

: f]YXf]W\ g\ UZYb. 'A Y\ fYfY
: U\ ffUXX]YVghÅ\`Y`i bX` , VYfZÅ``Y` 'Dc`]nY]
gi W\ h`NYi [Yb

8]Y`Dc`]nY]`F Uj YbgVi f[`Yfa`]hhY`h`bUW\`a Y\ fYfYb
8]YVghÅ\`Yb`i bX`J cfZÅ``Yb`]a `6cXYbgYY_fY]g" `NYi [Yb
k YfXYb` [YVYhYbž`g]W\`ni `a Y`XYb"

&*"\$, "&\$&(` `%(.%\$

Dc`]nY]dfÅg]X]i a `F Uj YbgVi f[

6cXYbgYY_fY]g`f`c`hgŁ

: f]YXf]W\ g\ UZYb

⇒`XYb`Y`h`h`Yb`HU[Yb`YfgW\ØhhYfhY`Y]bY`GYf]Y`j`cb`GhfUZhUHYb`XYb
6cXYbgYY_fY]gž`]bgVYgcbXYfY`X]Y`GhUXh: f]YXf]W\ g\ UZYb"
K`Å\`fYbX`X]Y`Dc`]nY]`k`Y]hYf\]b`X]Y`<]bhYf[fØbXY`XYf`J`cfZÅ``Y
i`bhYfgi`W\`hž`k`YfXYb`NYi [Yb` [YVYhYbž`g]W\`ni `a Y`XYb"

5a`GUa`ghU[`nk`]gW\Yb`%-.`\$`l` \f`i`bX`&&`l` \f`k`i`fXYb`]a
GhUXh[YV]Yh`a`Y\`fYfY`\`cW\dfY]g][Y: U\`ffÅXYf` [Yghc`\`Yb`"Nk`Y]`9!
6]_Yg`XYf`A`Uf`_Y` `C`fVYU` ž`]b`f`c`h`i`bX`Ub`h`f`Un]hž`k`i`fXYb`Ui`g`XYf`
?`Uf`ghfU»`Y`Y`b`h`k`Y`b`X`Y`h`"8`Y`f`8]YVghU\`j`Y`fi`fgUW\`h`Y]b`Y`b`G`W`U`X`Y`b`
j`cb`fi`bX`%&"\$`\$`\$`9i`fc`"Ni`XYa`b`U`a` `Y]b`l`b`VY`_`Ub`bhYf`nk`]gW\Yb`
%*.`\$`l` \f`i`bX`%+.`\$`l` \f`Y]b`Ub[YVi`bXYbYg`A`ci`bhU]bV]_Y`XYf`
A`Uf`_Y` `@]hYj`]`Y` `]b`?`Òb][`gk`Y[`a`]hž`XYggYb`K`Yfh`VY]`Yhk`U` ("`\$`\$`\$`
9i`fc`"Y[`h`@Y`h`h`Y`C`f`hi`b[`XYg[Yghc`\`Yb`Yb`6]_Yg`k`Uf`]a` `6YfY]W\`
5i`Yb`X`cfZ`"8]Y: U\`b`Xi`b[`V`Y]Vh`V]g`ni`f`?`Åfi`b[`XYg: U`g`c`ZYb"

; Yk`U`hgUa`Y` , VYf[f]ZZY`]a` `GhUXh[YV]Yh

5a 'GcbbhU[a cf[Yb[Y[Yb:%\$'i \f'j Yf'YhhY'Y]b'V]g'Ub[
i bVY_UbbhYf'HÅhYf'Y]bYb'' +!>Å\f][Yb'Ua 'Ca b]Vi g!6U\bcZ'Ua
Fca Ubg\cfbYf'D'Uhn''8]YgYf'k i fXY'j cb'XYa 'A Ubb']b'XYb
GWk]hn_UghYb'[Ybca a Yb'i bX'\a 'k i fXY'XUg'A cV]'hY'YZcb
[Yghc\`Ybž'VYj cf'XYf'5b[fY]ZYf'b'F]W hi b['6i W\cfb!D'Uhn'Zc\"
8]Y'Dc`nY]VY\ÖfXY'\Uh'X]Y'9fa]h'i b[Yb']b'X]YgYa ' : U`
Ui Z[Ybca a Yb'i bX'V]hhYh'i a 'gUWX]Yb`]WY'<]bk Y]gY'j cb
NYi [Yb''

8Yf'HÅhYf'k]fX'VYgWf]YVYb'U'g'f' b[ž'Yhk U'% \$'Wå ' [fc» ž'a]h
Xi b_`Yf'<Ui hZUfVY'i bX'gdcfh]WYf'GhUhi f''9f'k Uf'a]h'Y]bYa 'fchYb
H!G\]fhž'Y]bYf'Xi b_`Yb'<cgY'i bX'Xi b_`Yb'GWi \Yb'VY_`Y]XYh''

