

A Uf]bY '@Y 'DYb. ' < UZhghfUZY 'b UWK  
a ]`]UfXYbgWk YfYf'9I !J Yfi bhfYi i b[ °

A Uf]bY '@Y 'DYbž'X]Y 'Y\Ya U`][ Y 'J c fg]hnYbXY 'XYf  
fYWX hgdcdi `]gh]gWYb 'DUfhY]'F UggYa V`Ya Ybh'B Uh]cbU`fF B Łž  
k i fXY 'Ua '%"5df]'&\$&) 'k Y[ Yb'l bhfYi Y 'j Yfi fhY]'h'F ]Wk hYf]b  
6ÅbÅX]WY 'XY 'DYfh\i ]g'ghY`hY 'ZYghž'XUgg '@Y 'DYb 'ØVYf'j ]Yf  
A ]`]cbYb'9i fc'Ub'9I !; Y`XYfb'j Yfi bhfYi h'\UhhY"'8 Ug'l fhY]'  
g]Y\h'Y]bY'j ]Yf'Å\ f][ Y '< UZhghfUZY 'j cfž'j cb'XYf'nk Y]'ϰ\ fY 'ni f  
6Yk Å\fi b[ 'i bX'nk Y]'ϰ\ fY 'i bhYf'<Ui gUffYgh'[ Y`Y]ghYh  
k YfXYb'a ØggYb"'Ni gÅhn`]Wk 'ni ']\fYf'< UZhghfUZY 'k i fXY ']\f  
Y]bY'; Y`XghfUZY 'j cb'%"\$"\$"\$"\$'9i fc'Ui ZYf'Y[ hž'i bX'g]Y`XUfZ  
]\f'ÒZYbh]Wk Yg'5a h'b]Wk h'a Y\ f'Ui gØVYb"'@Y 'DYb'd`Ubhž  
[ Y[ Yb'XUg'l fhY]'`b'6Yfi Ž b[ 'ni '[ Y\Yb'i bX'VYnY]Wk bYh'Yg  
U'g'dc`h]gWk 'a ch]j ]Yfh'DUfhY]Wk YZ'æfXUb'6UfXY`U` \ Uh  
VYfY]hg/ Ua d^Y`]d/



A Uf]bY '@Y 'DYbž'X]Y 'Y\Ya U`][ Y 'J c fg]hnYbXY 'XYf  
fYWX hgdcdi `]gh]gWYb 'DUfhY]'F UggYa V`Ya Ybh'B Uh]cbU`fF B Łž  
k i fXY 'Ua '%"5df]'&\$&) 'k Y[ Yb'l bhfYi Y 'j Yfi fhY]'h'F ]Wk hYf]b  
6ÅbÅX]WY 'XY 'DYfh\i ]g'ghY`hY 'ZYghž'XUgg '@Y 'DYb 'ØVYf'j ]Yf  
A ]`]cbYb'9i fc'Ub'9I !; Y`XYfb'j Yfi bhfYi h'\UhhY"'8 Ug'l fhY]'g]Y\h

Y]bY'j ]Yf'À\fi[ Y' < UZhghfUZY' j cfž'j cb'XYf'nk Y]' ð\fy'ni f  
6Yk À\fi b[ 'i bX'nk Y]' ð\fy'ni bhYf' < Ui gUffYgh'[ Y'Y]ghY'h'k YfXYb  
a ØggYb"'Ni gÀhn'Wk'ni ']\fyf' < UZhghfUZY' k i fXY' ]\f'Y]bY'; Y'XghfUZY  
j cb'%'\$\$'\$\$'\$'9i fc'Ui ZYf'Y[ hž'i bX'g]Y'XUfZ']\f'ÒZYbh'Wk'Yg'5a h  
b]Wk'h'a Y'\f'Ui gØVYb"

