

: U\ ffUXZU\ fYf'ZØW\ hYh'bUW\ 'I bZU``]b
: fY]bg\Y]a ' 'Dc`]nY]'gi W\ h'NYi [Yb

I bZU``Zi W\ h']b': fY]bg\Y]a .': U\ ffUXZU\ fYf'ghfY]Zi[YdUf_hYb
DYi [Ychi bX'Z]Y\h"<]bk Y]gY'Ub'Dc`]nY]'6UX'8Øf_\Y]a
YfVYhYb"

⊕XYf'B UW\ h'ni a '&("5i [i gh&\$&(žnk]gW\ Yb'A]hYfbUW\ h'i bX'Y]b
I \fž_Ua 'Yg]b'XYf'6U\ b\cZghfU»Y'j cb': fY]bg\Y]a 'ni 'Y]bYa
JcfZU``žXYf'Y]bY'FY]\Y'j cb': fU[Yb'Ui Zk]fZi'9]b'bcW\
i bVY_UbbhYf'a Àbb`]W\ Yf': U\ ffUXZU\ fYf'_c``X]YfhY'a]h'Y]bYa
[YdUf_hYb'DYi [Ych"8Yf'JcfZU``YbXYhY']b'Y]bYf': 'i W\ hž'X]Y
gck c``XYb'D_k !6Yg]hYf'U`g'Ui W\ 'X]Y'Öfh]W\ Y'Dc`]nY]'VYi bfi \][h"

8Yf': U\ ffUXZU\ fYfž'XYf']b'X]YgY'?c``]g]cb']bj c'j]Yfh'k Ufž
VYgW\ ÅX][hY'XUg[YdUf_hY': U\ fnYi ['Yf\YV`]W\ "8Yf'[YgW\ ÅhnhY
GUW\ gW\ UXYb'VY'Ài Zhig]W\ 'Ui Z'fi bX'' \$\$\$'9i fcž'k Ug'b]W\ h'bi f'ZØf
XYb': U\ fnYi [VYg]hYfž'gcbXYfb'Ui W\ 'ZØf'X]Y'_ca a i bU`Y
G]W\ Yf\Y]h'j cb'6YXYi hi b[']gh'"9g'V`Y]Vhi b'_Ufž'k Ufi a 'XYf': U\ fYf
bUW\ 'XYf'?c``]g]cb'Zc\ž'UbghUhh'g]W\ 'i a 'XYb'YbhghUbXYbYb
GW\ UXYb'ni '_Øa a Yfb"

8]Y'Gi W\ Y'bUW\ 'NYi [Yb

I a 'XYb'JcfZU``Ui Zni _`ÀfYbž'g]bX'X]Y'6Y\ØfXYb'Ui Z'X]Y'A]h\]ZY
XYf'² ZZYbh]W\ _Y]h'Ub[Yk]YgYb'"8]Y'Dc`]nY]]bgdY_h]cb'6UX
8Øf_\Y]a 'fi ZhiU`Y'NYi [Yb'cXYf'DYfgcbYbž'X]Y'fY'Yj UbhY
⊕Zcfa Uh]cbYb'\UVYbž'Ui Zž'g]W\ 'ni 'a 'XYb'"9g']gh'YbhgW\ Y]XYbXž
XUgg'X]Y'; Ya Y]bgW\ UZh'ni gUa a YbUfVY]hYhž'i a 'gc`W\ Yb'JcfZÄ``Yb
Ybh[Y[Ybni k]f_Yb'i bX'X]Y'JYfUbhk cfh]W\ Yb'ni f'FYW\ YbgW\ UZh
ni 'n]Y\Yb"K Yf'Yhk Ug[YgY\Yb'\Uh'cXYf']f[YbXk Y`W\ Y'<]bk Y]gY
[YVYb'_Ubbž'gc``hY'i a [Y\YbX'X]Y'Dc`]nY]'_cbhU_h]YfYb"

8]Y'?'cbhU_ha Ò[`]W_X]hYb'g]bX'_'Uf'XYZ]b]Yfh'`b hYfYgg]YfhY
_ÒbbYb'X]Y'Dc`nY]]bgdY_h]cb'6UX'8Øf_\Y]a`i bhYf'XYf
HY`YZcbbi a a Yf'\$*' &&# *' !\$`YffY]W_Yb'cXYf'dYf'9!A U]""8]YgY
5i Zfi ZY'ni f'Ni gUa a YbUfVY]h'UXYb'X]Y'6Øf[Yf'Y]bž'U_hj`Ua
G]W_Yf\Y]hg!`i bX'CfXbi b[gVYk i gghgY]b`]fYf'GhUXh'hY]`ni bY\ a Yb"