9]b'k Y]hYfYf'J cfZU``YfY][bYhY'g]W\`Ua 'GcbbhU['[Y[Yb'&\$.() 'i \f
]b'XYf'NYddY`]bghfU»Y''9]b'U[fYgg]j Yf'i bVY_UbbhYf'VYgWÅX][hY
a]h'Y]bYa 'GhY]b'Y]bYb'D_k ž'bUWXYa 'Yf'g]W'ni j cf']b'Y]bYb
GhfY]h'j Yfk]W_`Y'h'\UhhY''8Yf'9][Yb'hØa Yf'XYg': U\fnYi [gž'XYf
Y]b[fY]ZYb'k c`hYž'k i fXY'NYi [Y'XYg'J cfZU`gž'XYf'Y]bYb'GWUXYb
j cb'Yhk U') "\$\$\$'9i fc'j Yfi fgUW'hY''8Yf'J UbXU'Y'Zc\`Ui ZY]bYa
gWk UfnYb': U\ffUX']b'F]W hi b['GYa ccgYf'K Y[''8]Y'Dc`nY]
V]hhYh'Ui W\`Y]f'i a ' <]bk Y]gY''

ϕ'Y]bYa 'UbXYfYb'J cfZU``]b'GhYhhYb'Ua '6cXYbgYY'_Ua 'Yg'ni
Y]bYa '[YZÅ\f']WYb', VYf\c`a UbØj Yf''9]b'*%Å\f][Yf'5i hcZU\YfYf
j Yfgi W'hYž'Y]bYb'F Y]gYVi g'ni 'ØVYf\c`Ybž'k cVY]'Yg'ni 'Y]bYa
Ni gUa a Ybghc»_Ua ž'XYf'Y]bYb'GUWgWUXYb'j cb'Yhk U') "\$\$\$
9i fc'j Yfi fgUW'hY''8Yf'5i hcZU\YfYf'k c`hY'gY]bYb'Vi gZU\YbXYb
HcW'hYf'Zc'[Ybž'bUWXYa 'g]Y'XYb'6i g'j YfdUggh'\UhhY''8]Y'Dc`nY]
\Uh'Y]bY'GhfUZUbny][Y'k Y[Yb'; YZU\f']a 'GhfU»Ybj Yf_Y\`f
Y]b[Y'Y]hYh''

9]bVfYWYf'i bX'5i hcUi ZVfØWY

5a 'ZfØ\Yb'GUa ghU[a cf[Ybž'i a 'Yhk U'&.() 'i \fž'k i fXY'Y]b
&-!>Å\f][Yf'ZYgh[Ybca a Ybž'XYf'a Y\YfYf'5i hcg'[YÖZZbYh'i bX
; Y[YbghÅbXY'[Yghc\`Yb'\UVYb'gc``''9]b'Ui Za Yf_gUa Yf'5bk c\`bYf
VYa Yf_hY'j YfXÅW'h][Y'; YfÅi gWY'i bX'gU\`XYb'J YfXÅW'h][Ybž'XYf
a]h'Y]bYa 'k Y]hYfYb'?ca d`nYb']b'Y]bYa '5i hc'ni 'gWUZZYb

a UWXhY"9]b_i fnYf'J YfZc`[i b[gj Yfgi WX'YbXYhY'XUa]hž'XUgg'XYf
HUhj YfXÅWXh][Y'a]h'DZYZZYfgdfUm'Xfc\hYž'UVYf'gWX`]Y»`]WX'j cb'XYf
Dc`nY]'Ui Z[Y[f]ZZYb'k i fXY"'GY]b'5`_c\c`[Y\U'h'U['VY]'&ž(
Dfca]`Y"'8]Y'9fa]hh'i b[Yb'ni 'gY]bYa '?ca d`nYb'g]bX'bcWX'ja
; Ub[Y"

5i » YfXYa 'k]fX'Y]b'8]YV'[Ygi WXhž'XYf']b'?fYggVfcbb'Y]b
A cV]'hY'YZcb'Ui g'Y]bYa 'XYfnY]h'c'ZYbYb'5i hc'Ybhk YbXYhY"'8Yf
HÅhYf'bi hnhY'X]Y'; Y'Y[Yb\Y]h'nk]gWX'Yb'%'.' \$'I \f'i bX'%'+'.' \$'I \fž
U'g'XYf': U\fnYi [\U'hYf'gY]bYb'K U[Yb'a]h'\Yfi bhYf[Y'UggYbYf
GWXY]VY'ÒZbYhY"'8]Y'Dc`nY]'k Ufbh'Y]bXf]b[`]WX'XUj cfž
K Yfh[Y[YbghÅbXY'c'ZYb'ja '5i hc`]Y[Yb'ni 'UggYb"

