

: Øfh\`j YfdUggh`HUVY`Yb gd]hnY. `Nc fb][ Yf  
k ØhYbX`Ui Z`Hc f\`ØhYf`B c`

B UW`Bc`g: Y\`Yf`a`Gd]Y`[ Y[ Yb`DUXYfVc fb`[ Yf`h: Øfh\g  
HfU]bYf`Nc fb][ Yf`b`F U[ Y`6UmYfb!Hc fk Ufh`I`fY]W`Ai » Yfh  
g]W`Ya dØfh"

⊕`XYf`gdUbbYbXYb`K`Y`h`XYf`&": i » VU`!6i bXYg`][ U`ghUbX`Y]b  
XfUa`Uh]gW`Yg`9fY][ b]g`a`A`]hY`di b`h`XYf`6Yf]W`hYfghUhh`b["  
B UW`XYa`I`bYbhgW`]YXYb`nk`]gW`Yb`; fYi`h\Yf: Øfh`i`bX`XYa`G7  
DUXYfVc fb`ž`XUg`Ua`Y`h`hYb`Gd]Y`hU[`ghUhhZUbXž`\_Ua`Yg`ni`Y]bYa  
5i`ZgW`fY]`VY]: Øfh`"8Yf`; fi`bX`k`Uf`Y]b`gW`k`YfYf: Y\`Yf`XYg  
&%!`Å`f][ Yb`Hc f\`ØhYfg`BU`i`Y`Bc`ž`XYf`Xi`fW`X]Y]bYb`a`]ggfUhYbXYb  
5VgW`U[`Y]bYb`HfYZYf`XYg; Y[ bYfg`Yfa`Ø[`]W`hY`"8]Yg`ZØ`fhY`ni  
Y]bYa`%.%ž`XUg`X]Y`<c`Zbi`b[ Yb`XYf: Øfh`Yf`Ui`ZX]Y  
HUVY`YbZØ`fi`b[`ni`b]W`hY`a`UW`hY"

HfU]bYf`5`YI`UbXYf`Nc fb][ Yf`k`Uf`c`V`X]YgYg`A`]gg[ YgW`]W`g`YI`hfYa  
Ui`Z[ YVfUW`h`"8`Ug`]gh`Y]bY`]bU`\_nYdhUV`Y`G]hi`Uh]cbž`gc`Yhk`Ug`XUfZ  
b]W`h`d`Ugg]YfYb`ž`Yf`\_`Å`fhY`Yf`[ Y[ Yb`ØVYf`XYb`A`YX]Yb`"GY]bYf  
A`Y]bi`b[`bUW`X`UhhY`Bc`X`i`fW`X]YgYb: Y\`Yf`YbhgW`Y]XYbX`ni`a  
I`bYbhgW`]YXYb`VY][ YhfU[ Yb`⊕`Y]bYa`A`ca`Ybhž`XYf`Nc fb][ Yf  
ghUf`\_`VYY]bhf`Å`W`h][ hY`ž`Xfc`hY`Yf`gc[ Uf`XYa`Hc f\`ØhYf  
?`cbgYei`YbnYb`Ubž`gc`hY`g]W`Y]b`gc`W`Yf: Y\`Yf`k`]YXYf`c`Yb`  
8]Yg`VfUW`hY`Nc fb][ Yf`XUni`ž`gY]bY`K`i`h`i`bX: fi`ghfUh]cb`c`ZYb`ni  
nY][ Yb.`Gc`Y]bYb: Y\`Yf`XUfZ`Yf`b]W`h`bc`W`Y]ba`U`a`UW`Ybž  
gcbgh`\_`Ubb`a`]W`gY]b`6YfUhYf`Ubfi`ZYb`i`bX`ZfU[ Ybž`k`Ufi`a`Yf  
b]W`h`gd]Y`h"

