

# 9`nUj YhU`Gi g`cj U`j YfnUi VYfh`VY]a C f[ Y`gca a Yf`]b`G]`YbghYXY

9`nUj YhU`Gi g`cj U`gd]Y`h`VY]a`C f[ Y`gca a Yf`]b`XYf  
Gh"! : `cf]Ub! ? ]fWXY`Ua`&( "'5i [ i gh'K Yf\_Y`XYf`K ]YbYf`?`Ugg]\_  
i bX`XYg`F c\_c\_c"

⊕`XYf`Gh"! : `cf]Ub! ? ]fWXY`b`G]`YbghYXY`k ]fX`Ua`GUa ghU[ žXYa  
&( "'5i [ i ghžY]b`[ Ubn`VYgcbXYfYf`a i g]\_U`]gWXYf`5VYbX  
ghUhhz]bXYbžXYf`gck c`@YV\UVYf`XYf`\_`Ugg]gWXYb`A i g]\_U`g`Ui W  
BYi [ ]Yf][ Y`[ `Y]WXYfa U»Yb`UbgdFYWXYb`k ]fX`"8]Y`VYY]bXfi W\_YbXY  
C f[ Ub]gh]b`9`nUj YhU`Gi g`cj U`k ]fX`i a`% , `i \f`X]Y`6Ygi WXYf`a ]h  
]\fYa`?`ÒbbYb`j YfnUi VYfb`i bX`g]Y`Ui Z`Y]bY`U\_i gh]gWXY`F`Y]gY  
Xi fW` ; i ghcghØW\_Y`XYf`K ]YbYf`?`Ugg]\_i bX`XYg`F c\_c\_c  
a ]hbY`a Yb"

8Yf`5VYbX`ghY`h`i bhYf`XYa`A chc` NUFhY`@Y]W`h][ \_Y]h`i bX  
j Yfgd]Y`hY`9`Y[ Ubn`ž`k Ug`gW`cb`Y`hnh`X]Y`J cfZ`fYi XY`Ui Z`XUg`9j Ybh  
ghY][ Yfh`"8]Y`Ni \`ØfYf`\_`ÒbbYb`g]W`Ui Z`Y]bY`5i gk U``Ub  
A Y]ghYfk Yf\_Yb`Z`fYi Ybž`X]Y`Ui Z`XYf`VYfØ`a hYb`x`Ubb!5XUa`!  
6YfbYf!C f[ Y`XUf[ YVchYb`k YfXYb`"9`nUj YhU`Gi g`cj U`gW`ØdZ`h`Ui g  
Y]bYa`fY]WXYb`F`YdYfhc]fY`i bX`Vf]b[ h`GhØW\_Y`j cb`VYXYi hYbXYb  
?ca`dcb]ghYb`ni f`5i ZZØ`fi b[ ž`XUfi bhYf`7Uf`D\`]]dd`9a Ubi Y`  
6UWž` ; Ycf[ `D\`]]dd`HY`Ya Ubb`i bX`K c`Z[ Ub[ `5a UXYi g`A`cnUfh"

## 9`nUj YhU`Gi g`cj U` `9]bY`A`Y]ghYf]b`XYf`C f[ Y`

8]Y`A i g]\_Yf]b`V`]W`h`Ui Z`Y]bY`VYY]bXfi W\_YbXY`?`Uff]YfY`ni fØW`"  
6YfY]hg]`ja`? ]bXYgU`hYfž`a ]h`bi f`gYW`g`»\fYbž`VY[ Ubb`g]Yž`?`Uj ]Yf  
ni`gd]Y`Yb`i bX`YbhXYW`hY`VU`X`XUfUi Z`]\fY`@Y]XYbgW`UZh`ZØf`X]Y  
C f[ Y`"≠fY`U`UXYa ]gWXY`5i gV]`Xi b[ `gW`Y]Y»h`g]Y`ni fnY]h`Ub`XYf  
fYbca`a ]YfhYb`i b]j Yfg]h`h`XYf`?`ØbghY`]b`6Yf]b`VY]`DfcZYggc`f