⇒ A Uf_XcfZ[UV'Yg'YVYbZU`g'Y]bYb'J cfZU`ž'U'g'Y]b'F UXZU\ fYf
[Y[Yb'Y]b'5i hc'hfUhi bX'DUggUbhYb'VY'Àgh][hY"'8Yf'A Ubb'k i fXY
U'g'dgmWX]gWX'Ub[YgWX'U[Yb'VYgWX'f]YVYb"
8]Y'9fa]hh'i b[Yb'XUi Yfb'Ubž'i bX'NYi [Yb'g]bX'Ui Z[YZcfXYfhž'g]WX
VY]'XYf'Dc`nY]'ni 'a Y'XYb"

< Åi g`]WX Yf'J cfZU``'a]h
: Yi Yfk Y\ fVYhY]'][i b[

9]b'[YZÅ\ f`]WX Yf'J cfZU``YfY][bYhY'g]WX'Ui WX'Ua 'GUa ghU[UVYbX']b
XYf'5UWXghfU» Yž'k c'Ub[YVfUbbhYg'9ggYb'ni f'5'Ufa]Yfi b['XYf
: Yi Yfk Y\ f'ZØ\ fhY"'9]b'GYb]cf'\UhhY'gY]b'; Yf]WX'hj Yf[YggYbž'k Ug
ni 'Y]bYa 'Y]WX'hYb'J Yf'Yhni b[gZU``Xi fWX'F Ui WX'ZØ\ fhY"'8]Y'Dc`nY]
i bX'FYhhi b[gX]YbghY'k UfYb'ja '9]bgUhnž'Yg'YbghUbbX'YXcWX'_Y]b
bYbbYbgk YfhYf'GUWX'gWX'UXYb"

F ØW_ZfU[Yb'V]hhY'Ub.

Dc`nY]dfÅg]X]i a 'F Uj YbgVi f[GhUVgghY``Y
² ZZYbh]WX_Y]hgUfVY]hG]a cb'; OddYfhHY'YZcb. '\$+) %,' \$' !%\$%\$9!
A U]'. fUj YbgVi f["dd"dfYggYghY``Y4 dc`nY]"Vk ``XY

C f][]bU'!7cbhYbh'j cb.'Dc`nY]dfÅg]X]i a 'F Uj YbgVi f[ž'ØVYfa]hhY'h
Xi fWX'byk g'U_hi Y``

< Ài Z][_Y]h'j c b ': U\ ffUXX]YVghÀ\`Yb`]b
8 Yi hgW\`UbX

: U\ ffUXX]YVghÀ\`Y`ghY``Yb`Y]b`ni bY\`a YbX`VYgcf[b]gYffY[YbXYg
DfcV`Ya`]b`XYi hgW\Yb`GhÀXhYb`XUf"@Ui h`Y]bYf`9f\YVi b[`XYg
6i bXYg_f]a`]bU`Ua hg`f6?5Ł`k i fXYb`]a``đ\`f`&\$&&ØVYf`' \$\$\$`\$\$\$
: U\ ffÀXYf`U`g`[Yghc\`Yb`[Ya`Y`XYh``8]Yg`nY][h`Y]bYb``Y]W\hYb
5bgh]Y[`]a`J`Yf[`Y]W\`ni`XYb`J`cf`U\`fYb`i bX`a UW\h`XYi h`]W\ž`XUgg
]bgVYgcbXYfY`\`cW\dfY]g][Y': U\ ffÀXYf`N]Y`j cb`8]YVghÀ\`Yb`g]bX"
8Yf`8]YVghU\`j cb`9!6]_Yg`\Uh]g]W\`XUVY]`U`g`VYgcbXYfg`UhhfU_hj
ZØf`?f]a`]bY``Y`Yf`k]YgYbž`k Ug`g]W\`Ui W\`]b`XYb`j`cf`Y[YbXYb
J`cfZÀ``Yb`]b': f]YXf]W\`g\`UZYb`k`]XYfgd]Y[Y`h``9]bY`gc`W\Y
9bhk]W`i b[`ZØ\`fh`XUni ž`XUgg`9][YbhØa`Yf`j`Yfa`Y\`fh]b
8]YVghU\`g]W\Yfi b[Yb`i bX`; DG!HfUW_]b[!GmghYa`Y`]bj`Ygh]YfYbž
i`a`]\`fY': U\ ffÀXYf`VYggYf`ni`gW\ØhnYb"

