

## 5`VVfi W\_. 'GWk YfYf'I bZU``'Ui Z'6' ( ' F Yhhi b[ g\i VgWk fUi VYf']a '9]bgUhn

J cfZU\fhgj Yf`Yhni b[ 'VY]'5`VVfi W\_. 'GWk YfYf'I bZU``'Ui Z'6' ( ž  
F Yhhi b[ g\i VgWk fUi VYf']a '9]bgUhnž'nk Y]'DYfgcbYb'j Yf`Yhnh"

9]b'gWk YfYf'J Yf\_Y\fgi bZU``YfY][ bYhY'g]Wk 'Ua '8]YbghU[ ž'XYb'&\$"  
5i [ i gh&\$&( ž[ Y[ Yb'%). \$ \$'I \f']b'XYf'FY[ ]cb'5`VVfi W\_ž'U'g'Y]bY  
\*( !Å\f][ Y'5i hcZU\fyf]b'Ub'Y]bYf'?fYi ni b[ 'i bUWk hgUa 'k Uf'"G]Y  
k Uf'Ui Z'XYf'@UbXghfU»Y'%) ( 'i bhYfk Y[ g'i bX'Vc[ 'b'X]Y  
6i bXYgghfU»Y'' ( 'Y]bž'c\bY'XYb'\YfUbbU\YbXYb'J Yf\_Y\f'ni  
VYUWk hYb'"8]YgY'9bhgWk Y]Xi b[ 'nc[ 'Y]bY'XfUgh]gWk Y: c'[ Y'bUWk  
g]Wk ž'U'g'g]Y'Y]bYb'' ( !Å\f][ Yb': U\fyf'fUa a hYž'XYf']b'F]Wk hi b[  
@Ui ZYbVi f[ 'Z' \f"

6YfY]hg'XYf'5i ZdfU``k Uf'a cbi a YbhU'ž'k cXi fWk 'VY]XY': U\fnYi [ Y  
Yf\YV'Wk 'VYgWk ÅX][ h'k i fXYb'"8]Y'9]bgUhn\_fÅZhY'XYf': Yi Yfk Y\ f  
a i gghYb'Ui gfØW\_Ybž'i a 'VY]XYb'DYfgcbYb'[ YVfcWk YbY'HØfYb'ni  
ÒZbYb'i bX'g]Y'Ui g']\fYb'5i hcg'ni 'VYž'fY]Yb'"K Å\fybX'X]Y  
\*( !Å\f][ Y'fY'Uh]j 'gWk bY``VY\UbXY'h'k YfXYb'\_cbbhYž'k Uf'X]Y '@U[ Y  
XYg'' ( !Å\f][ Yb'\_f]h]gWk Yf'"GY]b'Ni ghUbX'YfZc'fXYfhY'XYb'9]bgUhn  
Y]bYg'F Yhhi b[ g\i VgWk fUi VYfgž'i a ']\b'gWk bY``gha Ò[ 'Wk 'b'Y]b  
?fUb\_Yb\Ui g'ni 'hfUbgdcfh]YfYb"

## 8 Ug'I bZU``[ YgWk Y\Yb']a '8 YhU]`

8]Y'I a ghÅbXY'XYg'I bZU``g'j YfXYi h]Wk Ybž'k ]Y'k ]Wk h][ 'Yg']ghž'Ub  
?fYi ni b[ Yb'VYgcbXYfg'j c'fg]Wk h][ 'ni 'gY]b'"8 Ug'B]Wk hVYUWk hYb'XYf  
J cfZU\fh\_Ubb'[ fUj ]YfYbXY': c'[ Yb'\UVYbž'k ]Y'j]b'X]YgYa ': U``'8]Y  
Yf']hYbYb'J Yf`Yhni b[ Yb'XYf'6YhY']][ hYb'k UfYb'gc  
gWk Yfk ]Y[ YbXž'XUgg'VY]XY']bg'?fUb\_Yb\Ui g'Y]b[ Y'YZYfh'k YfXYb  
a i gghYb'"K Å\fybX'X]Y' [ YbUi Y'GWk UXYbg\Ò\Y'bcWk 'b]Wk h

VYn]ZYfh'k YfXYb`\_Ubbž]gh'XYf'a UhYf]Y`Y`J Yf'i gh'Ub[ Yg]W\hg'XYf ghUf\_Yb`NYfghÒfi b[ `XYf': U\fnYi [ Y`Yf\YV`]W\ "