<Ybfmi: U]fg'UVž'bUWXYa 'g]Y'VYfY]hg']b'a Y\ fYfYb'A Y]ghYf\_i fgYb  
k Yfhj c``Y'9fZU\fi b[ Yb'gUa a Y'b'\_ccbhY""8UZØf'k ]fX'g]Y'gck c\`  
ZØf']\fY'hYWb]gWXYb': Å\[\_Y]hYb'U'g'Ui W'ZØf']\fY'a i g]\_U'gWXY  
5i gXfi W\_g\_fUZh[ YgWÅÀhnh"

Gi g`cj U']gh'b]W'h'bi f'ZØf']\fY'gc`gh]gWXYb'8UfV]Yhi b[ Yb'VY\_Ubbhž  
gcbXYfb`\Uh'Ui W'VY]j YfgW]YXYbYb'K YhhVYk YfVYb'XYf  
Cf[ Y'a i g]\_nU\`fY]WXY'DfY]gY'[ Yk cbbYb"" ÆfY'5i Zhf]hhY'g]bX'ØVYf  
X]Y'; fYbnYb'8Yi hgW'UbXg'\]bUi g'VY[ Y\fhž'i bX'g]Y'gh  
fY[ Y'a Å»][ 'VY]'bhYfbUh]cbU'Yb': Ygh]j U'g'ni '\ØfYb"" Æf'HU'Ybh  
YfghfYW\_h'g]W'ØVYf'j YfgW]YXYbY'9dcWXYbž'k cVY]Y]b'VYgcbXYfYf  
GWk Yfdi b\_h'Ui ZXYf'6UfcW\_a i g]\_`Y[ h" ÆfY': Å\[\_Y]hž'X]Y  
K Yf\_Y'UbXYfYf'?ØbghYf'a ]h']\fYf'Y][ YbYb'BchY'ni ]bhYfdfYh]YfYbž  
a UW'h'YXYb'5i Zhf]hh'ni 'Y]bYa 'Y]bn][ Ufh][ Yb'9f'YVb]g"

? cbnYfh'i bX': Ø\fi b[ Yb']b'XYf'Gh"! : `cf]Ub!  
? ]fWXY

8Ug'? cbnYfh'k ]fX'Xi fW'Y]bY'UbgW'Y»YbXY': Ø\fi b[ 'Xi fW'X]Y  
fca Ub]gWXY'Gh"! : `cf]Ub!]? ]fWXY'Yf[ Åbnhž'k Ug'XYb'5VYbX'ni 'Y]bYa  
VYgcbXYfg'VYfY]WXYfbXYb'9f'YVb]g'a UW'h"8]Y'? ]fWXY'gY'Vgh]gh  
Y]b'UfW]hY\_hcb]gWXYg'ž k Y'i bX'hfÅ[ h'ni f'VYgcbXYfYb  
5ha cgd\ÅfY'XYg'9fY][ b]ggYg'VY]"6Ygi WXYf'\_ØbbYb'X]Y  
\]ghcf]gWXY'GhÅhhY'bÅ\Yf'\_YbbYb'YfbYb'i bX'g]W'j cb']\fYf  
GW'Øb\Y]h]bgd]f]YfYb'UggYb"

: Øf'U``YbYžX]Y'Y]bYb'5VYbX'j c``Yf'A i g]\_i bX'?i 'hi f'Yf'YVYb  
a ØW'hYbž]gh'X]YgYg'9j Ybh'Y]b'UVgc'i hYg'A i gg"9[ U'ž'cV'G]Y'Y]b  
: Ub'\_Ugg]gWXYf'A i g]\_g]bX'cXYf'Y]bZUW'bi f'bYi [ ]Yf][ 'Ui Z'X]Y  
\_Ub[ `]WXYb'A Ø[ `]W\_Y]hYb'XYf' Cf[ Y``'9`nUj YhU'Gi g`cj U  
j Yfgdf]W'h'Y]b'? cbnYfhž'XUg'gck c\`XUg'C\ f'U'g'Ui W'XUg'<Yfn  
Ubgdf]W'h"8Yf'G]"YbghYXYf' Cf[ Y'gca a Yf'\Uh'g]W'j b'X]YgYa 'ž\ f  
Y]ba U'a Y\ f'U'g'D'UhhZcfa 'ZØf'\cW\_UfÅh][ Y'8UfV]Yhi b[ Yb  
YhUV'Yfh'i bX'n]Y\h'6Ygi WXYf'Ui g'XYf'[ YgUa hYb'fY[ ]cb'Ub"