@Y'DYb'd'Ubhž'[ Y[ Yb'XUg'i fhY]' ]b'6Yfi Z' b[ 'ni 'i [ Y\Yb'i bX  
VYnY]Wk'bYh'Yg'U'g'dc`]h]gWk'a c'h]j ]Yfh'DUfhY]Wk'YZ'æfXUb'6UfXY''U  
\Uh'VYfY]hg'ni 'UbXYgk Y]hYb'DfchYghYb'Ui Z[ Yfi ZYb'i bX'ZcfXYfh'X]Y  
: fUbncgYb'Ui Z'g]Wk'Ya d'Øfh'ni 'nY][ Yb"'9f'\_f]h]g]Yfh'XUg'i fhY]'U'g  
i b[ YfYWk'h'i bX'a cV]'g]Yfh'i bhYfghØhnYf'ZØf'X]Y'DfchYghU\_h]cbYb"  
F Åa mi < Y]mž'XYf'GhUUhgUbk U'h'XYg'? UggUh]cbg[ Yf]Wk'hgž  
j YfhY]X][ hY'\]b[ Y[ Yb'X]Y'9bhgWk'Y]Xi b[ 'U'g'↑f]gh]gWk'Y  
A U»bU\ a Yžk À\fybX'X]Y'J c'fg]mYbXY'F]Wk'hYf]b'Ui Z[ fi bX'j cb  
8fc\i b[ Yb'a ]hhYfk Y]Y'i bhYf'Dc`]nY]gWk'i hn'ghY'h''5i Wk  
DfYa ]Yfa ]b]ghYf': fUbWk'g'6Umfc'i 'Ài » YfhY'g]Wk'g\_Ydh]gWk'ØVYf'X]Y  
gcZcfh][ Y'J c`ghfYW\_i b[ 'XYg'5i ggWk'i ggYg'j cb'@Y'DYb'ZØf'X]Y  
\_ca a YbXYb'K U\Yb'i bX'ZcfXYfh'X]Y'A Ø[ 'Wk'\_Y]h'ni f'6Yfi Z' b[ "

?cbgYei YbnYb'ZØf'X]Y'dc`]h]gWk'Y'Ni \_i bZh

8Ug'i fhY]' [ Y[ Yb'@Y'DYb'\Uh'VYfY]hg'k Y]hfY]Wk'YbXY  
?cbgYei YbnYb"'G]Y'k i fXY'j cb'XYf'DfÀg]XYbhgWk'UZhgk U\`&\$&+  
Ui g[ YgWk'cggYb'i bX'\Uh'Ub[ Y\_ØbX][ hž'\_Y]bY'7\UbWk'Ui Z'Y]bY  
HY]'bU\ a Y'Ub'XYf'K U\`ni 'gY\Yb"'@Y'DYb'VY\Ui dhYhž'g]Y'gY]  
i bgWk'i 'X][ 'i bX'g]Y\h]b'XYa 'l fhY]'Y]bY'; YZU\ f'ZØf'X]Y  
8Ya c\_fUhY]Y"'Àfy'dc`]h]gWk'Yb'; Y[ bYf'bi hnYb'X]Y'; Y'Y[ Yb\Y]hž'i a  
]\fyb'GhUbXdi b\_h'ni 'VY\_fÀZh][ Yb"'¥f]W7]c'h]ž'Y]b'\_cbgYfj Uh]j Yf  
5V[ YcfXbYhYfž'\Uh'XUg'i fhY]'U'g' i bk ØfX][ Y'ž gh]nj YfgWk'k Øfi b[  
VYnY]Wk'bYhž'k À\fybX'»Ub!@ WA Å'YbWk'cb'j cb'XYf  
'b\_gdcdi`]gh]gWk'Yb'DUfhY]'@U': fUbWk']bgci a ]gY'Y]b  
5VgYhni b[ gfYZfYbXi a 'ZcfXYfh"

?i fnY'K YfVY]bV'YbXi b[

8]Y'5i Za Yf\_gUa \_Y]hž'X]Y'XUg'i fhY]'Yf\]Y'hž'k Uf'Ybcfa ' 'gck c\`  
]b': fUb\_fY]Wk'U'g'Ui Wk' ]b[ 'Ubn'9i fcdU"'l bhYfghØhnYf'k ]Y'≠U']Ybg  
J]nYdfYa ]Yfa ]b]ghYf'A UhhYc'GU'j ]b]i bX'l b[ Ufbg