K]W_h][Y`bZcfa Uh]cbYb'ZØf'X]Y

2 ZZYb h`]W_X]h

9fY][b]ggY`k]Y'X]YgY'nY][Ybž'k]Y'j Yf'Yhn`]W_X]Y'J Yf_Y\fgc fXbi b[
]ghi bX'k]Y'k]W_h][`Yg']ghž'F Y[Y'b'Y]bni \U'hYbž'i a`G]W_Yf\Y]h'ZØf
U`Y'J Yf_Y\fg hY]`bY\ a Yf'ni`[Yk`À`f'Y]ghYb""8 Ug`\]Yf
VYgW_f]YVYbY'J Yf\U'hYb'XYg': U\ffUXZU\ fYfg`_ÒbbhY`U`g
fØW_g]W_hg`cg`Ub[YgY\Yb'k YfXYbž'XU`Yf'b]W_h'bi f'XYb'GW_UXYb
b]W_h'a Y`XYhYž'gcbXYfb`Ui W_X]Y'A Ò[`]W_X]h'XYf'?`Àfi b[`i bX
J YfUbhk cfhi b[gØVYfbU\ a Y`UV`Y\`bhY"

5b[Yg]W_hg`XYf'HUhgUW_Yž'XUgg': U\ffÀXYf']b`j]Y`Yb'GhÀXhYb'Y]b
ni bY\ a YbX`VY`]YVhYg': cfhVYk Y[i b[ga`]hY`g]bXž'k]fX`X]Y
DfcV`Ya Uh]_j cb`i bZÀ`Yb'i bX': `i W_hj Yf\U'hYb`VYgcbXYfg
fY`Yj Ubh""9g']gh'b]W_h'bi f'Y]bY': fU[Y`XYg'GW_UXYbgYfgUhnYg/Yg
[Y\`hi a`X]Y'a cfU`]gW_Y'J YfUbhk cfhi b[ž'X]Y`YXYf
J Yf_Y\fg hY]`bY\ a Yf'hfÀ[h""8]Yg'ghY\`h]a`ghUf_Yb'?cbhfUgh'ni`XYb
K YfhYb'XYf'F ØW_g]W_hbU\ a Y`i bX`XYg'F YgdY_hgž'X]Y`ja
GhfU» Ybj Yf_Y\`f'[Y`hYb'gc`hYb"

Ni gÀhn`]W`ni f'X]fY_hYb'GW_UXYb fY[i`]Yfi b[`a i gg'Ui W_X]Y': fU[Y
XYf'J Yf_Y\fg Yfn]Y\i b[`]b'XYb': c_i g'[YfØW_h'k YfXYb""b`GW_i`Yb
i bX`b]h]Uhj Yb'gc`hYb'j YfghÀf`h'Dfc[fUa a Y`Ub[YVchYb'k YfXYbž
i a`gck c\`: U\ffUXZU\ fYf`U`g'Ui W_X'5i hcZU\ fYf'ZØf'X]Y'; YZU\ fYb
i bX'J YfUbhk cfh]W_X]hYb']a`GhfU» Ybj Yf_Y\`f'ni`gYbg]V`]g]YfYb"

8]Y`Øfh`]W_Yb'6Y\ØfXYbž'k]Y'X]Y'Dc`nY]X]fY_h]cb`BYi ghUXh'U"X"
K Y]bghfU» Yž`\UVYb`VYfY]hg`i bhYfghØhni b[`Ub[YVchYbž'i a`XYb
: U``k Y]hYf'ni`i bhYfgi W_Yb""8]Yg']ghY]b'k]W_h][Yf'GW_f]hž'i a`XUg
J YfhfUi Yb`]b'X]Y`ÒZZYb h`]W_Y`G]W_Yf\Y]h'ni`ghÀf_Yb"; Ygd fÀW_Y
ØVYf'DfÀj Ybh]cbga U» bU\ a Yb'i bX`X]Y'J YfVYggYfi b[`XYf
Ni gUa a YbUfVY]h'nk]gW_Yb'XYb'6Øf[Yfb'i bX`XYf'Dc`nY]'g]bX

YggYbn]Y`ž`i a `gc`WXY`J cfZ`Y`]b`Ni `i bZ`ini `j Yfa Y]XYb"

8Yf`5i Zfi Z`Ub`X]Y`6Yj `O`_Yfi b[ž`g]W`VYnØ[`]W`XYg`J cfZ`U`g`ni
a Y`XYbž`]gh`b]W`h`bi f`Y]bY`A U» bU`a Y`ni f`5i Z`_`Äfi b[ž`gcbXYfb
Ui W`Y]b`GWf]h`i]b`F]W`hi b[`Y]bYg`g]W`YfYfYb`@VYbgi a Z`Xg`ZØf
U`Y"

