

# GWk YfYf'J Yf\_Y\fgi bZU``Ui Z'5 &\* .: U\ fYf i bhYf'5`\_c\c`j YfXUW h

GWk YfYf'J Yf\_Y\fgi bZU``Ui Z'XYf'5&\* 'VY]'GhUXY.'8 fY]  
: U\fnYi [Y'VYhY'] [hž'a Y\ fYfY'J Yf'YhnhY"'8 YhU]'g'ni a 'J cfZU``  
\Yf"

þ'XYf'B UW h j cb'GUa ghU[ 'Ui Z'GcbbhU[ 'YfY][ bYhY'g]W'Ui Z'XYf  
5i hcVU\b'&\* 'Y]b'gWk YfYf'J Yf\_Y\fgi bZU``ž'XYf' [ 'ØW\_]W'Yfk Y]gY  
b]W'h'a ]h'hØX`]W'Yb'J Yf'Yhni b[ Yb'YbXYhY"'I a '\$\$. (\$'I \f'k i fXYb  
: Yi Yfk Y\ž'F Yhni b[ gX]Ybghi bX'Dc`nY]'ni f'I bZU``ghY``Y'nk ]gW'Yb  
XYb'5bgW'i ggghY``Yb'8c``Yfb'i bX'GhUXY!C gh[ Yfi ZYb"'8Yf'J cfZU``  
VY[ Ubbž'U`g'Y]bY'&'!Ä\ f][ Y'GhUXYf]bž'X]Y'a ]h]\fYa 'JK 'Dc`c' ]b  
F]W'hi b[ 'GhUXY'Z' \fž'X]Y'?cbhfc``Y'ØVYf']\f': U\fnYi [ 'j Yf'cf'i bX  
]bg'GW'Yi XYfb '[ Yf]Yh"

8]Y'† b[ Y': fUi 'ghcddhY'a ]h'\fYa 'Dc`c'Ui Z'XYa 'GY]hYbghfY]ZYbž  
k cVY]'X]Y': fcbhXYg'5i hcg'Ui Z'XYb'fYW'hYb'j cb'nk Y]: U\ fghfY]ZYb  
fU[ hY"'8Yf'++!Ä\ f][ Y'HUI ]ZU\ fYfž'XYf']b'Y]bYa 'JK 'Hci fUb  
i bhYfk Y[ g'k Ufž'Yf\_UbbhY'X]Y'; YZU\ f'ni 'gdÄh'i bX'dfU``hY'Ui Z'X]Y  
: U\fnYi [ Zfcbh'XYg'Dc`cg"'8i fW'XYb'5i ZdfU``k i fXY'XUg'5i hc'XYf  
I bZU``j Yfi fgUW'Yf]b' ]b'X]Y'5i »YbgW'i hnd'Ub\_Y'[ YgW'Yi XYfh"'8Yf  
HUI ]ZU\ fYf'\UhhY'ni a 'NY]hdi b\_h'XYg'I bZU``g'\_Y]bY': U\ f[ ÄghY'Ub  
6cfX"

## I bZU``j Yfi fgUW'Yf]b' i bhYf'J YfXUW h

8i fW'HfØa a YfhY]'Yž'X]Y'Ui Z[ fi bX'XYg'Ni gUa a Ybghc»Yg'ØVYf  
X]Y': U\fvU\b'j YfghfYi h'k UfYbž'k i fXY'Ui W'Y]b'Xf]hYf'D\_k ž'Y]b  
5i X]5 ('Y]bYg' (&!Ä\ f][ Yb'A UbbYg'Ui g'GhUXYž'VYgW'ÄX][ h"  
; 'ØW\_]W'Yfk Y]gY'V']YV'XYf'5i X]!: U\ fYf'i bj Yf'Yhnh"'8]Y'&'!Ä\ f][ Y  
: fUi 'Yf']h'U``YfX]b[ g'gWk YfY'J Yf'Yhni b[ Ybž'X]Y'YXcW' ]b]W'h