- I bZU`nY]hdi b\_h.`8]YbghU[ ž&\$""5i [ i gh&\$&(ž%) .\$\$`I \f
- C fh.`9]ba ØbXi b[ `@UbXghfU»Y%) ( `]b`X]Y`6i bXYgghfU»Y` ( ž5`VVfi W\_
- 6YhY`][ hY.`\*( !`À\`f][ Y`: fUi `fi U\fyf]bŁi bX` ( !`À\`f][ Yf A Ubb`fi U\fyfŁ
- GcZcfha U»bU\`a Yb.`9]bgUhn`j cb`: Yi Yfk Y\`fi bX FYhhi b[ g\i VgW\`fUi VYf

5i Z`X]Y`\_ÒfdYf`]W\Yb`i bX`dgmW\]gW\Yb`5i gk ]f\_i b[ Yb`Y]bYg gc`W\Yb`i bZU`g`g]bX`X]Y`6YhfcZZYbYb`cZha U`g`b]W\h`j cfVYfY]hYh" 8]Y`5b[ gh]j cf`Y]bYa`gc`W\Yb`9fY][ b]g`V`Y]Vh]a` ; YX`W\hb]gžk Ug X]Y`h`À[ `]W\Y`B`i hni b[ `XYf`GhfU»Yb`VYY]bZi ggYb`\_Ubb""5i W\`X]Y : Yi Yfk Y\`fi bX`FYhhi b[ gX]YbghY`a ØggYb`g]W\`VY]`gc`W\Yb 9]bg`À`h`Yb`Ybcfa`UbghfYb[ Ybž`i a`X]Y`G]W\Yf\Y]h`XYf`J Yf`Y`h`h`Yb ni` [ Yk`À\`f`Y]ghYb"

9]b`k Y]hYfYf`k ]W\h][ Yf`5gdY`\_h]gh`X]Y`j cb`XYb`6Y\`ÒfXYb Xi fW\ [ YZØ\`fhY`i bhYfgi W\i b[ `XYg`J cfZU`g""i bZU`Ub`U`mgYb`Y`Z`Yb b]W\h`bi f`VY]`XYf`5i Z`\_`Àfi b[ ž`gcbXYfb`Ui W\`XUVY]ž`ni \_ØbZj[ Y Ni gUa`a YbghÒ»Y`Ub`[ YZ`À\`f`]W\Yb`?fYi ni b[ Yb`ni`j Yfa Y]XYb" 6YgcbXYfY`5i Za Yf\_gUa`\_Y]h`f]W\hYb`X]Y`9i dYfhYb`\]YfVY]`Ui Z J Yf`\_Y\`fgnY]W\Yb`i bX`, VYfk UW\i b[ ggmghYa Yž`X]Y`Yj Ybhi Y` j YfVYggYfh'k YfXYb`\_ÒbbhYb"

## K ]W\h][ \_Y]h`X`Yf`J Yf`\_Y`f`gg]W\Yf\Y]h

8]Y`HfU[ ]\_`X]YgYf`G]hi Uh]cb`XUfZ`b]W\h][ bcf]Yfh'k YfXYb""»XYf X]YgYf`i bZ`À`Y`gW\`À[ h`K Y`Yb`i bX`Vf]b[ h`X]Y`Xf]b[ YbXY`: fU[ Y bUW\`XYf`J Yf`\_Y`f`gg]W\Yf\Y]h`Ui Z`5i W\`k Ybb`X]Y`i fgUW\Y`ZØf`X]Y J cfZU\`fhgj Yf`Y`hni b[ `b]W\h`YbX[ Ø`h][ ` [ Y`\_`À`fh]`ghž`gc`hY`XUg 9fY][ b]g`Y]b`5i Zfi Zni f`Yf\`Ò\`hYb`K UW\gUa`\_Y]h`Ui Zi bgYfYb GhfU»Yb`gY]b""8]Y`J YfUbhk cfhi b[ `]a`GhfU»Ybj Yf`\_Y`f`Y]Y[ h]a`a Yf VY]`YXYa`9]bnY`bYbž`i bX`X]Y`9bhgW\Y]Xi b[ ž`g]W\Yf`ni`ZU\`fYbž` ]Y[ h]b`i bgYfYb`<`ÀbXYb"

