

&( `]b hYfYggUb hY `: U\_hYb `ØVYf`F i gg`UbX

K ]f`hY]`Yb`X]Y`]b hYfYggUb hYghYb `: U\_hYb `ØVYf`F i gg`UbXž`X]Y  
]a `@Ui ZY`j cb`nk Y]`F Y]gYb`]b`X]YgYg`A Ua a i h`UbX  
[ YgUa a Y`h`k i fXYb`Fi gg`UbX`k i fXY`U`g`j ]Y`Y`8]b[ Y  
VYgW`f]YVYb.`Y]bY`A i hYfž`Y]bY`; Yk ]bbYf]bž`Y]bY`? fUZh`i bX  
Y]bY`? Åa dZYf]b``9g`]ghž`k ]Y`7`i fW`j``Yg`VYfØ`a h  
Ui gXfØW\_hYž`Y]b`F ÅhgY`ž`XUg`]b`Y]b`A mghYf]i a `]b`Y]bYa  
9b][ a U`[ Y`Ø`h`]gh``F i gg`UbX`]gh`gck c`\\`Vi W`ghÅV`]W`U`g  
Ui W`a YhUd`cf]gW`ØVYfX]a Ybg]cb]Yfh``5V[ YgY`Yb`j cb  
gY]bYf`d`mg]gW`Yb`; fØ» Y``Ui Yfh`Yg`gY]h`š`fnY`b hYb`U`g  
; YgdYbgh`ØVYf`XYa `K YghYb``5i ZDYhYfg`\_Øfn`]W`Yf`F Y]gY`]b  
X]YgYg`@UbX`XYf`; Y`Y]a b]ggY`gUa a Y`hY`Yf`Y]bY`: Ø`Y  
]b hYfYggUb hYf`: U\_hYb `ØVYf`F i gg`UbX`Y]b][ Y`VY`Ub bž  
UbXYfY`k Yb][ Yf``K ]Y`Yg`HfUX]h]cb`]ghž`UVYb`/ Ua d`^Y``]d/

K ]f`hY]`Yb`X]Y`]b hYfYggUb hYghYb `: U\_hYb `ØVYf`F i gg`UbXž`X]Y`]a  
@Ui ZY`j cb`nk Y]`F Y]gYb`]b`X]YgYg`A Ua a i h`UbX`[ YgUa a Y`h`  
k i fXYb

F i gg`UbX`k i fXY`U`g`j ]Y`Y`8]b[ Y`VYgW`f]YVYb.`Y]bY`A i hYfž`Y]bY  
; Yk ]bbYf]bž`Y]bY`? fUZh`i bX`Y]bY`? Åa dZYf]b``9g`]ghž`k ]Y`7`i fW`j``Yg`VYfØ`a h`Ui  
gXfØW\_hYž`Y]b`F ÅhgY`ž`XUg`]b`Y]b`A mghYf]i a `]b`Y]bYa `9b][ a U`[ Y`Ø`h`]gh``

F i gg`UbX`]gh`gck c`\\`Vi W`ghÅV`]W`U`g`Ui W`a YhUd`cf]gW`  
ØVYfX]a Ybg]cb]Yfh``5V[ YgY`Yb`j cb`gY]bYf`d`mg]gW`Yb`; fØ» Y  
`Ui Yfh`Yg`gY]h`š`fnY`b hYb`U`g`; YgdYbgh`ØVYf`XYa `K YghYb``

5i ZDYhYfg`\_Øfn`]W`Yf`F Y]gY`]b`X]YgYg`@UbX`XYf`; Y`Y]a b]ggY  
gUa a Y`hY`Yf`Y]bY`: Ø`Y`]b hYfYggUb hYf`: U\_hYb `ØVYf`F i gg`UbX`  
Y]b][ Y`VY`Ub bž`UbXYfY`k Yb][ Yf``K ]Y`Yg`HfUX]h]cb`]ghž`UVYb`k ]f  
X]Y`VYghYb`XU]cb`i b hYb`ni gUa a Yb[ YghY``h``

⇒b hYfY ggUb hY : U\_hYb`ØVYf`F i gg`Ub X

% " F i gg`UbX`]gh`ZÀWYba`À»][`XUg`[ fÒ» hY`@UbX`XYf`K`Y`h`"9g  
i a`ZUggh`%+`A`]`]cbYb`E i UXfUh\_]`ca`YhYf`f\*`ž`A`]`]cbYb  
E i UXfUha`Y`YbŁ`i bX`a`UW`h`a`Y`f`U`g`Y]b`BYi bhY`XYf  
@UbXZÀWY`XYf`9fXY`Ui`g`"fE i Y`Y.`667Ł