YVYbg[ YZ\`f]W`k UfYb" 5i Z[ fi bX`XYg`J YfXUW`hg`Ui Z  
5`\_c\c`VYY]bZi ggi b[ `i bhYfnc[ Yb`X]Y`6YUa hYb`g]Y`Y]bYf  
6`i hdfcVY`ja `ni ghAbX][ Yb`?fUb\_Yb\Ui g"

8Yf`HUI ]ZU\ fYf`Yf`]h`Y]W`hY`J Yf`Yhni b[ Yb`"BUW`Y]bYf  
Ua Vi `UbhYb`6Y\UbX`i b[ `\_cbbhY`Yf`XUg`?fUb\_Yb\Ui g`bcW`]b`XYf  
gY`VYb`BUW`h`k ]YXYf`j Yf`UggYb`"8Yf`Ni ghUbX`XYf`&`!`Z\`f][ Yb  
YfZcfXYfhY`XU[ Y[ Yb`Y]bY`Y]b[ Y\YbXY`a`YX]n]b]gW`Y  
I bhYfgi W`i b[ ž`bUW`XYa`g]Y`Ui Z`X]Y`hYbg]h`h`]\fYf`J Yf`Yhni b[ Yb  
\]b`i bhYfgi W`h`k i fXY`"8]Y`I bZU`Yfa`]h`Yf`gW`h`hYb`XYb  
; YgUa hgW`UXYb`Ui Z`a`]bXYghYbg`" "\$\$\$\$9i fcž`k Ug`Ui Z`X]Y  
Yf\YV`]W`Yb`6YgW`AX][ i b[ Yb`XYf`VY]XYb`J c`\_gk U[ Yb  
ni fØW`ni ZØ\fYb`]gh`6Y]XY` : U\fnYi [ Y`a`i gghYb`Ub`gW`Y]Y»YbX  
UV[ YgW`Yddh`k YfXYb"

## J Yf\_Y\fgVY\]bXYfi b[ Yb`Xi fW`XYb`I bZU`

8]Y`5i hcVU\ba`Y]ghYfY]`k Uf`gW`bY`j cf`Cfhž`i a`X]Y` : U\fvU\`b`ni  
fY]b][ Yb`i bX`X]Y`HfØa`a`YfhY]`Y`ni`VYgY]h][ Yb`"8Yf`J cfZU`ZØ\fhY  
ni`Yf\YV`]W`Yb`J Yf\_Y\fgVY\]bXYfi b[ Yb`Ui Z`X]YgYa`5VgW`b]h`XYf  
5`\*`ž`X]Y`V]g]b`X]Y`ZfØ\Yb`A`cf[ Ybghi`bXYb`UbXUi`YfhYb`"  
5i hcZU\ fYf`a`i gghYb`g]W`Ui Z`Ab[ YfY`K`UfhYnY]hYb`i bX`GhUi`g  
Y]bghY`Ybž`k`À\YbX`X]Y`9]bgUhn\_f`Z`hY`]\fY`5fVY]h`j`Yff]W`hYhYb  
i bX`X]Y`G]W`Yf\Y]h`Ui Z`XYf`5i hcVU\`b`k ]YXYf\YfghY`hYb`"