F YU`\_h]cb`Ui`g`XYf`6i`bXYg`][ U

8]Y`Y`Zh][ Y`F`YU`\_h]cb`XYg`HfU]bYfg`nc[`gW`bY`X]Y

5i Za Yf\_gUa \_Y]hj cb`UbXYfYb`Gd]Y`Yfb`i bX`9I dYfhYb`Ui Z`g]Wk`  
6UmYfb!Hcfk Ufh`Gj Yb`l`fY]Wk`žXYf`gY`Vgh`\_Y]bYb`i: fYa XYb`]b`XYf`  
8YVUhhY`k Ufž`nY][ hY`9a dÖfi b[ `ØVYf`Nc fb][ Yfg`ÖZZYbh]Wk`  
[ YÄi » YfhY`? f]h]\_": ð`Y]bYa`Dcgh`Ui Z`ðghU[ fUa`i]Y»`Yf`XYi`h]Wk`  
k YfXYbž`k Ug`Yf`j cb`XYf`G]hi Uh]cb`\\Y`h" `l b[ `Ui`V`]Wk`ž`gc`Y]bY`  
5i ggU[ Y`j cb`Y]bYa`HfU]bYf`]b`XYf`²`ZZYbh]Wk`\_Y]h`ž`gWk`f]YV`Yf`i bX`  
j YfgU`\\`gY]bYb`?ca`a`YbhUf`a`]h]Y]bYa`fchYb`k`ØhYbXYb`9a`c`ŋ"

8]YgY`ÖZZYbh]Wk`Y`?cb`Zfc`bhUh]cb`nk`]gWk`Yb`HfU]bYf`i bX`Gd]Y`Yf`]gh`  
b]Wk`h`bi`f`VYa`Yf`\_Ybgk`Yfh`ž`gc`bXYfb`ghY`h`Ui`Wk`X]Y`i: fU[ Y`bUWk`  
XYa`l`a`[ Ub[ `a`]h`↑`b[ Yb`HU`YbhYb`]a`XYi`hgWk`Yb`i: i`»`VU`""`ð`  
gY]bYa`Y][ YbYb`?ca`a`YbhUf`VYhc`bhY`Nc`fb][ Yfž`XUgg`XYf`Hc`fk`Ufh`  
nk`Uf`Ui`Wk`ghUf`\_Y`DUfUXYb`[ YnY][ h`\\UVYž`X]Yg`YXc`Wk`b]Wk`h`U`g`  
5i`gfYXY`ZØf`XYb`i: Y`\\Yf`X]YbYb`\_ÖbbY""`GY]bY`@Y]ghi`b[ `k`Uf`gc`ž`  
XUgg`Yf`XUg`%`%ni`j`YfUb`hk`c`fhYb`\\UhhY`ž`ghY`h`Y`Nc`fb][ Yf`\_`Uf`i`bX`  
a`UWk`hY`XYi`h]Wk`ž`XUgg`Yf`]b`X]YgYf`G]hi`Uh]cb`\_Y]bY`5i`gbU`a`Yb`  
a`UWk`Yb`k`ØfXY"

ð`XYf`Nk`]gWk`YbnY]h`k`Uf`X]Y`DUfh]Y`]b`i: Øfh`\\`b]Wk`h`X]Y`Y]bn][ Y`  
GdUbbYbXY`]b`XYf`@[ U""8Yf`%": 7`?U]gYfg`Ui`hYfb`ZY]YfhY`Ua`  
[ `Y]Wk`Yb`HU[ `Y]bYb`G]Y[ `i`Y[ Yb`XYb`5i`ZghY][ Yf`DfYi`»`Yb`A`ØbghYf`  
ð`Y]bYf`k`Y]h[ Y`\\YbX`YfY][ b]gUfa`Yb`6Y[ Y[ bi`b[ `k`Uf`Yg`XYf`  
Y]b[ Yk`YWk`gY`hY`F`U[ bUf`5Wk`Yž`XYf`]b`XYf`, \*`"A`]bi`hY`ZØf`XYb`  
YbhgWk`Y]XYbXYb`HfY`ZZYf`gcf[ hY`i`bX`XUa`]h`X]Y`<`c`Zbi`b[ Yb`XYf`  
@Ui`hYfYf`Ui`Z`Y]bY`YfZc`[ fY]Wk`Y`GU]gcb`ghÄf`hY""`K`]f`k`]ggYbž`XUgg`  
k`]f`XYb`6U`"bi`f`]b`XYb`GhfUZF`Ui`a`Vf]b[ Yb`a`ØggYb`i`bX`Yf`]gh`  
]a`a`Yf`XUž`k`c`Yg`[ YZÄ`\\f`]Wk`k`]fX`ž`gc`F`\\Y]b`UbXg`?Ud]hÄb`A`Uf`cb`  
F]hhYf`ØVYf`5Wk`Yž`XYf`]b`XYb`Y`hnhYb`K`c`Wk`Yb`j`]Y`6YUWk`hi`b[  
[ YZi`bXYb`\\Uh"