&" F i gg`UbX`U`h`X]Y`Àb[ ghY`9]gYbVU`b`XYf`K`Y`h`"8]Y  
HfUbgg]V]f]gW`Y`ØVYfgdUb`bh`ZUgh`XUg`[ Ub`nY`@UbX`ž`j`Yf`Àggh  
A`cg\_Ui`]a`K`YghYb`i bX`ZÀ`f`h]a`C`ghYb`bUW`  
K`UX]k`cg`hc`\_"8]Y`[ YgUa`hY`F`Y]gY`]gh`-`&\$\$`\_a`"Ub[  
f)`"+\$\$`A`Y`YbŁ`i bX`k`ØfXY`%)`&`Ghi`bXYb`i bX`&+`A`]bi`hYb  
c`b`Y`i bhYfVfYW`i b[`XUi`Yfb`"fE i Y`Y.`H`Y`HY`Y[ fUd`Ł

U`h1`8]Y`HfUbgg]V]f]Yf`]b`F i gg`UbX`2 : U]fY`Bi`hni`b[`8]Y  
HfUbgg]V]f]gW`Y`9]gYbVU`b`]b`F i gg`UbX`]gh`X]Y`Àb[ ghY`9]gYbVU`b  
XYf`K`Y`h`f] U]f`i`gYŁ

% " F i gg`UbX`"Y[ h`gck`c`"b`9i`fcdU`U`g`Ui`W`]b`5g]Yb.`9]b  
J]YfhY`"gY]bYg`HYff]hcf]i`a`g`]Y[ h]b`9i`fcdU`i`bX`XfY]  
J]YfhY`]b`5g]Yb`"6Ya`Yf`\_Yb`gk`YfhYfk`Y]gY`YVYb`bi`f`&`&`i  
XYf`6Yj`Ò`\_Yfi`b[`]a`Ug]Uh]gW`Yb`HY]"`fE i Y`Y.`K`Y`h`U`h`UgŁ

&" 8]Y`F i ggYb`g]bX`bUW`K`Y]»`fi`gg`UbX`ž`A`c`XUk`]Yb`i`bX  
@]hUi`Yb`X]Y`j`]Yfh[ fÒ» hYb`Hf]b`\_Yf`XYf`K`Y`h`"8]Yg`\_Òb`bhY  
Yf`\_ÀfYb`ž`k`Ufi`a`Y]bYf`j`cb`ZØb`Z`a`Àbb`]W`Yb`HcXYg`ZÀ`Yb  
]b`F i gg`UbX`U`\_c`c`VYX]b[`h]gh`"fE i Y`Y.`H`Y`HY`Y[ fUd`Ł

"`6]g`&`\$`%`[ U`h`U`Y`g`a`]h`k`Yb][`Yf`U`g`%`\$`i`5`\_c`c`"U`g  
@YVYbga`]hY`"i`bX`b]W`h`U`g`5`\_c`c`"fE i Y`Y.`667Ł

U`h1`2`A`cg\_Ui`]gh`X]Y`<Y]a`Uh]`cb`+`A`]`]UfX`ÀfYb`i`bX`n`À`h

% " ⇒`A`cg\_Ui`"YVYb`a`Y`f`A`]`]UfX`ÀfY`U`g`]b`ZUgh`YXYf  
UbXYfYb`GhUXh`"9g`U`h`+`A`]`]UfX`ÀfY`i`bX`fUb[`]Yfh`bi`f  
`b`hYf`BYk`Mcf`\_f]`&Ł`i`bX`<cb[`\_cb[`f+]`Ł`"fE i Y`Y.`  
:`cfVYgŁ

&"`a`;`Yk`Ò`VY`i`bhYf`XYa`8Yb`\_a`U`ZØf`X]Y`Y`XYb`UZhYb

J YfhY]X][ Yf`@Yb]b[ fUXg`h]W\_h`Y]b`A Yhfcbca  
i bi bhYfvfcWYb""9g`]gh`XYf`Hcbž`XYf`k A`fYbX`XYf  
6Y`U[ Yfi b[ `]a `c`\_U`Yb`F`UX]c`[ Ygd]Y`h`k i fXYž`i a `XYb  
6Yk c`bYfb`ni `j Yfg]WYfbž`XUgg`X]Y`GhUXh`bcW`Ua `@VYb  
k Uf`fE i Y`Y. `@cbY`m`D`UbYhŁ