8]YgYf`I bZU`k`]fZ`]ja`a`Yf`k ]YXYf` : fU[ Yb`ni`f`J Yf\_Y\fgg]W`Yf\Y]h  
i bX`XYf` ; YZU\ fYb`j`cb`5`\_c\c`Ua`GhYi`Yf`Ui Z`Gc`W`Y`J cfZ`Y`Y  
Yf]bbYfb`i`bg`Ub`X]Y`J YfUbhk`cfhi`b[ ž`X]Y`YXYf` : U\Yf`hf`À[ hž`i`a  
X]Y`G]W`Yf\Y]h]ja`GhfU»Ybj`Yf\_Y\`f`ni`[ Yk`À\`f`Y]ghYb`"8]Y  
9fa`]h`i`b[ Yb`XYf`Dc`nY]`g]bX`XYfnY]h`bcW`]ja` ; Ub[ Yž`i`a`XYb  
[ YbUi`Yb`<Yf[ Ub[ `XYg`I bZU`g`k`Y]hYf`ni`\_`ÀfYb`"8]Y`G]W`Yf\Y]h  
Ui Zi`bgYfYb`GhfU»Yb`]ghj`cb`[ fØ»hYf`6YXYi`hi`b[ ž`i`bX`gc`W`Y  
I bZ`Y`gc`hYb`5b`Ugg`gY]bž`bcW`j`cf]g]W`h][ Yf`ni`gY]b`"

## 9]b`A`U\ba`U`ZØf`U`Y`J Yf\_Y\ fghY]`bY\`a`Yf`

8]Y`HfU[ ØX]Y`Ui Z`XYf`5i hcVU\`b`]ghY]b`Y]bXf]b[ `]W`Yf`F`Ya`]bXYf  
ZØf`U`Y`5i hcZU\ fYfž`ghYhg`U`Y`G]W`Yf\Y]hgj`cf\_Y\`fi`b[ Yb`ni

VYUW hYb`i bX`g]W`XYg`Y][ YbYb`J Yf\U`hYbg`ja`GhfU»Ybj Yf\_Y\`f  
VYk`i gghini`gY]b"8]Y`J YfUbhk`cfhi`b[`ZØf`XUg`Y][ YbY`@YVYb`gck`JY  
XUg`@YVYb`UbXYfYf`J Yf\_Y\`fghY]`bY\`a`Yf`gc`hY`b]W`h`Ui`Z`X]Y  
`Y]W`hY`G`W`i`hYf`[ Ybca`a`Yb`k`YfXYb" `A`YbgW`Yb`YVYb`Å`b[ Yb`j`cb  
XYb`9`bhgW`Y]Xi`b[ Yb`UVž`X]Y`k`]f`hfY`ZY`bž`k`Ybb`k`]f`\`]bhYf`XYa  
GhYi`Yf`g]hnYb"

## I fgUW`Yb`ZØf`J Yf\_Y\`fgi`bZÅ``Y`]b 8Yi`hgW`UbX

J Yf\_Y\`fgi`bZÅ``Y`g]bX`]b`8Yi`hgW`UbX`Y]b`YfbghYg`H\`Ya`Už`XUg  
fY[ Y`a`Å»][`]b`XYb`B`UW`f]W`hYb`VY\`UbXY`h`k`]fX"8]Y`\`Åi`Z][`ghYb  
I`fgUW`Yb`XU`ZØf`g]bX`;`YgW`k`]bX][`\_Y]hgØVYfgW`fY]hi`b[ Ybž  
5V`Yb`\_i`b[ `Xi`fW`A`cV]`hY`YZc`bYž`U`\_c\`c`VYX]b[`hYg`:`U\`fYb`i`bX  
i`b[ Øbgh][`Y`K`]hYfi`b[`gVYX]b[`i`b[ Yb" `@`i`h`XYa`GhUh]gh]gW`Yb  
6i`bXYgUa`h[`UV`Yg`]a`š\`f`&\$&%`ØVYf`&ž`A`]`]cbYb  
J Yf\_Y\`fgi`bZÅ``Y`]b`8Yi`hgW`UbX`ž`k`cVY]`Yhk`U" `\$\$`\$\$\$`ni  
DYfgcbYbgW`ÅXYb`ZØ\`fhYb"8Yf`[`fUj`]YfYbXghY`:`U`\_hcf`VY]I`bZÅ``Yb  
]gh`c`Zha`U`g`X]Y`a`YbgW`]W`Y`:`Y\`Yfei`chYž`X]Y`]b`j`]Y`Yb`:`Å``Yb  
Xi`fW``,`VYfa`ØXi`b[`cXYf`5`\_c\`c`Y]bZi`gg`j`YfghÅ`f`\_h`k`]fX"