8]Y'?ca V]bUh]cb'Ui g'ØVYffUgWXYbX'Zf]gWXYb'žbhYfdfYhUh]cbYb'i bX  
XYf'Y]bXfi W\_gj c``Yb'5\_i gh]\_XYf'Gh"! : `cf]Ub!]? ]fWXY'k ]fX'[ Yk ]gg  
U`Y'5bk YgYbXYb'j b']\fYb'6Ubb'n]Y\Yb""8]Y'9fk Ufhi b[ 'Ui Z'XUg

?cbnYfh'Ua ' &(" '5i [ i gh'ghY][ hi bX'a Uf\_]Yfh'Y]b'k Y]hYfYg' < ][ \`][ \h  
]a 'X]Yg'À\`f][ Yb' Cf[ Y`gca a Yf"

8]Y`\_Øbgh'Yf]gWY'8UfV]Yhi b[ 'j cb'9`]nUj YhU'Gi g`cj U`]gh'b]W'h'bi f  
Y]b': Ygh]j U`ZØf'X]Y'G]bbYž'gcbXYfb'ghY`h'Ui W'Y]bY'J YfV]bXi b[  
XUf'nk ]gWYb'XYf'a i g]\_U`]gWYb'HfUX]h]cb'i bX'XYf'a cXYfbYb  
5i ZØ\fi b[ g\_i bgh" ÆfY': À\`][ \_Y]hž'U`hY'A Y]ghYf'a ]h'bYi Yf  
@Y]XYbgW'UZh'ni 'VY'YVYbž'gh'Y]b'VYXYi hYbXYf'6Y]hfU[ 'ni f  
: cfhgYhni b[ 'X]YgYf'fY]WYb'a i g]\_U`]gWYb'9fVgW'UZh"

## 8]Y`Gh"! : `cf]Ub! ? ]fWY'Y' i bX' ]\`fY'; YgWY ]WY hY

8]Y`Gh"! : `cf]Ub! ? ]fWY'Y' ]gh'Y]b'VYa Yf\_Ybgk YfhYg'6Ui k Yf\_'XYf  
fca Ub]gWYb'5fW]hY\_hi fž'XUg' ]b'XYf'FY[ ]cb'Y]bY'VYXYi hYbXY  
Fc`Y'gd]Y'h"G]Y'k i fXY' ]a '%&"`đ\`f\i bXYfh'YfVUi h'i bX'nY]WYbYh  
g]WY'Xi fWY' ]\`fY'WUfU\_hYf]gh]gWYb'F i bXVØ[ Yb'i bX'a Ugg]j Yb  
GhY]ba Ui Yfb'Ui g" '8]YgY'A Yf\_a U`Y'g]bX'hmd]gWY'ZØf'X]Y  
fca Ub]gWY'6Ui k Y]gY' i bX'j Yf'Y]\`Yb'XYf'? ]fWY'Y' ]bYb'[ Ubn  
VYgcbXYfYb'7\Ufa Y"

æa '@Ui ZY' ]\`fYf'; YgWY ]WY hY' \U'h'X]Y'? ]fWY' nU\`fY]WY  
J Yf'ÀbXYfi b[ Yb'i bX'FYghUi f]Yfi b[ Yb'Yf'YVhž'X]Y' ]\`fY'\ ]ghcf]gWY  
Gi VghUbn'VYk U\`fh'\UVYb" '6YgcbXYfg'Yfk À\`bYbgk Yfh']gh'X]Y  
fYghUi f]YfhY' Cf[ Y`ž'X]Y' ]b'XYf'J Yf[ Ub[ Yb\Y]h'Xi fWY' j YfgWY]YXYbY  
'Øbgh'Yf'[ YdZY[ hi bX'j YfVYggYfh'k i fXY" '8]YgY' Cf[ Y` ]gh'Y]b  
k ]WYh][ Yf'6YghUbXhY]'`XYg'\_i `hi fY`Yb'@YVYbg']b'G]'`YbghYXY' i bX  
hfÀ[ h'ni f'5hfU\_h]j ]h'À'h'j cb'J YfUbgU`hi b[ Yb'k ]Y'XYa  
Cf[ Y`gca a Yf'VY]"

