Gi ffYU`Yf`F c`Yf!Ni [ .`8fY]: U\ fYf`]b
6]b[Yb`c\ bY`@]nYbn`i bX`J Yfg]W\ Yfi b[

6]b[Ybž`]b`Y]bYf`fi \][ Yb`B UW\ hž`dUgg]YfhY`XUg
I`bj`cfghY`VUfY`Ui Z`XYf`?cV`YbnYf`GhfU» Y``#`XYf`gd`ÀhYb
Ghi bXY`XYg`&\$''5i [i gh&\$&(ž[YbUi Yf`[ YgU[ hi a`&'`I` \fž
VYa Yf`\_hYb`6YUa hY`XYf`Dc`]nY]]bgdY`_h]cb`6]b[ Yb`Y]bY
; fi ddY`F c`YfZU\ fYfž`X]Y`g]W\`]b`Y]bYf`i b[ Yk`Ò\ b`]W\ Yb
: cfa`Uh]cb`Ui Z`XYf`6-`VYk`Y[hY`"K`Ug`g]W\`ni b`ÀW\ gh`\ Ufa`cg
Ub\`ÖfYb`a`U[ ž`Yb hdi`ddhY`g]W\`gW\ bY`"U`g`g`\_i`ff]`Yg`6`X`.

6]b[Ybž`]b`Y]bYf`fi \][ Yb`B UW\ hž`dUgg]YfhY`XUg`I`bj`cfghY`VUfY`Ui Z`
XYf`?cV`YbnYf`GhfU» Y``#`XYf`gd`ÀhYb`Ghi bXY`XYg`&\$''5i [i gh&\$&(ž
[YbUi Yf`[ YgU[ hi a`&'`I` \fž`VYa Yf`_hYb`6YUa hY`XYf`
Dc`]nY]]bgdY`_h]cb`6]b[ Yb`Y]bY`; fi ddY`F c`YfZU\ fYfž`X]Y`g]W\`]b
Y]bYf`i b[ Yk`Ò\ b`]W\ Yb`: cfa`Uh]cb`Ui Z`XYf`6-`VYk`Y[hY`"K`Ug`g]W\
ni b`ÀW\ gh`\ Ufa`cg`Ub\`ÖfYb`a`U[ ž`Yb hdi`ddhY`g]W\`gW\ bY`"U`g`
g`\_i`ff]`Yg`6`X`.'9]b`F c`Yf`k`Uf`Ub`Y]bYb`UbXYfYb`a`]h`Y]bYa
GdUbb[i`fh`VY`ZY`gh][hž`k`À\ fYb`X`Y]b`Xf]hYf`F c`YfZU\ fYf`
\]bhYf\Yfž` \f"

8]YgY`Y][ YbUfh][ Y`?c bghY`U]cb`YffY[hY`XUg`#`hYfYggY`XYf`
Dc`]n]ghYbž`X]Y`XUfUi`Z`]b`Y]bY`J`Yf`\_Y\fg`_cbhfc`Y`Xi`fW`Z`Ø`fhYb`"
8]Y`J`Yf`\_Y\fgg]hi`Uh]cb`k`Uf`U`Y`g`UbXYfY`U`g`[ Yk`Ò\ b`]W\`"6Y]
X]YgYf`?cbhfc`Y`ghY`hY`g]W\`YfUi`gž`XUgg`XYf`F c`Yfž`XYf`XUg`
; YgdUbb`nc[ ž`b]W\`hj`Yfg]W\`Yfh`k`Uf``Y]b`XYi`h]W\`Yf`J`Yfg`h`c`»
[Y[Yb`X]Y`J`Yf`_Y\fgj`cf`gW\`f]ž`hYb`"8`cW\`XUg`k`Uf`bcW\`b]W\`h`U`Y`g`"
?Y]bYf`XYf`: U\ fYf`VYgU`Y]bY`[ Ø`h][Y`: U\ fYf`Ui`Vb]gž`k`Ug`X]Y`@U[ Y`
bcW\`dfc`V`Ya`Uh]gW\`Yf`a`UW`hY"

