

: U\ffUX`]a `; `Y]g.`6i bXYgdc`nY]`gi W\h  
NYi [ Yb`]b`? Uf`gfi \Y

I bVY\_UbbhYf`Y[h: U\ffUX`]bg; `Y]g`Ua`? Uf`gfi \Yf  
<Ui dhVU\`b\cZ` `6i bXYgdc`nY]`gi W\h`NYi [ Yb`Z0f  
[ YZ\`f`]W\Yb`JcfZU`"

? Uf`gfi \Y`f`c`hgk

9]b`i bj YfZfcfYbYf`JcfZU`"]a`? Uf`gfi \Yf`<Ui dhVU\`b\cZ`\Uh`Ua  
GUa`ghU[ ž`XYb`&("`5i [ i ghž`Z0f`5i ZfY[ i b[ `] Ygcf[ h`9]b  
i bVY\_UbbhYf`HÄhYf`\Uh`Y]b[ Y`VYg: U\ffUX`]b`XYb`; `Y]gVYfY]W\  
[ Y`Y[ hž`k Ug`ni`Y]bYf`Yfbgh\UZhYb`; YZ\`fXi b[ `XYg`6U\bj Yf\_Y\fg  
\ÄhY`Z0\`fYb`\_ÖbbYb"

8]Y`HUh`YfY][ bYh`g]W\`nk`]gW\Yb`-`i bX`%-`I \fž`U`g`XYf`HÄhYf  
UbgW\Y]bYbX`c\`bY`<Ya`a`i b[ Yb`XUg: U\ffUX`Ui Z`Y]b`5VghY`"[ `Y]g  
]a`6YfY]W\`XYf`5VghY`"[ fi ddY`K`Ygh`UV`Y[ hY`"Ni`a`;`ØW`\_`k`i`fXY  
XUg`<]bXYfb]g`Xi`fW`Y]bYb`Ui`Za`Yf\_gUa`Yb`A`]hUfVY]hYf`XYf  
8Yi`hgW\Yb`6U\`b`5;`fYW\`hY]h][`Yb`hXYW`\_`hi`bX`Ui`g`XYa  
;`YZU\`fYbVYfY]W\`Yb`hZYfb`h"

9fa ]hh`i b[ Yb`Ui ZYb`]b`j`c`Ya` `; Ub [ Y

8]Y`6i bXYgdc`nY]`\Uh`XUfUi`Z`]b`gcZcfh`A`U»`bU\`a`Yb`Yf[ f]ZZYb`i`bX  
XUg: U\ffUX`g]W\Yf[ YghY`h"; `Y]W\`nY]h][`k`i`fXY`Y]b  
9fa ]hh`i b[ gj YfZU\`fYb`k`Y[ Yb`XYg`J`YfXUW\`hg`XYg`[ YZ\`f`]W\Yb  
9]b[ f]Zg`]b`XYb`6U\`bj`Yf\_Y\`f`Y]b[ Y`Y]hYh`8]Y`6Y\`ÖfXYb`g]bX`Ui`Z  
XYf`Gi`W\Y`bUW\`NYi [ Ybž`X]Y`Yj`Ybhi`Y`" <]bk`Y]gY`ni`f`≠Yb]h]hÄ`h`XYg  
9][ Ybh`Øa`Yfg`cXYf`ni`a` `<Yf[ Ub[ `XYf`HUh[ YVYb`\_ÖbbYb"

8]Y`6i bXYgdc`nY]`Yfa`i`h][`hi`U`Y`DYfgcbYbž`X]Y`Yhk`Ug`VYcVUW\`hYh  
\UVYbž`g]W\`ni`a`Y`XYb`" <]bk`Y]gY`\_ÖbbYb`hY`YZcb]gW\`i`bhYf`XYf  
Bi`a`a`Yf`\$`+`&%` `-%&\$`%\*`\$`cXYf`ØVYf`XUg`?`cbhU`\_hZcfa`i`Uf`Ui`Z`XYf

K YVgY]hY`XYf`6i bXYgdc`nY]`Y]b[ YfY]W h`k YfXYb" `XY  
`Zcfa Uh]cb`\_Ubb`XUVY]`YbhgWY]XYbX`gY]bži a`X]Y  
J YfUbhk cfh]WYb`ni f`F YWYbgW UZhini`n]Y\Yb"

8 Yf`J cfZU`k ]fZhi: fU[ Yb`Ui Z`K Ug`\_ÖbbhY`XUg`A chj` `XYg`HÄhyfg  
[ Yk YgYb`gY]b3`< UbXY`hYg`g]W`i a`Y]b`]gc`]YfhYg`9fY][ b]g`cXYf  
\_ÖbbhY`X]Yg`HY]`Y]bYg`[ fÖ» YfYb`DfcV`Ya`g`]a`6YfY]W`XYf  
6U\bg]WYf\Y]higY]b3`Gc`WY`5\_h]cbgZcfa`Yb`g]bX`b]W`h`bi`f  
[ YZÄ`f`]W`ž`gcbXYfb`Ui`W`j`Yfk`YfZ]W`ž`XU`g]Y`G]WYf\Y]hi`bX  
CfXbi`b[ `]a`6U\bj`Yf`\_Y`f`[ YZÄ`f`XYb"