⊕`XYf`c`VYb`[`YgW`]`XYfhYb`G]hi`Uh]cb`\_ØbbhY`XUg`J Yf\U`hYb`XYf  
&`!`Å\`f][`Yb`:`U\`fYf]bž`X]Y`j`Yfa`i`h]W`i`bhYf`5`\_c\`c`Y]bZi`gg`ghUbXž  
Ui`ZY]bY`j`cb`X]YgYb`:`U`\_hcfYb`\`]bk`Y]gYb" `DfÅj`Ybh]j`Y`A`U»`bU\`a`Yb  
k`]Y`J`Yf\_Y\`fgYfn]Y\`i`b[`ž`ghf]\_hY`J Yf\_Y\`fgØVYfk`UW`i`b[`i`bX`X]Y  
9]bZØ\`fi`b[`j`cb`5`\_c\`c`hYghg`Ub`G`W`ØggY`ghY`Yb`\`UVYb`]b`XYb  
`Y`hnhYb`š\`fYb`Y]bY`g][`b]Z]\_UbhY`F`c`Y`VY]`XYf`F`YXi`n]Yfi`b[`j`cb  
I`bZÅ``Yb`[`Ygd]Y`h"

## A`U»`bU\`a`Yb`ni`f`J`YfVYggYfi`b[`XYf J`Yf\_Y\`fgg]W`Yf\`Y]h

I`a`X]Y`J`Yf\_Y\`fgg]W`Yf\`Y]h`ni`Yf\`Ø\`Ybž`\`UVYb`X]Y`XYi`hgW`Yb  
6Y\`ØfXYb`j`YfgW`]YXYbY`A`U»`bU\`a`Yb`Yf[`f]ZYb"8Uni`[`Y\`ØfYb  
;`YgW`k`]bX][`\_Y]hg`\_cbhfc``Ybž`X]Y`9]b]W`hi`b[`j`cb`gc[`YbUbbhYb  
V`]hnYbXYb`?`cbhfc``Yb`i`bX`X]Y`J`YfVYggYfi`b[`XYf`⊕`ZfUghfi`\_`hi`fž  
k`]Y`n"6"X]Y`⊕`ghU``Uh]cb`j`cb`J`Yf\_Y\`fggW`]`XYfb`i`bX`6`]hnYf!

5b`U[ Yb`Ub`[ YZÀ\`f`]W\Yb`GhY`Yb`"9]b`6Y]gd]Y`ZØf`Y]bY  
YfZc`[ fY]W\Y`A U» bU\`a Y`]gh`X]Y`9]bZØ\`fi b[ `j cb`Di b`hY`]a  
: `YbgVi f[ !GmghYa ž`X]Y`VY]`J Yf`\_Y\`fgj YfghØ» Yb`j Yf\`Àb[ h`k YfXYb`"