8]Y`9f[ YVb]ggY`XYf`?`c`b`h`f`c`Y`Y`

8]Y`Ub`gW\`]Y» YbXY`I`bhYfgi`W\`i`b[`c`ZY`b`V`U`fhY`Y]b`k`Y]hYfYg`YfbghYg`

DfcV`Ya .`9]bYf`XYf': U\fyf`ghUbX`i bhYf`XYa `9]bZi gg`j cb`8fc [Ybž
i bX`nk Uf`gck c\`j cb`7UbbUV]g`U`g`Ui W`j cb`5a d\YhUa]b"
8]YgYf`I a ghUbX`ZØ\fhY`XUni ž`XUgg`ZØf`U`Y`XFY]`HY]`bY\`a Yf`XYf
FY]gY`X]Y': U\fh`gcZc`fh`VYYbXYh`k i fXY"8]Y`Dc`]nY]`_Ubb`XU`_Y]b
5i [Y`ni XfØW`Yb" `GhUhhXYggYb`gY\`Yb`g]W`X]Y`F`c`YfZU\fyf`bi b
Y]bYf`FY]\`Y`j cb`GhfUZUbnY][Yb`[ Y[ YbØVYfž`X]Y`]\fy`fYW`h]W`Yb
DfcV`Ya Y`Yf\`YV`]W`j YfgW`ÅfZYb`k YfXYb"

Æg[YgUa h`k YfXYb`g]Y`ZØf`XUg': U\fyb`c`\bY`J Yfg]W`Yfi b[ggW`i hnž
XUg': U\fyb`c`\bY': U\fyf`Ui Vb]g`i bX`X]Y`I f`\_i bXYbZ`gW`i b[
VY`Ub[ h`Ni g`Åhn`]W`k ]fX`Y]b`6i » [ Y`Xj YfZU\fyb`k Y[ Yb`XYg
: U\fybg`i bhYf`8fc [YbY]bZi gg`[ Y[ Yb`g]Y`Y]b[ Y`Y]hYh"8]Yg`nY][hž
k]Y`k ]W`h][`X]Y`9]b\`U`hi b[`XYf`J Yf`\_Y\fgfY[ Y`b`]ghž`VYgcbXYfg
k Ybb`8fc [ Yb`]a `Gd]Y`g]bXž`X]Y`b]W`h`bi f`XUg`Y][YbY`@YVYbž
gcbXYfb`Ui W`XUg`XYf`UbXYfyb`J Yf`_Y\fgfY]`bY\`a Yf`[ YZ`Å\`fXYb
_ØbbYb"

Gc`W`Y`GnYbUf]Yb`g]bX`b]W`h`bi f`Ua ØgUbhž`gcbXYfb`k]fZh`Ui W`
k]W`h][ Y': fU[ Yb`Ui Z`K ]Y`c`Zh][ bcf]Yfyb': U\fyf`[fi bX`Y[YbXY
J Yf`\_Y\fgdZ]W`hYb`3`Æ`Y]bYf`NY]hž`]b`XYf`G]W`Yf\`Y]h]a
GhfU» Ybj Yf`\_Y\`f`gc`VYXYi hYbX`]ghž`g]bX`J cfZ`Å`Y`k]Y`X]YgYf`Y]b
_`UfYf`<]bk Y]g`Ui ZX]Y`B`chk YbX][ \_Y]h] cb`]bhYbg]j YfYb
?cbhfc`Yb"9g]gh`k]W`h][ `ni`VYhcbYbž`XUgg`X]Y`Dc`]nY]`b]W`h`bi f`
XUni `XU]ghž`J YfghØ» Y`ni`U`bXYbž`gcbXYfb`Ui W`XUni ž`X]Y
G]W`Yf\`Y]h`U`Yf`J Yf`_Y\fgfY]`bY\`a Yf`ni`[Yk`Å\`f`Y]ghYb"