' " 9]bY`i bgYfYf`]bhYfYggUbhYghYb` : U\_hYb`ØVYf`F i gg`UbX`]ghž  
XUgg`Yg`]b`A cg\_Ui `Y]b`F YghUi fUbh`[ ]Vhž`XUg`Ui ggW`]Y» `]W  
j cb`Nk `]`b[ Yb`VYgYhnh`]gh" 8 Ug`Hk `]b`GhUfg`8]bYf  
VYgW`ÅZh][ h[ `Y]W`[ Y`\_Y]XYhY` ; YgW`k ]ghYf`i bX`]ghj`ca  
gck `Yh]gWYb` : ]a `?`b[ Xca `cZ`7fcc`\_YX`A ]ffcfg`Ui g`XYa  
Ÿ\`f`%- \* ( `]bgd]f]Yfh`fE i Y`Y. `667Ł

`U`h1 Gh`6Ug]`?Uh\YXfU`Y 2 HfUi a nY]h`6Ug]`]i g!`?Uh\YXfU`Y`]b  
A cg\_Ui `fHfUi a nY]hŁ

% " 8]Y`6Ug]`]i g!`?Uh\YXfU`Y`]b`A cg\_Ui `k i fXY`j cb`Dcghb]\_  
Ÿ\_U`ck `Yk `[ YgW`UZZYb""8Yf`@Y[ YbXY`bUW` `U`h`k Ub`XYf  
GW`fYW`\_]W`Y`]`b`XUbUW`[ YV`YbXYhž`gcXUgg`Yf`b]W`hg  
J Yf[ `Y]W`VUfYg`VUi Yb`\_cbbhY""fE i Y`Y. `@cbY`m`D`UbYhŁ

&" F i gg`UbX`]\Uh`a Y`f`NY]hncbYb`U`g`YXYg`UbXYfY`@JbX`XYf  
K Y`h" : fØYf`k UfYb`Yg`%%ž`UVYf`X]YgY`NU` `k i fXY`&\$\$  
Ui Z` bi f `bYi b`fYXi n]Yfh`fE i Y`Y. `FYi hYfgŁ

' " F i gg`UbXg`6U]\_U`gYY`]gh`XYf`h]YZghY`XYf`K Y`h`i bX`Yb`h`Å`h  
Yhk U`&\$`i `XYg`i b[ YZfcfYbYb`GØ» k UggYfg`XYf`K Y`h"  
fE i Y`Y. `6f]hUbb]WŁ

`U`h1 8]Y`I ZYf`XYg`6U]\_U`gYYg 2 B\_]h]b`J ]W`cf`#G`i hhYfg`hcW`8]Y  
I ZYf`XYg`6U]\_U`gYYg

% " F i gg]gW`Y` : Ø`fYf` \UVYb`Y]b][ Y`]bhYfYggUbhY`\_fYUh]j Y  
6YgW`ÅZh][ i b[ Yb`"A ]W`U]` ; cfVUhgW`ck `U`h`Y]b`5`Vi a `a ]h  
fca Ubh]gW`Yb`6U`UXYb`Ui Z[ Ybca`a Ybž`k A`fYbX`XYf  
XYfnY]h][ Y` : Ø`fYf`K `UX]a ]f`Di`h]b`Y]bY`ž`Xc!8J8`U`h"  
fE i Y`Y. `H`Y` ; i UfX]Ubž`H`Y` ; i UfX]UbŁ

&" Di`h]b`fYhhYhY`Y]ba U`Y]b` : YfbgY`hYUa`j`cf`Y]bYa  
g]V]f]gW`Yb`H][ Yf` [ UV`UVYf`gd`ÅhYf`ni`ž`XUgg`X]Y`F`Y`hi`b[  
]bgnYb]Yfh`k Uf`"5bXYfY`gY]bYf`Xc`\_i`a`Yb]h]YfhYb  
K`YfVY[U[ g`g]bX`XUg`A`Uf\_]YfYb`j`cb`K`U`Yb`i`bX`XUg`HcVYb

a ]h`Y]bYa `gY`hYbYb`GW`bYY`YcdUfXYb" fE i Y`Y. `667Ł

' " Fi gg`UbX`]gh`X]Y`<Y]a Uhj cb`Cma mU\_cbž`XYa ` \_`Ā`hYghYb  
VYk c`b`hYb`C`fh`XYf`9fXY" `5a `\*`"; YVfi Uf`%-`'  
j YfnY]W`bYhY`gY]bY`K YhYfghUj]cb`Y]bY`HYa dYfUhi f`j cb  
!`\*`ž`'..7" fE i Y`Y. `H`Y`HY`Y[ fUd`Ł