J Yf\_Y\ fgi bZÀ`Y`k ]Y`X]YgYf`Yfa i h[ Yb`X]Y ; YgY`gWk UZhž] \ fY  
< YfUb[ Y\Ybgk Y]gY`Ub`A cV]`hÀhni`ØVYfXYb`Yb" `X`Yg`X\ f` [ ]Vh  
Yg`a Y\ fYfY`gc`Wk Yf`J cfZÀ`Y`ž`X]Y`b]Wk h`bi`f`A YbgWk Yb`YVYb  
[ YZÀ\ fXYbž`gcbXYfb`Ui Wk`XYb` : Ua` ]Yb`i`bX` : fYi`bXYb`XYf  
J Yf`YhnhYb`]a` a` YbgY`Gcf[ Yb`i`bX`Z]bUbn]Y`Yg`@Y]X`Vf]b[ Yb  
\_ÒbbYb" `A U» bU\ a` Yb`ni`f`J YfVYggYfi`b[ `XYf`J Yf\_Y\ fgg]Wk Yf\ Y]h  
g]bX`i`bj`Yfn]Wk hVUfž`i` a` `X]Y`NU\`gc`Wk Yf`i` bZÀ`Y`ni`fYXi`n]YfYb"

8 ]Y`G]hi`Uh]cb`XYf`VY]XYb` : U\ fnYi` [ ]bgUggYb`i`bX`X]Y`5fh`XYg  
J cfZU`g`g]bX`\ YfUi`gZcfXYfbXY`9f]bbYfi`b[ Yb`Ub`X]Y ; YZU\ fYbž`X]Y  
]a`GhfU» Ybj`Yf\_Y\ f`Ui`Yfb" `8 U\ Yf`]gh`Yg`ZØf`i`bg`U`Y`k` ]Wk h[ [ ž`XYb  
K`Yfh`XYf`G]Wk Yf\ Y]h]a`GhfU» Ybj`Yf\_Y\ f`ni`Yf\_YbbYb`i`bX`U`\_h]j`ni  
ZØfXYfb"

## J Yf\_Y\ fgg]Wk Yf\ Y]h`i`bX`i`bZU`ghUh]gh]\_Yb

8 ]Y`J Yf\_Y\ fgg]Wk Yf\ Y]h]gh`Y]b`nYbhfU`Yg`H\ Ya`U`]b`8 Yi`hgWk`UbXž  
]bgVYgcbXYfY`Ub[ Yg]Wk hg`XYf`\ c\ Yb`NU\`Ub`J Yf\_Y\ fgi`bZÀ`Ybž  
X]Y`À\ f`]Wk`[ Ya`Y`XYh`k`YfXYb" `@Ui`h`XYf`GhUh]gh]gWk Yb`Y`a`hYf  
XYg`6i`bXYg`i`bX`XYf`@AbXYf`[ UV`Yg]a` `X\ f`&\$&&`a`Y\ f`U`g`&ž`  
A`]]cbYb`J Yf\_Y\ fgi`bZÀ`Y`ž`k`Ug`Y]bYa` `Y]Wk hYb`5bgh]Y`[ ]a  
J Yf[ `Y]Wk`ni`XYb`J cfU\ fYb`Ybhgd]Wk h`6YgcbXYfg  
\ Yf]cf[ Y\ cVYb`k`]fX`XUVY]ž`XUgg`i`bZÀ`Y`Xi`fWk  
J cfZU\ fhgj`Yf`Yhni`b[ Yb`\ Ài`Z][`ni`gWk`k`YfYb`DYfgcbYbgWk`ÀXYb  
ZØ\ fYb"

⇒ a` `X\ f`&\$&&`k`i`fXYb`ØVYf`)`\$`\$`\$`J Yf`YhnhY`VY]  
J cfZU\ fhgj`Yf`Yhni`b[ Yb`fY[ ]ghf]Yfhž`XUfi`bhYf`Yhk`U`%`,`\$\$  
gWk`k`Yfj`Yf`YhnhY`DYfgcbYb" `8 ]Yg`j`YfXYi`h]Wk h`X]Y ; YZU\ fYbž`X]Y  
a`]h`A`]ggUWk`hi`b[ Yb`XYf`J Yf\_Y\ fgyfY[ Y`b`Y]b\ Yf[ Y\ Yb" `8 ]Y  
Ub\ U`hYb`XY`5i`Z`Àfi`b[ `ØVYf`J Yf\_Y\ fgg]Wk Yf\ Y]h`i`bX`XUg  
9]b\ U`hYb`XYf`J Yf\_Y\ fgyfY[ Y`b`V`Y]VYb`XU\ Yf`]b`XYf`ÒZYb`h]Wk Yb  
8 ]g`\_i`gg]cb`j`cb`[ fc» Yf`6YXYi`hi`b[ "