## 9`]nUj YhU'Gi g`cj U. '? Uff]YfY' i bX'5i gV]'Xi b[

9`]nUj YhU'Gi g`cj U`\U'h'g]WY' ]bbYf\U'V`\_ØfnYghYf'NY]h' ]b'XYf  
A i g]\_k Y'h'Y]bYb'BUa Yb'[ Ya UW'h" ÆfY'a i g]\_U`]gWY'5i gV]'Xi b[  
VY[ Ubb' ]a ' ? ]bXYgU'hYf' i bX'ZØ\fhY'g]Y'Xi fWY' j YfgWY]YXYbY  
\_Øbgh'Yf]gWY'GhUh]cbYb" 'BUWY' ]\`fYa ' ?`Uj ]Yfi bhYff]WYh'VY[ Ubb  
g]Y'a ]h'XYa 'Ghi X]i a 'XYf' Cf[ Y`ž'XUg'g]Y'Ub'fYbca a ]YfhYb  
ægh]hi h]cbYb'k ]Y'XYf' i b]j Yfg]h'À'h'XYf'? ØbghY' ]b'6Yf' ]b'j Yfh]YZhY"  
BYVYb' ]\`fYa 'fY[ i `ÀfYb'Ghi X]i a '\U'h'g]Y'Ub'a Y\`fYfYb

A Y]ghYf\_i fgYb`hY][ Ybca a YbžVY]`XYbYb`g]Y`j cb`bUa \UZhYb  
8cnYbhYb`i bhYff]W\hYh`k i fXY"

⇒ `U\ f`&\$&&`[ Yk Ubb`g]Y`XYb`YfghYb`DfY]g`VY]a`8Yi hgW\Yb  
Cf[ Y`k YhVYk YfV`i bX`k ]fX`XUZØf`VYgcbXYfg`[ YgW\Åhnhž`XUgg`g]Y  
\_`Ugg]gW\Y`?ca dcg]h]cbYb`a`]hY]bYa`Zf]gW\Ybž`a`cXYfbYb`5bgUhn  
]bhYfdYh]Yfh"8UfØVYf`\]bUi`g`]gh`Gi`g`c`j`U`fY[ Y`a`Å»][ `Ub  
j YfgW\]YXYbYb`A`i`g]\_Z`gh]j`U`g`VYhY]`][ hž`k`Ug`]\fYf`6Y`Ubbh\Y]h`]b  
XYf`GnYbY`k`Y]hYfYb`5i`Zhf]YV`[ ]Vh"

8 Ug`F`YdYfhc]fY`i`bX`X]Y`6YXYi`hi`b[ `XYf  
K`]YbYf`?`Ugg]\_`

8 Ug`?`cbnYfhdfc[ fUa`a`ž`XUg`Gi`g`c`j`U`d`f`ÅgYbh]YfYb`k`]fX`ž`i`a`ZUggh  
Y]bY`VfY]hY`DU`YhY`j`cb`K`Yf`\_`Yb`Ui`g`XYf`K`]YbYf`?`Ugg]\_`i`bX`XYa  
F`c`\_`c`\_`c`"8]YgY`DYf]cXY`]gh`VY`\_Ubbh`ZØf`]\fY`9bhk`]W`\_`i`b[ `XYf`:`c`fa  
i`bX`Ghfi`\_`hi`f`]b`XYf`A`i`g]\_ž`k`Ug`g]W\`VYgcbXYfg`]b`XYb  
?ca dcg]h]cbYb`j`cb`A`cnUfhž`<UmXb`i`bX`6Yh\`c`j`Yb`k`]XYfgd]Y[ Y`h`  
8]Y`K`]YbYf`?`Ugg]\_ž`X]Y`Yhk`U`j`cb`%+)`\$`V]g`%`,`&\$`XUi`YfhYž`ghY`h  
Y]bY`Yb`hgW\Y]XYbXY`D\UgY`]b`XYf`A`i`g]\_`[ YgW\]W\hY`XUfž`]b`XYf  
g]W\`X]Y``,`VYf[ Åb[ Y`j`ca`6UfcW`\_`ni`f`F`ca`Ubh]\_`XYi`h]W\`nY][ Yb`"