### ? Ua dZ`i`a`X]Y`Di`b`\_hY

K`Ä`\\fYbX`X]Y`9fY][ b]ggY`]b`i: Øfh`\\`ZØf`BY[ Uh]`gWk`U[ nY]`Yb`gcf[ hYbž`  
[ UV`Yg`Ui`Wk`Dc]h]j`Y`A`ca`YbhY`]b`X]YgYf`gdUbbYbXYb`@[ U""  
<Yfh`U`6G7`g]Wk`YfhY`g]Wk`]b`Y]bYf`Ui`ZfY[ YbXYb`DUfh]Y`[ Y[ Yb`Δ`\\`b`  
FY[ YbgVi`f[ `Y]bYb`\_bUddYb`&.`\$!G]Y[ `i`bX`dcg]h]cb]YfhY`g]Wk`XUa`]h`  
VYggYf`]a`HUVY`Yba`]hhY`ZY`X""5i`Wk`k`Ybb`<Yfh`U`Ui`Z`XYb`  
k`]Wk`h][ ghYb`Hcf`Ä[ Yfž`<Uf]g`HUVU`\_cj`]Wk`j`Yfn]Wk`hYb`a`i`ggYž`XYf`



⊕`XYf`U\_hi Y`Yb`GU]gcb`nY][ h'g]Wk`ž`XUgg`X]Y`HYUa`gž`X]Y`]b`XYb`  
`YhnhYb`⊕\fYb`]b`X]Y`YfghY`@[ U`Ui`Z[ Ygh]Y[ Yb`g]bXž`cZi`[ i`h`  
a`]h\U`hYb`\_ÖbbYbž`Ui`Wk`[ Y[ Yb`ghUf`\_Y`J`YfY]bYž`X]Y`Äb[ Yf`]b`XYf`  
&`'6i`bXYg][ U`j`Yfk`Y`Yb`"@Ui`h`Y]bYa`'6Yf]Wk`h`XYf`8: `@`]Y[ Yb`X]Y`  
5i`Zgh]Y[ gWk`Ub`W`b`ZÖf`A`Ub`bgWk`UZhYbž`X]Y`Y]bY`ghUf`\_Y`GU]gcb`ghUf`hg`  
\UVYbž`VY]`ØVYf`) \$i` "'8]YgY`dcg]hj`Y`9bhk`]W`\_i`b[ ``Äggh`g]Wk`Ui`Wk`  
Ub`A`Ub`bgWk`UZhYb`k`]Y`XYa`%'`7`?`U]gYfg`Ui`hYfb`i`bX`<`Yfh\U`6G7`  
UV`YgYbž`X]Y`VY]XY`i`a`X]Y`Gd]hnYbd`ÄhnY`\_Äa`dZYb`i`bX`XUVY]`  
↑`b[ Y`HU`Yb`hY`i`bX`YfZU\`fYbY`Gd]Y`Yf`\_ca`V]b]YfYb`"

## ? f]h]\_`Ub`HfU]bYfb`i`bX`Gd]Y`YfYb`hk`]W`\_i`b[

8]Y`ÖZYb`h]Wk`Y`?`f]h]\_`j`cb`HfU]bYfb`Ub`]fYb`Gd]Y`Yfb`]gh`Y]b`  
\Äi`Z[ Yg`H\Ya`U`]a`X`Yi`hgWk`Yb`:`i`»`VU`ž`XUg`cZi`\_cb`hfcj`Yfg`  
X]g`\_i`h]Yfh`k`]fX`"⊕`X]YgYa`:`U`ž`gc`f[ hY`5`Yi`Ub`XYf`Ncfb][ Yfg`  
F`YU`\_h]cb`Ui`Z`BU`i`Y`B`c`g`:`Y`\`Yf`ZÖf`5i`ZgY`Ybž`XU`HfU]bYf`]b`XYf`  
F`Y[ Y`j`Yf`gi`Wk`Ybž`XYb`8`fi`W`\_j`cb`XYb`Gd]Y`Yfb`ni`b`Y\`a`Ybž`i`a`  
XYfYb`9bhk`]W`\_i`b[ `b]Wk`h`ni`VY`\]bXYfb`"9i`dYfhYb`Ui`g`XYa`  
:`i`»`VU`i`a`ZY`X`Uf[ i`a`Ybh]YfYbž`XUgg`gc`Wk`Y]bY`ÖZYb`h]Wk`Y`  
Ni`fYWk`hk`Y]gi`b[ `bY[ Uh]j`Y`5i`gk`]f`\_i`b[ Yb`Ui`Z`XUg`  
GY`VghVYk`i`gghgY]b`↑`b[ Yf`Gd]Y`Yf`\UVYb`\_Ubb`"