8Yf`5i Zfi Z`ni f`Ni gUa a YbUfVY]h

⇒g[YgUa hij YfXYi h]W`h`X]YgYf`J cfZ`U`X]Y`<YfUi gZcfXYfi b[Ybž`X]Y
]a `hÄ[`]W`Yb`GhfU» Ybj Yf`_`Y`f`VYghY`Yb`"5`Y`6YhY`][hYb`a ØggYb
g]W` `]`fYf`F`c`Y`VYk i ggh`gY]b`i bX`U`_h]j `ni f`G]W`Yf`Y]h`VY]hfU[Yb`"
⇒XYa `NYi [Yb`Yfa i h][h`k YfXYbž`]`fY`6YcVUW`hi b[Yb`ni `hY]Ybž`
nY][h`X]Y`Dc`]nY]ž`XUgg`[Ya Y]bgW`UZh]W`Yg`<UbXY`b`XYf`GW`ØggY`
]ghž`i a `gc`WXY`U[[fYgg]j Yb`J Yf`U`hYb`gk Y]gYb`i bX
: `i W`hj Yf`U`hYb`ni `fYXi n]YfYb"

⇒`XYb`Y`h`hYb``j`fYb`]gh`X]Y`NU`X`Yf`J Yf`_`Y`f`gi bZ`Y`]b
8Yi hgW`U`b`X`Xi fW`i bhYfgW`]YX`]W`Yb`: U`_`hc`fYbž`Y]bgW`]Y» `]W`
XYg`5bgh]Y[g`XYg`: U`ffUXj Yf`_`Y`fgž`Ub[Ygh]Y[Yb`"@Ui h`XYa
6i bXYga]b]ghYf]i a `ZØf`J Yf`_`Y`f`i bX`X][]hU`Y`⇒ZfUghfi `_hi f`U`h
g]W`X]Y`NU`X`Yf`: U`ffÄXYf`Ui Z`XYi hgW`Yb`GhfU» Yb`gY]h`&\$\$\$
j YfXcddY`h`"8]Yg`ZØ`fhY`ni `Y]bYf`J]Y`nU`X`j cb`i bZ`Y`bž`VY]`XYbYb
]bgVYgcbXYfY`: U`ffUXZU`fYf`]bj c`j]Yfh`k UfYb`"8]Y`k UW`gYbXY
6Y`]YVh`Y]h`XYg`F UXZU`fYbg`U`h`X]Y`B`chk YbX][`_Y]h]j YfghÄf`_hž
J Yf`_`Y`f`ghY]`bY`a Yf`ØVYf`g]W`YfY`J Yf`U`hYb`gk Y]gYb`i bX`X]Y
[YgYh`]W`Yb`J cfG`Wf]ZhYb`Ui Zni `_`ÄfYb"

GhY][YbXY`i bZU`nU`Yb`]a `GhfU» Yb[YVfUi W

⇒a `j`f`&\$\$&&k i fXYb`Ui h`XYa `GhU]gh]gW`Yb`6i bXYgUa h
]bg[YgUa hifi bX`&ž`A`j`]cbYb`J Yf`_`Y`f`gi bZ`Y`fY[]ghf]Yfhž`k Ug
Y]bY`9f`Ø`i b[`j cb`%ž&`i `]a `J Yf[`Y]W`ni a `J cf`U`f`VYXYi hYh`
6YgcbXYfg`U`Ufa]YfYbX`]ghž`XUgg`ØVYf`(\$`\$\$\$`X]YgYf`i bZ`Y`a`h
DYfgcbYbgW`UXYb`YbXYhYb`"8UVY]g]bX`F UXZU`fYf`c`Zh]j cb
gW`k YfYb`i bZ`Y`b`VYhfcZYbž`k Ug`X]Y`B`chk YbX][`_Y]h]j cb
5i Z`_`Äfi b[g`_`Ua dU[bYb`i bX`j YfVYggYfhYb
G]W`Yf`Y]hga U» bU`a Yb`Ui Z`XYb`GhfU» Yb`i bhYfghfY]W`h`F UX`Yf

g]bX`U`g`VYgcbXYfg`j`Yf`Ym`]WXY`J`Yf`_`Y`fghY`]`bY`a` Yf`Ubni`gY`Ybž`
k`Yg`U`V`X]Y`Ni`gUa`a`YbUfVY]hj`cb`Dc`]nY]i`bX`?`ca`a`i`bYb`ni`f`
J`YfVYggYfi`b[`X`Yf`J`Yf`_`Y`fghZ0\fi`b[`i`bi`a`[`Àb[`]W`]gh"