9]bV`]W`_`]b`X]Y`J Yf`_Y\`fgg]W`Yf\`Y]h

8]Y`<UbX`i b[`XYf`Dc`]nY]`]b`6]b[ Yb`]gh`Y]b`_`i [ Yf`GW`f]hž`i a`ZØf
a Y\`f`J YfUbhk c`fhi b[ `]a`GhfU» Ybj Yf`_Y\`f`ni`gcf[ Yb"i bZ`Å`Yž`X]Y
Xi fW`8fc [ Yba ]ggVfUi W`c`XYf`XUg': U\fyb`c`\bY': Ø\fyfgW`Y]b
j Yfi fgUW`h`k YfXYbž`\_ØbbYb`gW`k Yfk ]Y[ YbXY': c`[Yb`\UVYb"
»XYg`»\`f`[ ]Vh`Yg`j ]Y`Y': Å`Yž`]b`XYbYb`I bgW`i`X][Y`ni`C`d`ZYfb
j cb`gc`W`Yb`i bj YfUbhk c`fh]W`Yb`<UbX`i b[Yb`k YfXYb"

8Yf`J cfZU`Ubb`X]YgYa`Gca`a YfUVYbX`]i ghf]Yfh`Ui W`X`Yb`HfYbXž
XUgg`J Yf`_Y\fg`cbhfc`Yb`b]W`h`bi f`F`ci`h]bY`g]bXž`gcbXYfb`Ui W`
XUni`X]YbYbž`f]g`\_UbbY`J Yf\`U`hYbgk Y]gYb`ZfØ`nY]h][`ni

]XYbh]Z]n]YfYb`i bX`ni`i bhYfV]bXYb"K Ybb`i bg`X]YgY` ; YgWk]Wk hY
Y]bYg`Y\fhžXUbb`]gh`Ygž`XUgg`a Ub`]a`GhfU»Ybj Yf\_Y`f`b]Ya U`g
i bj cfg]Wk h][`gY]b`gc`hY"8]Y`?ca V]bUh]cb`Ui g
I bUi Za Yf_gUa _Y]hž`8fc[ Yb\_cbgi a`i bX`ZY`YbXYa
J Yfg]Wk Yfi b[ggWk i hm`]gh`Y]bY`YI d`cg]j Y`A ]gWk i b[ ž`X]Y`bi f`ni
gWk bY`ni`hfU[]gWk Yb`?cbgYeI YbnYb`ZØ`fYb`_Ubb"

9g`V`Y]Vh`ni`cZZYbž`XUgg`gc`Wk Y`_i fj YbfY]Wk Yb`5VYbhYi Yf`Ua
GhYi Yf`b]Wk h`X]Y`B cfa`k YfXYb"J Yf_Y`fgg]Wk Yf`Y]h`]gh`Y]bY
J YfUbhk cfhi b[ž`X]Y`YXYf`j cb`i bg`Yfbgh`bY`a Yb`gc`hY"K Ybb
X]YgY`9d]gcXY`]f[YbXYhk Ug`ni`V]YhYb`U`hž`XUbb`]gh`Yg`XYf
<]bk Y]gž`XUgg`Ui Wk`X]Y`i b[Yk Ò`b`]Wk ghYb`GnYbUf]Yb`Y]bY
Yfbgh`UZhY`BUWk f]Wk h`ØVYf`X]Y` ; YgYhnY`i bX`J YfcfXbi b[ Yb`]a
GhfU»Ybj Yf_Y`f`hfUbgdcfh]YfYb"@UggYb`G]Y`i bg`XUfUi ZUWk hYbž
XUgg`k]f`b]Wk h`bi f`j YfUbhk cfhi b[gVYk i gghY` : U`fYf`g]bXž`gcbXYfb
Ui Wk`Ui ZY]bUbXYf`UWk hYbž`i a`X]Y`GhfU»Yb`ZØf`U`Y`g]Wk Yf`ni
U`hYb"