## 9]b`d`Öhn`]W`Yf`5`b[ f]ZZ`Ui`Z`X]Y`G]W`Yf\Y]h

8]Y`HUh`nY][ hž`k ]Y`gW`bY`Y]bY`U`hÄ[ `]W`Y`G]hi`Uh]cb`]b`Y]bY  
dchYbn]Y`YVYbgVYXfc`\]W`Y`i a`gW`U[ Yb`\_Ubb"8 Ug`5VghY`Yb  
Y]bYg`: U\ffUXg`]b`Y]bYa` `;`Y]gVYfY]W`]gh`b]W`h`bi`f`fØW\_g]W`hg`cgž  
gcbXYfb`Ui`W`\_f]a`]bY`"8]Y`G]W`Yf\Y]hgVY`ÖfXYb`g]bX  
[ Ynk`i`b[ Ybž`Ui`Z`gc`WY`J`cfZÄ`Y`ni`fYU[ ]YfYbž`i`a`X]Y`G]W`Yf\Y]h  
U`Yf`: U\f[ ÄghY`ni`[ Yk`Ä`f`Y]ghYb"

8 Yf`J cfZU`]gh`Y]b`k`Y]hYfYg`6Y]gd]Y`XUZØfž`k ]Y`k ]W`h][`X]Y  
K UW`gUa`\_Y]h]`cb`A`]hUfVY]hYfb`i`bX`DUggUbhYb`]a`ÖZYbh]W`Yb  
FUi`a`]gh`9g`\_Ubb`]b`GY`i`bXYb`ni`[ YZÄ`f`]W`Yb`G]hi`Uh]cbYb  
\_ca`a`Ybž`XU\Yf`]gh`Yg`ZØf`YXYb`j`cb`6YXYi`hi`b[ ž`Ui`Za`Yf\_gUa`ni  
gY]b`i`bX`j`YfXÄW`h][ Y`5\_h]j`]hÄhyb`i`a`[ Y\YbX`ni`a`Y`XYb"

8]Y`6i bXYgdc`nY]`k ]fX`U`Yg`XUfUb`gYhYbž`XYb`HÄhyf`ni`Z]bXYb"  
5VYf`Yg`]gh`Ui`W`X]Y`J`YfUbhk`cfh`i`b[ `YXYg`9]bnY`bYbž`g]W`ZØf`X]Y  
G]W`Yf\Y]h`ni`Yb[ U[ ]YfYb" `XYg`bcW`gc`\_Y]bY`8YhU]`\_Ubb  
\Y`ZYbž`k Ug`nY][ hž`k ]Y`VYXYi`hYbX`X]Y`Ni`gUa`a`YbUfVY]h`nk`]gW`Yb  
XYf`²`ZYbh]W`\_Y]h`i`bX`XYb`6Y`ÖfXYb`]gh"

8 Yf`? Uf`gfi` \Yf`< Ui`dhVU`b`cZ]gh`Y]b`k ]W`h][ Yf  
J Yf`\_Y`fg`\_bchYbdi`b`hž`i`bX`J`cfZÄ`Y`k ]Y`X]YgYf`\UVYb`b]W`h`bi`f  
ghfUZfYW`h]W`Y`?`cbgYei`YbnYbž`gcbXYfb`gYhYb`Ui`W`Y]b`NY]W`Yb  
ZØf`X]Y`B`chk`YbX][ \_Y]h`k`Y]hYfYf`G]W`Yf\Y]hga`U»`bU`a`Yb"8]Y  
GW`UZI`b[ `Y]bYg`g]W`YfYb`i`a`ZY`Xg`ZØf`U`Y`F`Y]gYbXYb`gc`hY`ghYhg  
]a`J`cfXYf[ fi`bX`ghY\Yb"

6Y]`XYf`6i bXYgdc`nY]`Ui`ZYb`X]Y`9fa`]h`i`b[ Yb`Ui`Z`<cW`hci`fYbž  
i`bX`Yg`V`Y]Vh`UVni`k`UfhYbž`k`Y`W`Y`k`Y]hYfYb``Zcfa`Uh]cbYb`Ui`g  
XYb`NYi`[ Yb`\]bk`Y]gYb`\Yf]`cf[ Y\Yb`k`YfXYb" `A`ca`YbhUb`V`Y]Vh  
X]Y`: fU[ Y`c`ZYbž`k`Ug`\]bhYf`X]YgYa`Y][ YbUfh][ Yb`i`bX  
[ YZÄ`f`]W`Yb`J`cfZU`ghY`W`Yb`\_ÖbbhY"