8`Uf0VYf`\]bUi`g`a`U`bYb`9I`dYfhYb`]a`a`Yf`k`]YXYf`ni`f`J`c`fg]W`hž`
]bgVYgcbXYfY`]b`X]W`h`VYg]YXY`hYb` ;`YV]YhYb`k`]Y` :`fY]bg`Y]a`ž`k`c`
g]W`X`Ug`i`bUi`Za`Yf`_`gUa`Y`5`VghY`Yb`j`cb`D?`K`g`i`bX`X`Ug` :`U`fYb`
a`]h`XYa`F`UX`g`W`bY`ni`[`Y`Z`À`f`]W`Yb`G]hi`Uh]cbYb`Ui`gUfhYb`
`0`bbYb`"8`Ug`6Yk`i`gghgY]b`Z0f`X]Y`[`Y`[`Yb`gY]h][`Y`F`0`W``g]W`hb`U`a`Y`
]a`GhfU»Ybj`Yf`_`Y`f`]ghj`cb`nYbhfU`Yf`6YXYi`hi`b[`"

F`Y`W`h`]W`X`Y`F`U`a`Y`b`V`Y`X]b[`i`b[`Y`b`i`b`X`
I`b`Z`U`Z`i`W`h`

I`b`Z`U`Z`i`W`h`]gh]b`8Yi`hgW`U`b`X`Y]bY`GhfUZhUhž`X]Y`b`U`W`z`%(`&`X`Y`g`
GhfUZ[`Y`g`Y`h`n`V`i`W`X`Y`g`f`G`h`6`E`[`Y`f`Y`[`Y`h`]gh"K`Y`f`Y]b`Y`b`I`b`Z`U`
j`Y`f`i`f`g`U`W`h`i`b`X`g]W`j`cb`X`Y`f`I`b`Z`U`ghY`Y`Y`b`h`Z`f`b`hž`c`b`Y`g`Y]b`Y`b`
[`Y`g`Y`h`n`]W`X`Y`b`D`Z]W`X`h`Y`b`b`U`W`ni`_`ca`a`Y`b`ž`_`U`b`b`a`]h` ;`Y`X`ghf`U`Z`Y`b`
c`X`Y`f`g`c`[`U`f`Y]b`Y`f` :`f`Y`]\`Y]hgghf`U`Z`j`cb`V]g`ni`X`f`Y]`X`f`Y`b`f`Y`W`b`Y`b`"
=a`j`c`f`Y[`Y`b`X`Y`b` :`U`ž`]b`X`Y`a`X`Y`f` :`U`f`f`U`X`Z`U`f`Y`f`Y]b`Y`b`[`Y`d`U`f`_`h`Y`b`
D`_`k`V`Y`g`W`À`X][`h`Y`i`b`X`g]W`U`b`g`W`i`g`g`j`cb`X`Y`f`I`b`Z`U`ghY`Y`Y`
Y`b`h`Z`f`b`h`Y`ž`_`0`bb`h`Y`X]Y`g`f`Y`W`h]W`X`Y`?`c`b`g`Y`e`i`Y`b`n`Y`b`b`U`W`g]W`
n]Y`Y`b`ž`g`c`h`Y`Y`f`]X`Y`b`h]Z]n]Y`f`h`k`Y`f`X`Y`b`"

8]Y`D`c`]nY]Y`fa`i`h][`h`k`]hbYggYgž`\fY`6Yc`V`U`W`h`i`b[`Y`b`ni`h`Y]Y`b`ž`i`a`
X`Y`b`J`c`f`Z`U`Ui`Z`ni`_`À`f`Y`b`i`b`X`Y]b`Y`f`Y`W`h`n`Y]h][`Y`G`h`f`U`Z]Y`f`Z`c`[`i`b[`
g]W`X`Y`f`ni`g`h`Y`Y`b`"8]Y`A`Y`X`i`b[`j`cb`J`Y`f`_`Y`f`g`i`b`Z`À`Y`b`ž`V`Y`g`c`b`X`Y`f`g`
k`Y`b`b`Y`g`ni`G`U`W`g`W`À`X`Y`b`_`ca`a`hž`h`f`À[`h`X`U`ni`V`Y]ž`
J`Y`f`_`Y`f`g`g]W`X`Y`f`Y]h`ni`Y`f`\`0`Y`b`i`b`X`k`]Y`X`Y`f`c`h`Y`J`c`f`Z`À`Y`ni`
j`Y`f`\]b`X`Y`f`b`"

8`Y`h`U]`g`

6`Y`g`i`W`X`Y`b`G]Y`i`b`g`U`i`Z`b`!`U[`"X`Y`