F Y`Yj UbhY`fYWk h`]Wk Y`J cf[UVYb

⇒8Yi hgWk`UbX`i bhYf`Y[ Yb`XUg` : U`fYb`a ]h`a c`hcf]g]YfhYb
: U`fnYi [ Yb`gck]Y`X]Y`XUa]hj YfVi bXYbYb`J cfUi ggYhni b[Yb
ghfYb[Yb`[ YgYhn`]Wk Yb`FY[ Y`i b[Yb`8]Y` : U`fYf`Ui Vb]gj YfcfXbi b[
fi YJ Ě`Y[ h`ZYghž`XUgg`YXYfž`XYf`Y]b`?fUZhZU`fnYi [`ZØ`fYb`a ÒWk hYž
]a`6Yg]hn`Y]bYg[Ø`h][ Yb` : Ø`fYfgWk Y]bg`gY]b`a i gg`Ni XYa` ]gh`X]Y
J Yfg]Wk Yfi b[gdZ]Wk h`ZØf`U`Y`a c`hcf]g]YfhYb` : U`fnYi [ Y`]b
8Yi hgWk`UbX`[YgYhn`]Wk`j YfUb_Yfhž`X]Y`]b`z`%XYg
DZ]Wk hj Yfg]Wk Yfi b[g[YgYhnYg`fDZJ ; Ě`ZYgh[Y`U`hYb`]gh`8]YgY
J cfgWk f]ZhYb`gc`Yb`b]Wk h`bi f`X]Y`G]Wk Yf`Y]h`]a`GhfU»Ybj Yf\_Y`f`
[Yk Å`f`Y]ghYbž`gcbXYfb`Ui Wk`XYb`GWk i hm`8f]hhYf`j cf`Z]bUbni]Y`Yb
GWk`XYb"

⇒a` : U`XYf`i b[ Yk Ò`b`]Wk Yb`J Yf_Y`fg\_cbhfc`Y`VY]`6]b[Yb
Yfk Y]gYb`g]Wk`X]Y`J YfghØ»Y`XYf`VYhY][ hYb` : U`fYf`U`g`[fUj]YfYbX"
8Ug` : U`fYb`c`bY`J Yfg]Wk Yfi b[ ggWk i hm`_Ubb`gWk k Yfk]Y[YbXY
fYWk h]Wk Y` : c`[Yb`UVYbž`i bX`X]Y`GUb_h]cbYb`ZØf`XUg` : U`fYb
c`bY` : Ø`fYfgWk Y]b`g]bX`YVYbZU`g`Yf`YV`]Wk`8UfØVYf`Y]bUi g`]gh
XYf`9]bZi gg`j cb`8fc[ Yb`Ui ZXUg` : U`fYb`Y]bY`VYgcbXYfg`_f]h]gWk Y

5b[Y`Y[ Yb\Y]hžXU`X]Yg`XUg`l bZU`f]g]\_c`Yf\YV`]W\`Yf\`Ò\`h" B UW\`z
&(U`XYg`GhfU» Ybj Yf_Y\fg[YgYhnYg`fGhJ ; Ł`Xfc\Yb`]b`gc`W\Yb
: Ä`Yb`\c\Y`6i » [ Y`XYf`i bX`gc[Uf`i: fY]\Y]hgghfUZyb"

Gcn]U`Y`=a d`]\_Uh]cbYb`i bX

J Yf_Y\fgg]W\`Yf\Y]h

8]Y`Yfk Ä\bhY`J Yf_Y\fg_cbhfc`Y`gd]Y[Y`h`b]W\`h`bi f`XUg
]bX]j]Xi Y`Y` : Y\`j Yf\U`hYb`XYf` : U\fyf`k ]XYfž`gcbXYfb`k ]fZh`Ui W\`
Y]b`@]W\`h`Ui ZX]Y`VfY]hYfY`DfcV`Ya Uh]_`XYf`J Yf_Y\fgg]W\`Yf\Y]h`]b
8Yi hgW\`UbX" `@Ui h`GhUh]gh]\_`XYg`6i bXYga ]b]ghYf]i a g`Z0f`J Yf\_Y\`f
i bX`X][ ]hU`Y`b ZfUghfi \_hi f`[UV`Yg]a `š\`f`&\$&&ØVYf`&ž\* `A]`]cbYb
J Yf_Y\fgi bZÄ`Yžj cb`XYbYb`nU\`fY]W\`Y`Ui Z`8fc[ Yb`cbgi a
ni f0W_] YZ0\fh`k YfXYb`_cbbhYb" `8fc[ Yb`Ua `GhYi Yf`g]bX`Y]b
Yfbghni bY\`a YbXYg`DfcV`Ya ž`XUg`b]W\`h`bi f`X]Y` : U\fybXYbž
gcbXYfb`Ui W\`UbXYfY`J Yf\_Y\fgY]`bY\`a Yf`]b ; YZU\`f`Vf]b[h`

