bYa``\ ]ghcf]gW`Yb`?`Òb][`gVYgi`W`"  
Gc`W`Y`K`Yf`\_Y`hfU[ Yb`ni`f`GYbg]V`]g]Yfi b[ `ZØf`X]Y`gdYn]Z]gW`Yb  
< YfUi`gZcfXYfi b[ Yb`i bX`?`cbZ]\_hY`XYf`NY]h`VY]ž`Y]bgW`Y]Y`»`]W`X`Yf  
5fh`i bX`K`Y]gYž`k ]Y`A`UW`hi bX`ϻhf][ Y`XUg`h`À[ `]W`Y`@YVYb  
VYY]bZi`gghYb"

9]b`hmd]gW`Y`g`A`Yf`\_a`U`\ ]ghcf]gW`Yf`? f]a ]bU`fca`UbY`]gh`X]Y  
gcf[ Z`h][ Y`F`Y`W`Yf`W`Y`ž`X]Y`XYb`5i hc fYb`c`Zh`\ ]Zh`XYb`\ ]ghcf]gW`Yb  
?`cbhYi`h`Ui`h`Y`b]gW`X`Ufni`ghY`Yb`"GW`Yk ]cf`b]a`a`h]g]W`X]Y`gYf  
J`YfUbhk`cfhi b[ `Ubž`]bXYa`g]Y`]b`]fYf`9fn`À`\`i b[ `Y`W`hY`\ ]ghcf]gW`Y  
9`Ya`Yb`hY`gck ]Y`Z]\_h]j`Y` ; Y`gW`]W`hYb`a ]hY]bUbXYf`j`Yf`\_bØdZh"

@]hYfUf]gWY`DUfU`Y`Yb`ni`j`Yf[ Ub[ YbYb  
? f]a ]bU`ZÄ`Yb

8]Y`H\Ya Uh]\_`XYg`A`Yi`WY`a`cfXYg`i`bX`XYf`dc`]h]gWYb`bhf][ Ybž  
]bgVYgcbXYfY`k`Ä\FYbX`ZY]Yf`]WYf`5b`ÄggYž`\Uh]b`XYf`; YgW]WYhY  
k ]YXYf`c`h`Gdi`fYb`\]bhYf`UggYb`"9]b`j`Yf[ `Y]WVUFYg`6Y]gd]Y`]gh  
XYf`; U`XYg` A`cfXYg`j`cb`?`Öb][ `<Yfa`Ubb`j`cb`GU`a` "a`Ä\`f  
%\*`\$`k`i`fXY`?`Öb][ `<Yfa`Ubb`k`Ä\FYbX`Y]bYf`ZYgh]WYb  
J`YfgUa`a`i`b[ `Yfa`cfXYhž`k`Ug`k`Y]hfY]WYbXY`dc`]h]gWY  
?`cbgYei`YbnYb`\`UhhY`"Gc`WY`\]ghcf]gWYb`9fY][`b]ggY`nY][`Ybž`k`Y  
:`Y]Yf`]W`\_Y]hYb`c`Zi`j`cb`Xi`b`\_Yb`bhf][`Yb`ØVYfgW`UhhY`h`k`YfXYbž`Y]b  
A`ch]j`ž`XUg`Ui`W`]b`GWYk`]cfg`; YgW]WYhY`Ui`ZnUi`W`h"

9]b`k`Y]hYfYf`J`Yf[ `Y]W`\_Ubb`ni`XYb`8fUa`U`j`cb`F]WUfX`="`j`cb  
K`j`]Ua`G\U`YgdYUFY`[`Ync[`Yb`k`YfXYb`"8]Y`H\Ya`Yb`j`cb  
5a`V]h]cbž`bhf][`Yb`i`bX`Y`hnh]W`A`Yi`WY`a`cfX`g]bX`gck`c`\]b  
G\U`YgdYUFYg`K`Yf`\_U`g`Ui`W`]b`\]ghcf]gWYb`?`f]a`]bU`fca`UbYb  
k`Y`VY]`Äi`Z][`Ub[`YXYi`hYh`"8]YgY`]hYfUf]gWYb`DUfU`Y`Yb`nY][`Ybž  
XUgg`X]Y`:]`Ugn]bUh]cb`ZØf`\]ghcf]gWY`J`YfVfYWYb`b]W]h`bi`f`  
nY]h[`YVi`bXYb`]ghž`gcbXYfb`]b`XYf`a`YbgW`]WYb`B`Uhi`f`j`Yfk`i`fn`Y`h  
]Y[`h"

## 8 Ug`5i`ZYVYb`XYg`\]ghcf]gWYb`?`f]a`]g

b`XYb`Y`hnhYb`Ä\FYb`\Uh]g]W`Y]bY`VYa`Yf`\_Ybgk`YfhY`F`YbU]ggUbWY  
XYg`; YbFYg`XYg`\]ghcf]gWYb`?`f]a`]bU`fca`Ubg`j`c`nc[`Yb`"8]YgY  
F`ØW`\_Y`f`k`]fX`Xi`fW`XUg`ghY][`YbXY`bhfYfYggY`Ub`[`i`h  
fYWYfW]YfhYb`\]ghcf]gWYb`9fnÄ`\i`b[`Yb`i`bX`XYf`Gi`WY`bUW  
\_i`hi`fY`Yf`ÄYb]h]hÄh`[`YZØfXYfh`"8]Yg`gd]Y[`Y`h]g]W`b]W]h`bi`f`]b`XYb  
J`Yf`\_Ui`ZgnU`\`Yb`k`]XYfž`gcbXYfb`Ui`W`]b`XYf`J]Y`nU`\`Ub  
]hYfUf]gWYb`J`YfUbghU`hi`b[`Ybž`X]Y`g]W`X]YgYa`]; YbFY`k`]Xa`Yb`  
J`cf`U`Ya`VY]`@Ygi`b[`Yb`i`bX`G][`b]Yfghi`bXYbž`k`]Y`g]Y`]b`XYf  
6i`W`\UbX`i`b[`9f`YgYbYg`ghUhh]bXYbž`nY][`h]g]W`ž`XUgg`XUg  
Di`V`\_]i`a`g]W`ZØf`X]Y`J`YfZYW]hi`b[`j`cb`; YgW]WYhY`i`bX`:]`\_]h]cb  
VY[`Y]ghYfh"

8]Y`?`ca`V]bUh]cb`j`cb`@]hYfUhi`f`i`bX`UbXYfYb`\_i`hi`fY`Yb

9`Ya YbhYb`k ]Y`HYY`k À\fybX`XYf`@Ygi b[ `a UW`hgc`WXY  
J YfUbgH`hi b[ Yb`VYgcbXYfg`UhhfU\_hj] ``8 ]Yg`ZòfXYfh`b]W`h`bi f`XUg  
; Ya Y]bgW`UZhg[ YZØ`ž`gcbXYfb`h]YZfY`8 ]g\_i gg]cbYb`ØVYf`X]Y  
⇒\U`hY`XYf`6ØW`Yf`i bX`XYfYb` \]ghcf]gW`Y`?cbhYI hY"

8YhU]`g

6Ygi W`Yb`G]Y`i bg`Ui Z.`b!U[ "XY