A ]b]ghYfdFÅg]XYbhJ ]\_hcF`C fV½b`nY][ Yb`g]W`gc`]XUf]gW`a ]h`@Y  
DYb`G]Y`VYnY]W`bYb`XUg`l`fhY]`U`g`dc`]h]gW`Y`J`YfZc`[ i b [ ``5i W`  
; YYfh`K ]`XYfgž`Y]b`b]YXYf`ÅbX]gW`Yf`F`YW`hgdc`di`]ghž`XfØW`\_hY  
gY]bY`GW`cW\_]Yfi b [ `ØVYf`XUg`l`fhY]`Ui`g`

⇒hYfbUh]cbU`Y`F`YU`\_h]cbYb`i`bX`X]Y` ; YgW`]W`hY`XYf`F`B

8]Y`F`YU`\_h]cbYb`Ui`Z`XUg`l`fhY]`[ Y`Yb`ØVYf`X]Y` ; fYbnYb  
: fUb`\_fY]W`g`^]bUi`g`8Yf`?`fYa` ``Åi`»`YfhY`g]W`Y`VYbZU`g`ni`X`Ya  
J`YfZU`fYb`/`Gd`fY`W`Yf`8`a`]hf`^`DYg`\_`ck`\_`f]h]g]Y`fhY`X]Y`J`Yf`Y`hni`b`[  
X`Ya`c`\_`fU]gW`Yf`B`c`fa`Yb`]b`9i`fcdUž`VYnY]W`bYhY`XUg`l`fhY]`  
^`X`c`W`U`g`]bbYfY`5b`[ Y`Y`[ Yb`Y]h`i`: fUb`\_fY]W`g`8`Ug  
[ YgY`g`W`U`Z`h]W`Y`i`bX`dc`]h]gW`Y`l`a`Z`X`ž`]b`X`Ya` `@Y`DYb`U`[ ]Yfhž`]gh  
h]Y`Z`j`Y`fk`i`fnY`h`]b`Y`]b`Y`f` ; YgW`]W`hY`ghfU`hY`[ ]gW`Yf`5`U`b`n`Y`b`a`]h  
F`i`gg`U`b`X`" `Δ`fY`DU`fhY]`^`U`h`^`]ghc`f]gW`Y`b`[ Y`J`Y`fV]b`Xi`b`[ Yb`ni  
F`i`gg`U`b`X`ž`X]Y`Ui`Z`]^`fY`b`J`U`hYf`>`U`b`!`A`U`f]Y`@Y`DYb`ni`fØW`\_`[ Y`Y`b`"

I`b`hYf`@Y`DYb`^`U`h`X]Y`F`B`d`fc`!`fi`gg]gW`Y`D`cg]h]cbYb`j`YfZc`[`hi`b`X  
&`\$`%`+`]b`Y`]b`Y`f`K`U`^`\_`U`a`d`U`[`b`Y`V`Y`X`Y`i`h`Y`b`X`Y`Z]b`U`b`n]Y`Y`Y  
I`b`hY`f`gh`Ø`hni`b`[ `Ui`g`F`i`gg`U`b`X`Y`f`U`h`Y`b`"8`U`V`Y]`k`i`f`X`Y`b  
J`Y`f`V]b`Xi`b`[ Yb`nk`]gW`Y`b`X`Y`f`Z`f`U`b`n`Ø`g]gW`Y`b`Y`I`h`f`Ya`Y`b`F`Y`W`h`Y`b  
i`b`X`F`i`gg`U`b`X`dc`g]h]cb]Y`fhž`X]Y`g`ck`c`^`\_`i`^`hi`fY`Y`U`g`Ui`W`  
dc`]h]gW`Y` ,`V`Y`f`Y]b`gh]a`a`i`b`[ Yb`Ui`Z`k`Y]gYb`"H`X`Y`7`c`b`j`Y`f`g`U`h]c`b  
V`Y`f]W`h`Y`hž`X`U`gg`g`c`W`Y`5`U`b`n`Y`b`h]Y`Z]b`X`Y`f` ; YgW`]W`hY`X`Y`f`F`B  
j`Y`fk`i`fnY`h`g]b`X`ž`V`Y`[ ]b`b`Y`b`X`a`]h`\_`f]h]gW`Y`b`Z]b`U`b`n]Y`Y`b  
H`f`U`b`g`U`\_`h]c`b`Y`b`i`b`X`g`h`f`U`hY`[ ]gW`Y`b`DU`f`h`b`Y`f`g`W`U`Z`h`Y`b`"