5i Za Yf\_gUa \_Y]h'i bX`A ]h[ YZØ\`

⊕`gc`WXYb`G]hi Uh]cbYb`]gh`Yg`k ]W]h[ ž`XUgg`X]Y`7ca`a`i`b]hm  
Ui ZY]bUbXYf`UW]h[ ]Vh"⊕XYa`k ]f`i`bgYfY`l`a`[ YVi`b[ `VYcVUW]hYb  
i`bX`Ui`Za`Yf\_gUa`V`Y]VYbž`\_ÖbbYb`k ]f`a`Ö[ `]W]Yfk`Y]gY`XUni  
VY]hfU[ Ybž`[ YZÅ\`f`]W]Y`G]hi Uh]cbYb`ni`j`Yf\]bXYfb`i`bX  
g]W]Yfni`ghY`Ybž`XUgg`gc`WXY`J`cfZÅ`Y`b]W]h`ni`f`;`Yk`c`b`Y]h  
k`YfXYb"

< ]bhYf[ fi bX`XYf`G]W]Yf\Y]hg`U[ Y`]a  
6U\bj Yf\_Y\`f

⊕`XYb`YhnhYb`⊕\fYb`\Uh`X]Y`G]W]Yf\Y]h]a`6U\bj Yf\_Y\`f]b  
8Yi`hgW]\UbX`ni`bY\`a`YbX`Ub`6YXYi`hi`b[ `[ Yk`cbbYb`"8]Y  
6i`bXYgdc`nY]i`bX`X]Y`8Yi`hgW]Y`6U\`b`5;` \UVYb`nU\`fY]W]X  
A`U»`bU\`a`Yb`Yf[ f]ZZYbž`i`a`X]Y`G]W]Yf\Y]h`XYf`FY]gYbXYb`ni  
Yf\`Ö\`Yb`i`bX`J`cf\_Y\`fi`b[ Yb`[ Y[ Yb`dchYbn]Y`Y`;`YZU\`fYb`ni  
hfYZZYb`"Ni`X]YgYb`A`U»`bU\`a`Yb`nÅ\`Yb`i`bhYf`UbXYfYa`X]Y  
⊕ghU`Uh]cb`j`cb`;`VYfk`UW]i`b[ g\_Ua`YfUg]b`6U\`b\`ÖZYbž  
fY[ Y`a`Å»][ Y`G]W]Yf\Y]hg`cbhfc`Yb`i`bX`X]Y`GYbg]V`]g]Yfi`b[ `XYf  
²`ZZYb]h]W]\_Y]h`ZØf`[ YZÅ\`f`]W]Y`G]hi`Uh]cbYb"

J`cfZÅ`Y`k`]Y`XUg`5V`Y[ Yb`Y]bYg`;`U\`ffUXg]a`;`Y]gVYfY]W]`g]bX  
b]W]h`bi`f`[ YZÅ\`f`]W]`ZØf`XYb`6Yhf]YV`XYf`6U\`bž`gcbXYfb`\_ÖbbYb  
Ui`W]`Yfbgh\`UZhY`;`YZU\`fYb`ZØf`FY]gYbXY`XUfghY`Yb`"9]b`gc`W]Yg  
J`Yf\`U`hYb`\_Ubb`U`g`\_f]a`]bY`Y`<`UbX`i`b[ `Y]b[ Yghi`Zh`k`YfXYb`i`bX  
ghY`h`Y]bYb`fYW]h]W]Yb`J`Yfghc»`XUfž`XYf`Yb`hgd`fYW]YbXYb`;`c`[ Yb  
bUW]`g]W]`n]Y\`Yb`\_Ubb`"8]Y`6i`bXYgdc`nY]j`YfZc`[ h]b`gc`W]Yb  
:`Ä`Yb`Y]b`Bi`!`Hc`YfUbn!`Df]bn]dž`i`a`X]Y`G]W]Yf\Y]h]a  
6U\bj Yf\_Y\`f`ni`[ Yk`Å\`f`Y]ghYb"

GhUh]gh]\_Yb`ni`f`G]W]Yf\Y]h]a`6U\bj Yf\_Y\`f

@Ui`h`XYb`Øb[ ghYb`6Yf]W]hYb`XYf`8Yi`hgW]Yb`6U\`b`[ UV`Yg]a`⊕\f  
&\$&&`Yhk`U`;`\$\$`J`cfZÅ`Y`ž`X]Y`U`g`[ YZÅ\`f`]W]Y`9]b[ f]ZZY`b`XYb  
6U\bj Yf\_Y\`f`\_Ugg]Z]n]Yfh`k`i`fXYb`"8]YgY`J`cfZÅ`Y`fY]W]Yb`j`cb`XYf  
5V`U[ Y`j`cb`;`Y[ Ybgh`ÅbXYb`Ui`Z`;`Y]gYb`V]g`\]b`ni`J`UbXU`]ga`i`g"