A U» bU\`a Yb`ni f`DfÀj`Ybh]cb

I`a`': U\ ffUXX]YVghÀ\`Yb`Ybh[Y[Ybni`k`]f`_Ybž`gYhnYb`j`]Y`Y`GhÀXhY
Ui`Zj`YfgW\]YXYbY`DfÀj`Ybh]cbga`U»`bU\`a`Yb``8Uni`[Y\`ØfYb`i`bhYf
UbXYfYa`5i`Z`_Àfi b[gU_h]cbYb`XYf`Dc`]nY]ž`X]Y
²`ZYbh]W\`_Y]hgUfVY]h`ni`f`GW\`ÀfZ] b[`XYg`6Yk`i`ggHgY]bg`ZØf
8]YVghU\`g]W\Yfi b[Yb`i bX`[Ya`Y]bgW\UZh]W\Y``b]h]Uhj`Yb`k`]Y`XUg
5bVf]b[Yb`j`cb': U\ ffUXghÀbXYfb`Ub`g]W\YfYfYb`C`fhYb``8]Y`Dc`]nY]
Ya`dZ]Y`\`hž': U\ ffÀXYf`]a`a`Yf`Ub`ZYghj`YfUb`_YfhYb`; Y[YbghÀbXYb
UVni`gW\`Y]»`Yb`i bX`\`cW\`k`Yfh][Y`GW\`ØggYf`ni`VYbi`hnYb``Ni`XYa
gc``hY`X]Y`F`Y[]ghf]Yfi b[`]b': U\ ffUX!8`UhYbVUb`_Yb`]b`6YhfUW\`h
[Ync[Yb`k`YfXYbž`i`a`X]Y`7\`UbW\`b`XYf`K`]YXYfVYgW\UZZ] b[
[Yghc\`YbYf`F`ÀXYf`ni`Yf\`Ø\`Yb"

GhUh]gh]_Yb`ni`GhfUZhUhYb`]b': f]YXf]W\`g\`UZYb

: f]YXf]W\`g\`UZYb`j`YfnY]W\`bYh`k`]Y`j`]Y`Y`UbXYfY`GhÀXhY`]b`6UXYb!
K`ØfhYa`VYf[`Y]bY`J`]Y`nU\``Ub`GhfUZhUhYbž`X]Y`g]W\`b]W\`h`bi`f`Ui`Z
: U\ ffUXX]YVghÀ\`Yž`gcbXYfb`Ui`W\`Ui`Z`F`Ui`VØVYfZÀ``Y`i`bX
J`UbXU`]ga`i`g`YfghfYW`_Yb``5_hi`Y``Yb`6Yf]W\`hYb`ni`Zc`[Y`\`Uh`X]Y
Dc`]nY]j`cb`F`Uj`YbgVi`f[`Y]bY`X]j`YfgY`DU`YhhY`j`cb`GhfUZhUhYb

fY[]ghf]Yfhž'X]Y'j cb'; Yk U'h'V]g'\]b'ni '9][Ybhi a gXY`_]_hYb'fY]Wk" 8]Yg`'Àggh'g]W`'ja '?cbhYI h'XYf`'UbXYgk Y]hYb'GhUh]gh]_`XYf ?f]a]bU'dc`nY]'VYhfUWk hYbž'X]Y'ZØf'6UXYb!K ØfhY a VYf['Y]bY ghUV]'Y'?f]a]bU`]hÀhgfUhY'Ui Zk Y]ghž'YXcWk`]b'VYgh]a a hYb 6YfY]WkYb'k]Y'8]YVghÀ\`Yb'Y]bYb'XYi h]WkYb'5bgh]Y['nY]['h"

5_hi Y`Y'9b hk]W_`i b[Yb

5b[Yg]Wk hg'XYf'_Øfn`]WkYb'J cfZÀ`Y`]b': f]YXf]Wk g\ UZYb'fYU[]Yfh'X]Y Dc`nY]'a]h'j YfghÀf_hYb'?cbhfc`Yb'i bX'XYf'GWk UZi b['j cb 5b`Ui ZghY`Yb'ZØf'X]Y'6Øf[Yf"'8]Y'Ni gUa a YbUfVY]h'a]h'XYf 6Yj Ò`_Yfi b['VY]'XYf'5i Z_`Àfi b['j cb'GhfUZhUhYb'V'Y]Vh'Y]b VYXYi hYbXYg'5b`Y[Yb"'8]Y'Dc`nY]'V]hYh'fY[Y'a À»]['i a <]bk Y]gY'ni 'HÀhYfb'i bX'HUhYbž'i a 'gc'gWk bY`Yf'i bX'YZZY_h]j Yf [Y[Yb'X]Y'?f]a]bU`]hÀh'j cf[Y\Yb'ni '_ØbbYb"

8YhU]`g

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