

5f[c'6`cW_W U]b'a]h'? `U[Y'k Y[Yb]ffYZ0\ fYbXYf'5i ggU[Yb'[YgW\ `U[Yb

5f[c'6`cW_W U]b'k i fXY`VYgW\i `X][hž`VY]a `6ŌfgYb[Ub[`fĐC Ł
gY]bYf'5a Yf]WU b'8Yd cg]hUfm'G\UfYg'f58 GŁ]a `>\f'&\$&%
[Y[Yb'XUg'6i bXYgk YfhdUd]Yf[YgYhn'j Yfghc» Yb'ni ` \UVYbž
k]Y'Ui g'Y]bYf'VY]a `I G!6Yn]f_g[Yf]W\h'ZŌf'XYb'Ōgh]W\Yb
6Yn]f_j cb'BYk `Mcf_Y]b[YfY]W\hYb'5_hY` \Yfj cf[Y`h"8]Y
`Ōb[ghY'9bhk]W`i b[`]gh'Y]b'k Y]hYfYf'GW\`U[`ZŌf'5f[cž'XUg']b
Y]bYa `Vfi hU`Yb'?fmdhc!K]bhYf'XUfi a ` _Āa dZhYž'g]W\`ŌVYf
K UggYf'ni ` \U`hYb" `>`XYf'6YgW\k YfXY'k i fXY`VY`Ui dhYhž
XUgg'XUg'I bhYfbY`a Yb'gY]bY`ĐC!8c_i a YbhY'ZU`f`Āgg][
j cfVYfY]hYh` \UVYž'X]Y`YbhgW\Y]XYbXY'8YhU]`g'j YfgW\`Y]YfhYbž
X]Y'gY]bY ; YgW\ĀZhgfYbhUV]`]hĀh'VYY]bhfĀW\h][Yb'k ŌfXYb"
?`U[Y'[Y[Yb'5f[c'>`XYf'GUa a Y`_U[Y` \UVYb'>bj YghcfYb
j cb'5f[c'6`cW_W U]b'XYf':]fa U'j cf[Yk cfZYbž'i bk U`fY
5i ggU[Yb'[Ya UW\h'i bX'k]W\h][Y`>Zcfa Uh]cbYb
k Y[[Y`UggYb / Ua d^Y``]d/

5f[c'6`cW_W U]b'k i fXY`VYgW\i `X][hž`VY]a `6ŌfgYb[Ub[`fĐC Ł
gY]bYf'5a Yf]WU b'8Yd cg]hUfm'G\UfYg'f58 GŁ]a `>\f'&\$&%[Y[Yb
XUg'6i bXYgk YfhdUd]Yf[YgYhn'j Yfghc» Yb'ni ` \UVYbžk]Y'Ui g'Y]bYf
VY]a `I G!6Yn]f_g[Yf]W\h'ZŌf'XYb'Ōgh]W\Yb'6Yn]f_j cb'BYk `Mcf_
Y]b[YfY]W\hYb'5_hY` \Yfj cf[Y`h"

8]Y'`Ōb[ghY'9bhk]W`i b[`]gh'Y]b'k Y]hYfYf'GW\`U[`ZŌf'5f[cž'XUg']b
Y]bYa `Vfi hU`Yb'?fmdhc!K]bhYf'XUfi a ` _Āa dZhYž'g]W\`ŌVYf'K UggYf
ni ` \U`hYb" `>`XYf'6YgW\k YfXY'k i fXY`VY`Ui dhYhž'XUgg'XUg
I bhYfbY`a Yb'gY]bY`ĐC!8c_i a YbhY'ZU`f`Āgg][j cfVYfY]hYh` \UVYž
X]Y`YbhgW\Y]XYbXY'8YhU]`g'j YfgW\`Y]YfhYbž'X]Y'gY]bY
; YgW\ĀZhgfYbhUV]`]hĀh'VYY]bhfĀW\h][Yb'k ŌfXYb"

?`U[Y`[Y[Yb`5f[c

⊕`XYf`GUa a Y`_`U[Y`\UVYb`⊕j YghcfYb`j cb`5f[c`6`cW_WU]b`XYf
:]fa U`j cf[Yk cfZYbž`i bk U\FY`5i ggU[Yb`[Ya UW`h`i bX`k]W`h][Y
⊕Zcfa Uh]cbYb`k Y[[Y`UggYb`ni `UVYbž`k cXi fW`g]Y`]\fY
? Ud]hU`VYgW`f`Ab`_i b[Ybž`Ghfca `!`i bX`UbXYfYb`?cghYb`gck]Y
BYhnc Yf_gW`k]Yf][_Y]hYb`b]W`h`cZYb[Y`Y[h`\UVY`"⊕`XYf
9]bFY]W`i b[`Y]» h`Ygž`XUgg`X]Y`9]bgW`f`Ab`_i b[Yb`gY]bY`: `A`][_Y]hž
6]hW`c]b`UVni VUi Yb`i bX`gY]bY`<Y`]cg!5b`U[Y`]b`HYI Ug`ni
VYhfY]VYbž`VY`]bXYfhYb"