8]Y`K`Yf`\_`Y`j`cb`7`"D"9"6UW`i`bX`HY`Ya`Ubbž`X]Y`Y]bYb`k`]W\h][ Yb  
6Y]hfU[ `ni`f`XYi`hgW\Yb`A`i`g]\_hfUX]h]cb`Y]ghYbž`fi`bXYb`XUg  
Dfc[ fUa`a`UV`i`bX`nY][ Yb`X]Y`J]Y`ZU`h`XYg`F`YdYfhc]fYgž`XUg  
Gi`g`c`j`U`VY\YffgW\h"⇒fY`:`Å\][ \_Y]hž`X]Y`nUfhY`@Y]W\h][ \_Y]hi`bX  
j`Yfgd]Y`hY`9`Y[ Ub`n`X]YgYf`?`ca dcg]h]cbYb`Y]bni`ZUb[ Ybž`k`]fX  
g]W\Yf`]W\`XUg`Di`V`\_`i`a`]b`XYf`Gh"!:`cf]Ub!`?]fW\Y`VY[ Y]ghYfb"

5i`gk`]f`\_`i`b[ Yb`j`cb`A`i`g]\_j`YfUbghU`hi`b[ Yb  
Ui`Z`X]Y`c`\_`U`Y`?`i`h`i`f`

?`i`h`i`f`j`YfUbghU`hi`b[ Yb`k`]Y`XYf`G]`YbghYXYf`C`f[ Y`g`ca`a`Yf`\UVYb  
h]YZ[ fY]ZYbXY`5i`gk`]f`\_`i`b[ Yb`Ui`Z`X]Y`c`\_`U`Y`:`Ya`Y]bgW\UZh`G]Y  
ZØfXYfb`b]W\h`bi`f`XUg`\_`i`h`i`fY`Y`@YVYb`i`bX`Vf]b[ Yb`A`YbgW\Yb  
ni`gUa`a`Ybž`gcbXYfb`i`bhYfghØhnYb`Ui`W\`c`\_`U`Y`  
J`YfUbghU`hi`b[ gc`fhY`i`bX`?ØbghYf"8]Y`Gh"!:`cf]Ub!`?]fW\Yž`U`g`Y]b

NYbhfi a 'ZØf'a i g]\_U`]gWXY`HfUX]h]cbYbž'n]Y\`h'6Ygi WXYf`Ui g`XYf  
I a [ YVi b[ 'i bX`XUfØVYf`\]bUi g`Ubž'k Ug`ni f`\_i `hi fY``Yb`i bX  
k ]fhgW\UZh]WXYb`6Y`YVi b[ `XYf`FY[ ]cb`VY]hfÀ[ h"

Gc`WXY`9j Ybhg`hfU[ Yb`Ui » YfXYa `XUni `VY]ž`XUg`6Yk i gghgY]b`ZØf  
X]Y`6YXYi hi b[ `]ghcf]gWXYf`; YVÀi XY`i bX`XYfYb`9f\U`h`ni  
gW\ÀfZYb" `bXYa `g]Y`Y]b`VfY]hYg`Di V`\_]i a `Ubn]Y\`Ybž`\Y`ZYb`g]Y  
XUVY]ž`X]Y`K YfhgW\Àhni b[ `ZØf`?i bghi bX`?i `hi f`ni `ZØfXYfbž`k Ug  
`Ub[ Zf]gh][ `Ui W`XYf`6]`Xi b[ 'i bX`XYa `9f\U`h`X]YgYf`HfUX]h]cbYb  
ni [ i hY`\_ca a h"

8YhU]`g

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