Ni`g`Äh`n]W]`nY][ Yb`GhUh]gh]\_Ybž`XUgg`i`b[ YZÅ\`f`\*`\$i`X]YgYf`J`cfZÅ`Y  
]b`gh`ÄXh]gW]Yb`;`YV]YhYb`[ YgW]Y\`Ybž`k`c`X]Y`8]W]hY`Ub`FY]gYbXYb  
i`bX`6U\`b`Ub`U[ Yb`\`Ö\`Yf`]gh`8]YgY`NU\`Yb`j`YfXYi`h]W]Yb`b]W]h  
bi`f`X]Y`FY`Yj`Ubn`XYf`G]W]Yf\Y]h]a`ÖZZYb]h]W]Yb`BU\j`Yf\_Y\`fž  
gcbXYfb`Ui`W]`XYb`Xf]b[ YbXYb`6YXUfZ`Ub  
Df`Äj`Ybh]cbga`U»`bU\`a`Yb"

Ÿ \ b`j]W\Y`GhUh]gh]\_Yb`\_ÖbbhYb` \Y`ZYbž`XUg`6Yk i gghgY]b`XYf  
² ZYb`h]W\ \_Y]h`ni`gW\ÄfZYb`i`bX`X]Y`J`YfU`b`hk`cfh]W\ \_Y]h`VY]`XYf  
K U\fbY\`a`i`b[ `j`cb`J`YfX`ÄW`h][`\_Y]hYb`ni`Yf\`Ö\`Yb`"8]Y`6YXYi`hi`b[  
j`cb`NYi`[`Yb\`]bk`Y]gYb`\_Ubb`\`Yf`b]W\h`[`Ybi`[`VY`hcb`h`k`YfXYb`ž`XU  
g]Y`\`Äi`Z][`Yb`hgW\Y]XYb`X`ZØf`X]Y`5i`Z`\_`Äfi`b[ `j`cb`J`cfZ`Ä`Yb`g]b`X`"

## 5i Zfi Z`ni f`NYi [ Yb\ ]`ZY

8]Y`6i`bXYgdc`nY]`fi`Zi]b`gc`W\Yb`i`Ä`Yb`X]Y`6Yj`Ö`\_Yfi`b[ `Ui`Zž`]\fY  
5i`[`Yb`c`ZYb`ni` \U`hYb`i`bX`j`YfX`ÄW`h][`Y`5`\_h]j`]h`ÄhYb`ni`a`Y`XYb`  
ŸXY`ϕ`Zcfa`Uh]cb`\_Ubb`Yb`hgW\Y]XYb`X`gY]b`ž`i`a`X]Y`H`ÄhYf`ni`f  
FYW\YbgW\UZh`ni`n]Y\`Yb`i`bX`Ä`b`]W\Y`J`cfZ`Ä`Y`]b`XYf`Ni`\_i`b`Zi`ni  
j`Yf\`]b`XYfb`"8]Y`Ni`gUa`a`Yb`UfVY]h`nk`]gW\Yb`XYf`Dc`nY]i`bX`XYf  
6Yj`Ö`\_Yfi`b[ `]gh`i`bYf`Ägg]W\ž`i`a`X]Y`G]W\Yf\`Y]h`]a`6U\`bj`Yf`\_Y\`f  
ni`[`Yk`Ä`f`Y]ghYb`"

8i`fW\`X]Y`6YfY]hghY`i`b[ `j`cb`ϕ`Zcfa`Uh]cbYb`ØVYf`a`Ö[ `]W\Y`H`ÄhYf  
cXYf`J`cfZ`Ä`Y`\_`ÖbbYb`X]Y`6Øf`[`Yf`U`\_h]j`ni`f`J`YfVYggYfi`b[ `XYf  
G]W\Yf\`Y]h`VY]h`fU`[`Yb`"8U\`Yf`]gh`Y`g`k`]W\h][`ž`XUgg`NYi`[`Yb`g]W\`VY]  
XYf`Dc`nY]i`a`Y`XYb`ž`ZU`g`g]Y`ϕ`Zcfa`Uh]cbYb`ni`XYa`J`cfZU`Ua  
?Uf`gfi` \Yf`<`Ui`dhVU\`b\`c`Z`cXYf`Ä\`b`]W\Yb`G]hi`Uh]cbYb`\`UVYb`"

8YhU]`g

6Ygi W\Yb`G]Y`i`bg`Ui`Z.`X]Y!`bUW`f]W\`hYb`"bYh