F Y`Yj`Ub`hY`fYWk`h`]Wk`Y`5gdY`\_hY`VY]

J Yf\_Y\ fgi bZÀ`Y`b

æ : U`Y]bYg`J Yf\_Y\fgi bZU`g`k ]Y`XYa` ]b`5`VVfi W`\_g]bX`X]Y  
fYWX`h]WX`Yb`?cbgYei YbnYb`cZ`h`k`Y]hfY]WX`YbX`"8]Y` ; fi bX`U[ Yb`ZØf  
X]Y`fYWX`h]WX`Y`6Yk`Yfhi b[ `Y]bYg`gc`WX`Yb`J`cfZU`g`g]bX`]a  
GhfU» Ybj Yf\_Y\fg[ YgYhn`fGhJ ; Ł`gck ]Y`]a`6Øf[ Yf`]WX`Yb  
 ; YgYhnVi WX`fB; 6Ł`j YfUb`\_Yfh`"6Y]`Y]bYa` `J`cfZU`fhgj`cfZU```\_ØbbYb  
gck`c`n]j`]fYWX`h]WX`Y`U`g`Ui`WX`ghfUZfYWX`h]WX`Y`5gdY`\_hY`ni`f  
5bk`YbXi`b[ `\_ca`a`Yb`"

8]Y`<UZhi`b[ `\_Ubb`[ Ya`À»`z` , &` `6; 6`ZØf`GW`ÀXYb`Ub`DYfgcbYb  
cXYf` : U\fnYi` [ Yb`Y]bhfYhYb`ž`k`Ybb`X]Y`dZ]WX`hk`]Xf][ Y`J`Yf`Yhni`b[  
Y]bYf`J`Yf\_Y\fgg]WX`Yfi`b[ gdZ]WX`h`bUWX` [ Yk`]YgYb`k`YfXYb`\_Ubb`" ð  
X]YgYa` : U``\_ØbbhY`X]Y`\*`(!`À\`f][ Y` : U\fyf]b`a`Ò[ `]WX`Yfk`Y]gY`ZØf  
X]Y`GW`ÀXYb`XYg` (!`À\`f][ Yb` : U\fyfg`j`YfUb`hk`cfh`]WX` [ Ya`UWX`h  
k`YfXYb`ž`XU`g]Y`X]Y`J`cfZU`fhgfY[ Y`b`a`]ggUWX`hYh`h`U`"5i`WX`X]Y  
 : fU[ Y`XYf` : U\`f`Àgg][ `\_Y]h`k`]fX`]b`gc`WX`Yb` : À`Yb`cZ`h`i`bhYfgi`WX`h`ž  
i`a`Y]bY`a`Ò[ `]WX`Y`J`YfUb`hk`cfh`]WX`\_Y]h`ni` `\_`ÀfYb`"

8]Y`F`c``Y`j`c`b`F`Y`h`h`i`b[`g`X]Y`b`g`h`Y`b`i`b`X  
B`c`h`ZU```a`U`b`U[`Y`a`Y`b`h`

8]Y`g`WX`bY``Y`F`YU`\_h]c`b`j`c`b`F`Y`h`h`i`b[`g`X]Y`b`g`h`Y`b`i`g`h`Y`b`h`g`WX`Y]X`Y`b`X`ZØf  
X]Y` , VYf`YVY`b`g`WX`U`b`W`b`j`c`b`i`b`ZU``c`d`Z`Y`f`b`" ð`X`Y`f`V`Y`g`WX`f]Y`V`Y`b`Y`b  
G]h`i`U`h]c`b`k`i`f`X`Y`b`X]Y`C`d`Z`Y`f`X`i`f`WX` : Y`i`Y`f`k`Y`\`f`i`b`X`F`Y`h`h`i`b[`g`X]Y`b`g`h  
g`WX`bY``[ YVcf[ Yb`i`b`X`j`Yfgcf[ h`"8]Y`5i`gk`]f`\_i`b[ Yb`Y]bYf  
fYWX`h`nY]h][ Yb`a`YX]n]b]g`WX`Yb` ð`h`Y`f`j`Y`b`h]c`b`g]b`X`]b`n`U`\`f`Y]WX`Yb  
G`h`i`X]Y`b`X`c`\_i`a`Y`b`h]Y`f`h`i`b`X`V`Y`Y[ Yb`ž`X`U`g`g`X]Y`Y`f`g`h`Y`b`A`]b`i`h`Y`b  
b`U`W`X`Y]b`Y`a`g`WX`k`Y`f`Y`b`i`b`ZU``c`Z`h`Y`b`h`g`WX`Y]X`Y`b`X`g]b`X`"