8 Ug`5f[i a Ybh`_c`bnYbhf]YfhY`g]W`XUfUi Z`XUgg`XUg`; YgW`A`Z`h`j cb
5f[c`k Yb][Yf`bUW`\U`h][`gY]ž`U`g`X]Y`5b`Y[Yf`[`Ui VYb`a UW`Yb
k c`hYb`"G]Y`VY`Ui dhYhYb`Ui W`ž`XUgg`X]Y`[YgW`A`Z`h`]W`Yb`i bX
Z]bUbn]Y`Yb`5i gg]W`hYb`XYg`i bhYfbY`a Ybg`ØVYfVYk YfhY`h`gY]Yb`
⊕Zc`[Y`i bfYW`ha `A`][Yf`<UbX`i b[Yb`i bX`i bhYf`Uggi b[Yb`j cb
5f[c`Yf`]hYb`X]Y`5b`Y[Yf`Yf`YV`]W`Y`J Yf`i ghY"

8]Y`5b[YVchgi bhYf`U[Yb`k i fXYb`ZU`f`A`gg][`YfghY`h`i bX
Ybh`]Y`hYb`]bZc`[YXYggYb`i bk U\FY`5i ggU[Yb`ØVYf`k YgYbh`]W`Y
HUhgUW`Yb`cXYf`Yg`k i fXY`i bhYf`UggYbž`UbXYfY`HUhgUW`Yb
Ubni [YVYbž`X]Y`YfZcfXYf`]W`g]bXž`XUa]h`X]Y`[Ya UW`hYb
5i ggU[Yb`b]W`h]ffYZØ`fYbX`g]bXž`i bX`g]Y`k i fXYb`b]W`h`b
, VYfY]bgh]a a i b[`a]h`XYb`fY[Y`b`i bX`J c`fgW`f]ZhYb`ZØf`]\fY
9fghY`i b[`YfghY`h"

K `A`fYbX`gY]bYg`6`ØfgYb[Ub[g`[UV`XUg`]b`@cbXcb`Ubg`A`gg][Y
6Yf[VUi i bhYfbY`a Yb`Yhk U`+ž) `A]`]cbYb`58G!5_h]Yb`ni `Y]bYa
5b[YVchgdFY]g`j cb`%) `I G!8c`Uf`Ui gž`k Ug`XYa
6Yf[VUi i bhYfbY`a Yb`Y]bYb`9f`Øg`j cb`fi bX`%\$) `A]`]cbYb`I G!
8c`Uf`VYgW`YfhY`"GY]hXYa `]gh`XYf`5_h]Yb`_i fg`YXcW`a Ug]j
Y]b[YVfcW`Yb"

7 fmd hc `K]bhYf` \ Uh`g]W`ZØf`5f[c`U`g`ghY]b][
Yfk]YgYb

BYVYb`a Y`fYfYb`6Yf[`Yi hYb`k Uf`5f[c`6`cW_WU]b`[Ynk i b[Ybž

]a`j Yf[Ub[YbYb`Gca a Yf`a Y\`f`ni`j Yf_Ui ZYbž`U`g`]b`Y]bYa`A cbUh
UV[YVUi h`k`i fXYž`U`g`X]Y`DfY]gY`bUW`i bhYb`[]b[Yb`"5`g`gY]bY
5_h]Yb`Y]bYb`GW`U[`Yf`]hhYbž`k`i fXY`XYf`ni`j cf`Ub[Y_ØbX][hY`D`Ubž
&+`A]`]cbYb`l G!8c``Uf`Ui Zhi Vf]b[Ybž`UV[YgU[h`"6]g`9bXY`&\$&&
gYmhY`Yg`XYb`<UbXY`gY]bYf`5_h]Yb`Ub`XYf`BUgXUe`Ui`g"

5f[c`j Yf_Ui ZhY`gc[Uf`gY]bY`<Y`]cg!A]b]b[!5b`U[Y`]b`HYI Ug`ZØf`*)
A]`]cbYb`l G!8c``Uf`Ub` ; U`UI m`8][]hU`"8Yf`8YU`YfZcfXYfhY`Ui W`ž
XUgg; U`UI m`XYa`6Yf[VUi`i bhYfbY`a`Yb`Y]b`8Uf`Y`Yb`]b`<Ø`Y
j`cb`")`A]`]cbYb`l G!8c``Uf`ni`f`J`YfZØ[i`b[`ghY`hž`i`a`Y]bY
ϕgc`j`Ybn`ni`j`Yfa`Y]XYb`"

...

8YhU]`g

6Ygi W`X`Yb`G]Y`i`bg`Ui`Z.`_fmdhc!bYk`g`Uh