8]Y`J Yf`\_Y\`fgg]W\Yf\`Y]h`\_Ubb`ni XYa`Xi fW`ÒZYbh`]W\Y  
5i Z`Àfi b[ g\_Ua dU[ bYbž`k ]Y`B]W\h`Ua`GhYi Yf`"?Y]b`5`\_c\`c`ž  
[ YZØfXYfh`k YfXYb`"8]YgY`?Ua dU[ bYb`n]Y`Yb`XUfUi Z`UVž`XUg  
6Yk i gghgY]b`ZØf`X]Y`; YZU\`fYb`j cb`5`\_c\`c`Ua`GhYi Yf`ni`gW\`AfZYb  
i bX`X]Y`6Øf[ Yf`ni`Yfa`i h][ Ybž`Ui Z`5`hYfbUh]j Yb`k ]Y  
: U\`f[ Ya`Y]bgW\UZhYb`cXYf`ÒZYbh`]W\Y`J Yf`\_Y\`fga`]hhY`  
ni fØW`ni [ fY]ZYb`"8]Y`\_cbh]bi ]Yf`]W\Y`6YcVUW\hi b[ `i bX`5b`U`mgY  
j cb`J Yf`\_Y\`fgi bZÀ`Yb`gck ]Y`X]Y`A Ò[ `]W\`\_Y]hž`fYW\`hnY]h][ `XUfUi Z`  
ni`fYU[ ]YfYbž`g]bX`YVYbZU`g`Yb`hgW\`Y]XYbX`ZØf`X]Y`J YfVYggYfi b[  
XYf`J Yf`\_Y\`fgg]W\Yf\`Y]h`]b`8Yi hgW\`UbX`"

## GhUh]gh]\_Yb`ni f`J Yf`\_Y\`fgg]W\Yf\`Y]h`]b 8Yi hgW\`UbX`

⇒ a` `š\`f`&\$`%`-`]gh`X]Y`NU\`X`Yf`J Yf`\_Y\`fgi bZÀ`Y`]b`8Yi hgW\`UbX`  
gW\`f]hhk`Y]gY`[ Ygi b`\_Ybž`k À\`fYbX`X]Y`NU\`X`Yf`J Yf`\_Y\`fghc`hYb`  
`Y]W\`h`Ubgh]Y[ "`@Ui h`XYa`8Yi hgW\`Yb`J Yf`\_Y\`fgg]W\Yf\`Y]hgfUh  
fB`J`F`É`[ ]Vh`Yg`Y]bY`J]Y`nU\`j cb`: U`hc`fYbž`X]Y`]b`XYb`Y`hnhYb`  
š\`fYb`ni f`J YfVYggYfi b[ `XYf`J Yf`\_Y\`fgg]W\Yf\`Y]h`VY][ YhfU[ Yb`  
`UVYb`"<]Yf`g]bX`Y]b][ Y`fY`Yj UbhY`GhUh]gh]\_Yb`.

- ⇒ a` `š\`f`&\$`\$`\$`k`i`fXYb`fi`bX`&ž`A`j`]cbYb`J Yf`\_Y\`fgi bZÀ`Y`fY[ ]ghf]Yfh`
- 8]Y`5bnU\`X`Yf`J Yfi b[ `ØW`hYb`VY`]YZ`g]W\`&\$`\$`\$`Ui Z`Yhk`U`'\$`\$`\$`\$`DYfgcbYb`"
- Fi bX`&")`\$\$`A`YbgW\`Yb`ghUfVYb`VY]`J Yf`\_Y\`fgi bZÀ`Ybž`k`Ug`Y]bYb`5bgh]Y[ `[ Y[ YbØVYf`XYa`J`cf`U\`f`XUfghY`h`"

8]Y`8UhYb`VY`Y[ Ybž`XUgg`hfc`hn`Y]bYg`5bb`À\`Ybg`Ub`  
G]W\Yf\`Y]hga`U» bU\`a`Yb`XYf`?Ua`dZ[ Y[ Yb`5`\_c\`c`Ua`GhYi Yfž`  
GW\`bY`][`\_Y]h`i`bX`5V`Yb`\_i`b[ `Y]bY`\_cbghUbhY`<YfUi`gZcfXYfi`b[ `ZØf`  
X]Y`; YgY`gW\`UZh`V`Y]Vh`8]Yg`nY][`h`g]W\`Ui`W\`]b`XYb`  
\_cbh]bi ]Yf`]W\Yb`6Ya`Ø\`i`b[ Yb`i`a`5i Z`Àfi b[ `i`bX`J YfVYggYfi b[  
XYf`J Yf`\_Y\`fg]bZfUghfi`\_hi`f`"

8YhU]g

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