8]Y`?cbhfc`Y`i bX`5\`bXi b[ `j cb`J Yfgh0» Ybž`k]Y`g]Y`VY]`6]b[Yb
Xi fW\ [YZ0\fh`k i fXYž`gd]Y`h`Y]bY`YbhgW\`Y]XYbXY`F c`Y`]a
6Ya 0\Yb`XYf`6Y\0fXYbž`X]Y`GhfU» Yb`g]W\`YfYf`ni `a UW\`Yb"
A U» bU\`a Yb`k]Y`fY[ Y`a Ä»][Y`J Yf\_Y\fg\_cbhfc`Yb`\_0bbYb`XUni
VY]hfU[Ybž`A YbgW\`Yb`XUj cb`UVni `U`hYbž`i bhYf`XYa `9]bZi gg`j cb
8fc[Yb`ni `ZU\`fYbž`gck]Y`X]Y`U`[ Y`a Y]bY` : U\fnYi [ j Yfg]W\`Yfi b[
ni `Z0fXYfb"

2 ZZYbh`]W\`Y`K U\`fbY\`a i b[ `i bX

DfÄj Ybh]cbga U» bU\`a Yb

8]Y`0ZZYbh`]W\`Y`K U\`fbY\`a i b[`j cb`8fc[Yb`Ua `GhYi Yf`]gh]b`XYb
`YhnhYb`š\`fYb`ni bY\`a YbX`[Ygh]Y[Ybž`k Ug`g]W\`Ui W\`]b`XYf
5i Za Yf_gUa _Y]h`XYg` ; YgYh[YVYfg`k ]XYfgd]Y[ Y`h`?Ua dU[bYb
ni f`5i Z`Äfi b[`0VYf`X]Y` ; YZU\`fYb`XYg` : U\fybgi bhYf
8fc[YbY]bZi gg`g]bX`i bYf`Ägg`]W\`C f[ Ub]gUh]cbYb`k]Y`X]Y
8Yi hgW\`Y`J Yf_Y\fgk UW\`h`gYhYb`g]W\`U`h]j `XUZ0f`Y]bž
gYbg]V`]g]YfYbXY`Dfc[fUa `a Y`ni `Yb`hk]W_Y`b`i bX`8i fW\`gYhni b[
j cb`fY[ Y`b`ni `Z0fXYfb"

Ni XYa 'g]bX' b]h]Uh]j Yb'ni f'VYggYfYb'5i Z_`Àfi b['ØVYf'X]Y
; YZU\fyb'XYg': U\fybg'c\by': Ø\fyfgWXY]b'cXYf'J Yfg]WXYfi b[
bchk YbX] ["K cf_g\cdg'i bX' bZcfa Uh]cbgj YfUbghU'hi b[Yb']b
GWxi `Yb'i bX'; Ya Y]bXYb' _ÒbbhYb'XUni 'VY]hfU[Ybž'↑ b[Y
A YbgWXYb'ØVYf'X]Y'F]g]_Yb'i bX'?cbgYei YbnYb'Y]bYg'gc`WXYb
J Yf\U'hYbg'Ui Zni _`ÀfYb"

Ni gUa a YbZUggYbX`Àggh'g]W'gU[ Ybž'XUgg'X]Y'J Yf\_Y\fg\_cbhfc`Yb
k]Y']b'X]YgYa ' : U`Y]bY'bchk YbX][ Y'A U» bU\ a Y'XUfghY`Ybž'i a
X]Y'J Yf_Y\fgg]WXYf\Y]h'ni 'Yf\Ø\Ybž'i bX'XUgg'i a ZUggYbXY
?ca a i b]_Uh]cbggghfUhY[]Yb'ni f'GYbg]V]'g]Yfi b['XYf'; YgY`gWUZh
i bYf`Àgg`W'g]bXž'i a 'XUg': Y\j Yf\U'hYb'ja 'GhfU» Ybj Yf_Y\f'ni
j Yff]b[Yfb"

8YhU]`g

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