5i`ZXYf`Ub`XYfYb`GY]hY`k`]fX`Ui`Wk`\Äi`Z[ `VY`hc`b`hž`XUgg`Yg`  
b`chk`YbX][ `gY]ž`\c`Y`Gh`Ub`XUf`Xg`ni`g`Yh`nYbž`i`a`]b`Y]bYf`gc`\Ufh`  
i`a`\_Äa`dZhYb`@[ U`k`]Y`XYf`&`'6i`bXYg][ U`YfZc`[ fY]Wk`ni`gY]b`'8]Yg`  
ghY`h`X]Y`:`fU[ Yž`k`]Y`HfU]bYf`X]Y`6U`Ub`W`nk`]gWk`Yb`?`f]h]\_`i`bX`  
A`ch]j`Uh]cb`Z]bXYb`\_ÖbbYbž`i`a`XUg`VYghY`DchYbn]U`Ui`g`]fYb`  
Gd]Y`Yfb`\YfUi`gni`\c`Yb`'9g`]gh`Y]b`ZY]bYg`Ni`gUa`a`Ybgd]Y`ž`XUg`  
gck`c`\`J`Yfhf`Ui`Yb`U`g`Ui`Wk`8]gn]d`]b`YfZcfXYfh`"

## GhUh]gh]\_`Yb`ni`f`Gd]Y`Yf`Y]ghi`b[

5\_hi Y`Y`GhUh]gh]\_`Yb`nY][ Ybž`XUgg`X]Y`Hcf`\ØhYfdcg]h]cb`]b`XYb`  
`YhnhYb`⊕\fYb`ni`bY`a`YbX`k`]Wk`h][ Yf`[ Yk`cfXYb`]gh`@Ui`h`Y]bYf`  
5bU`mgY`XYg`⊕`hYfbUh]cbU`7Yb`hfY`Zcf`Gdc`fhg`Ghi`X]Yg`f7`→GŁ`  
gd]Y`Yb`Hcf`\ØhYf`Y]bY`YbhgWk`Y]XYbXY`F`c`Y`ZÖf`XYb`9fZc`[ `]fYf`  
HYUa`gž`k`cVY]`X]Y`:`Y`\`Yfei`chY`XYf`?`YYdYf`]b`XYf`6i`bXYg][ U`i`bX`  
XYf`&`'6i`bXYg][ U`\_cb]bi`]Yf`]Wk`YfZUggh`k`]fX`"⊕`XYf`GU]gcb`

&\$&&#&' 'VYhfi [ 'X]Y': Y\`Yfei c hY`VY]`Hcf\ØhYfbž`X]Y`ni`'X]fY`\_hYb  
; Y[ Ybhc fYb`ZØ\fhYbž`Xi fW\gW\ b]hh]W\`\$ž) `d fc`Gd]Y`Yf" `Gc`W\Y  
GhUh]gh]\_Yb`j YfXYi h]W\Ybž`XUgg`gY`Vgh`Y]b`Y]bnY`bYf': Y\`Yf`]b  
Y]bYa`'Yb[ Yb`Gd]Y`k Y]hfY]W\YbXY': c`[ Yb`\UVYb`\_Ubb"

8 UfØVYf`\]bUi g`VY`Y[ Yb`8 UhYbž`XUgg`Gd]Y`Yf`]a`'5`hYf`j cb`&%  
&J\ fYb`Ui Z`XYf`Hcf\ØhYfdcg]h]cb`g][ b]Z]\_Ubh`k Yb][ Yf`9fZU\ fi b[  
\UVYb`U`g`]\fY`Ä`hYfYb`?c`Y[ Ybž`k Ug`ni`'Y]bYf`\Ø\YfYb  
: Y\`YfUbZÄ``][ \_Y]h`ZØ\ fYb`\_Ubb" `Hfc`h`gc`W\Yf`GhUh]gh]\_Yb`gY`h`hYb  
j ]Y`Y`HYUa`g`Ui Z] ]Y`j Yfgd fYW\YbXY`HU`Yb`hYž]b`XYf`<c ZBi b[ žg]Y  
Xi fW`Gd]Y`d fUi ]g`i bX`HfU]b]b[ `k Y]hfY`ni Yb`hk ]W`Y`b`i bX`Ub`X]Y  
<YfUi gZc fXYfi b[ Yb`Ui Z`DfcZ]!B]j YUi`'\YfUbni ZØ\ fYb"

8 YhU]`g

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