5b`[ Yg]W`hg`X`Y`g`8`fi`W`\_`g`i`b`X`X`Y`f`F`Y`U`\_`h]c`b`Y`b`\_`Ø`b`h`Y`Y`g`g]W`X`ZØf`@Y  
DYb`U`g`g`W`k`]Y`f][`Y`fk`Y]gYb`ž`]^`fY`dc`]h]gW`Y`b`>`X`Y`U`Y  
Xi`f`W`ni`g`Y`hn`Y`b`ž`]b`g`V`Y`g`c`b`X`Y`f`Y`]b`Y`]b`Y`f`N`Y]hž`]b`X`Y`f`X`Y`f`9]b`Z`i`gg  
j`Y`f`V`f`Y]h`Y`h`f`d`fc`!`fi`gg]gW`Y`f`G`h]a`a`i`b`[ Yb`]b`9i`fcdU`UV`b]a`a`hi`b`X  
X`Y`f`:`c`\_`i`g`Ui`Z`Y]b`Y`f`Y]b`Y`h]W`Y`f`Y`b`9i`!`Dc`]h]\_`Y`[`h`N`i`\_`i`b`Z`h`i`b`X  
9]b`Z`i`gg`X`Y`f`F`B`]b`X`Y`f`Z`f`U`b`n`Ø`g]gW`Y`b`Dc`]h]\_`V`Y]V`Y`b`X`U`a`]h  
U`b`[ Yg]W`hg`X`Y`f`U`\_`hi`Y`Y`b`9`b`h`k`]W`\_`i`b`[ Yb`i`b`[ Yk`]gg`"

Ni`g`U`a`a`Y`b`Z`U`gg`Y`b`X`V`Y]V`h`Z`Y`ghni`^`U`h`Y`b`ž`X`U`gg`X`U`g`l`fhY]`[ Y`[ Yb  
A`U`f]b`Y`@Y`DYb`b`]W`h`b`i`f`]^`fY`dc`]h]gW`Y`?`U`ff]Y`f`Y`ž`g`c`b`X`Y`f`b`Ui`W`  
X]Y`8`mb`U`a`\_]`X`Y`g`F`Y`W`hgdc`di`]g`a`i`g`]b`9i`fcdU`b`U`W`^`U`h`[

VYY]bZi ggYb' \_ÒbbhY"'? fcbY']bZcfa ]YfhØVYf'XUg'[ YgUa hY'I a ZY`X  
i bX`X]Y`9bhk ]W\_`i b[ Ybž'k À\fybX'GØXXYi hgWXY`X]Y`VfY]hYb  
FYU\_h]cbYb`Ui ZXUg`I fhY]`VY`Yi W`hYh"

C fh`XYg'; YgWXY\Ybg8YhU]`g`ni f`A Y`Xi b[ K Ug`]gh  
dUgg]Yfh36Yhfi [ ; YbUi Yf`C fh

VY\_Ubbh3: fUb\_fY]W GUW gW UXYb( \$\$\$\$\$\$` `GW UXYb6YghY  
FYZfYbn\_fcbY"UhK Y]hYfY`E i Y`Yb h\YW`bj YfgUh]cb"W`a

---

Gci fW.`X]Y!b UW f]W hYb"Uh

8YhU]`g

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