8Yi`hg`WX`U`b`X`j`YfZØ[ h`ØVYf`Y]b`[ i`h`ghfi`\_`h`i`f]Y`f`h`Y`g  
B`c`h`ZU```a`U`b`U[`Y`a`Y`b`h`ž`X`U`g`g]WX`]b`G]h`i`U`h]c`b`Y`b`k`]Y`X]Y`g`Y`b`V`Y`k`À`h`f`h`  
8]Y`Vi`b`X`Y`g`k`Y]h`Y`B`c`h`f`i`Z`b`i`a`a`Y`f`%`%`&`j`Y`f`V]b`X`Y`h`X`Y`b`5`b`f`i`Z`Y`f  
g`c`Z`c`f`h`a`]h`X`Y`f`Ø`f`h`]WX`Y`b`F`Y`h`h`i`b[`g`Y]h`g`h`Y``Y`ž`X]Y`<]Z`Y`g`WX`bY``i`b`X  
Y`Z]n]Y`b`h`\_`c`c`f`X]b]Y`f`h`"8i`f`WX`X]Y` ð`h`Y[ f`U`h]c`b`j`Y`f`g`WX`]Y`X`Y`b`Y`f  
8]Y`b`g`h`Y`ž`Y]b`g`WX`Y]Y`»`]WX` : Y`i`Y`f`k`Y`\`f`ž`F`Y`h`h`i`b[`g`X]Y`b`g`h`i`b`X`D`c`n]Y`ž  
k`]f`X`Y]b`Y`f`U`g`WX`Y`i`b`X`Y`Z`Y`\_h]j`Y`B`c`h`ZU``f`Y`U`\_h]c`b`[ Yk`À`f`Y]g`h`Y`h`"

Df`À`j`Y`b`h]j`Y`A`U»`b`U`a`Y`b`ni`f`F`Y`X`i`n]Y`f`i`b[

# j cb 'J Yf\_Y\fgi bZÄ``Yb

I a 'X]Y'; YZU\fyb'ja 'GhfU»Ybj Yf\_Y\f'ni 'a ]b]a ]Yfybž'g]bX  
dfÄj Ybh]j Y'A U» bU\ a Yb' i bYf'Ägg']W" "8 ]Yg' i a ZUggh  
5i Z\_Äfi b[ g\_Ua dU[ bYb'ni f'GYbg]V` ]g]Yfi b[ 'ZØf  
J Yf\_Y\fgg]WYf\Y]hž']bhYbg]j Y': U\fyfgW i 'i b[ Yb' i bX'ghfYb[ YfY  
?cbhfc``Yb'\ ]bg]W h']W 'XYf'9]b\U'hi b[ 'j cb'J Yf\_Y\fgfY[ Y'b"  
⊖]h]Uh]j Yb'k ]Y'X]Yg'ZØfXYfb'Y]b'VYggYfYg'J YfghÄbXb]g'XYf  
j YfgW ]YXYbYb'J Yf\_Y\fgg]hi Uh]cbYb' i bX'hfU[ Yb'ni f'FYXi n]Yfi b[  
XYf'i bZU``nU\`Yb'VY]``

Ni XYa 'k ]fX'XYf'5i gVUi 'g]WYfYf'J Yf\_Y\fgk Y[ Y'gck ]Y'X]Y  
J YfVYggYfi b[ 'XYf'⊖ZfUghfi \_hi fž'k ]Y'VY]gd]Y`gk Y]gY'XYi h']WY  
6YgW ]XYfi b[ Yb'Ub'?fYi ni b[ Ybž'U'g'YggYbn]Y``YfUW hYh" 8 ]Y  
?ca V]bUh]cb'X]YgYf'5bgÄhY' \_ÖbbhY'ni 'Y]bYf'g][ b]Z\_UbhYb  
FYXi n]Yfi b[ 'XYf'J Yf\_Y\fgi bZÄ``Y' i bX'ni 'Y]bYf'\Ö\Yfyb  
G]WYf\Y]h'ZØf'U``Y'J Yf\_Y\fgH]`bY\ a Yf'ZØ\fyb"

8 YhU]`g

6Ygi WYb'G]Y' i bg'Ui Z.'b!U[ "XY