`U`h1 `K ]ggYbgk YfhYg`ØVYf`Fi gg`UbX. ` \_`Ā`hYghYf`C`fh`2`7fYUhj`Y  
7ca a cbg`Fi gg`UbX`]gh`X]Y`<Y]a Uhj cb`Cma mU\_cbž`XYa  
\_`Ā`hYghYb`VYk c`b`hYb`C`fh`XYf`9fXY`f7fYUhj`Y`7ca a cbg`&`"\$Ł

%`%`-\$, ` \_`Ua `X]Y`fi gg]gW`Y`C`ma`d]Ua`UbbgW`UZh`a`]h`%&  
HU[ Yb`J`Yfgd`Ā`hi`b[ `]b`@cbXcb`Ubž`k`Y]`g]Y`bcW`X`Y`b  
š`]Ub]gW`Y`b`?`U`Y`b`X`Y`f`j`Y`fk`Y`b`X`Y`h`" fE i Y`Y. `H`Y`<`i`a`Ub  
C`f[ `Ub]nUj]cb`c`Z`H]a`YŁ

&" Fi gg`UbX` \`Uh`Y]bYb`XYf`h`ØX`]W`ghYb`GYYb`XYf`K`Y`h`"8Yf  
?`UfUhgW`U]!`GYY`]b`XYf`B`Ā`Y`X`Y`f`fi`gg]gW`Y`b`GhUXh  
HgW`Y`UV]bg\_`]a`I`fU`]gh`Y]bY`8Ydcb]Y`Z0f`5hca`a`Ø`i`bX  
gc`fUX]cU`\_hj`ž`XUgg`G]Y`a`]h`n]Ya`\_]W`Y`f`G]W`Y`f`Y]h`ghYfVYb  
k`ØfXYbž`k`Y`bb`G]Y`Y]bY`Ghi`bXY`XUbYVYb`ghY`Yb" fE i Y`Y.  
667Ł

' " Fi gg`UbX`[`fYb`nh`Ub`%( `@`Ā`b`X`Y`f. `B`c`f`k`Y[`Y`b`ž: `]b`b`Ub`X`ž  
9gh`Ub`X`ž`@`Y`h`Ub`X`ž`@]h`Ui`Y`b`ž`Dc`Y`b`ž`K`Y]»`fi`gg`Ub`X`ž`7`]\`b`U`ž  
I`\_`fU]b`Y`ž;`Y`c`f[ `]Y`b`ž`5`g`Y`f`V`U]X`g`W`U`b`ž`?`U`g`U`W`g`h`U`b`ž`A`c`b[ `c`Y`]  
i`b`X`B`c`f`X`\_`c`f`Y`U" `?`Y]b`Ub`X`Y`f`Y`g`@`Ub`X` \`Uh`g`c`j`]Y`Y;`fY`b`n`Y`b`"  
fE i Y`Y. `H`Y`HY`Y[ fUd`Ł

( " Ą`Fi gg`UbX`VYZ]bXYh`g]W`X`Y`f` \`Ø`W`ghY`Di`b`\_`h`9i`fcdUg`"8Yf  
9`V`fi`g`ghY`h`i`Ui`Z) `\*` ( `&`a` `f`%, `")`%`\$`ž`Ł`Ø`V`Y`f`X`Y`a  
A`Y`Y`f`Y`g`g`d]Y[ `Y`i`b`X`k`i`f`X`Y`5`b`Z`U`b[ `X`Y`g`]`Y`f`Y`g`j`c`b`D`Y`h`Y`f`  
K`U`h`g`c`b`ž`X`Y`a`A`]h`U`f`V`Y]h`Y`f`j`c`b`5`h`U`g`/`6`c`c`h`g`ž`V`Y`g`h]Y[ `Y`b`"  
fE i Y`Y. `667Ł

`U`h1 `]b`h`Y`f`Y`gg`Ub`h`Y`ZU`\_`h`Y`b`Ø`V`Y`f`fi`gg`Ub`X. `X`Y`f`Y`V`fi`g`]gh`X`Y`f  
\`Ø`W`ghY`di`b`\_`h`Y`i`fcdUg`2`5`h`U`g`/`6`c`c`h`g`D`Y`h`Y`f`K`U`h`g`c`b`U`i`Z`X`Y`a  
;`]d`Z`Y`X`Y`g`9`V`fi`g`f`b`h`U`g`/`6`c`c`h`g`Ł

%`Fi gg`UbX`]gh`ZUgh`gc`[`fc`»`k`]Y`D`i`hc. `%+`A`]`cb`Y`b  
E`i`U`X`f`U`h\_]`ca`Y`h`Y`f`]a`J`Y`f[ `Y]W`ni`D`i`hc`a`]h`%+`ž`\*  
A`]`cb`Y`b`E`i`U`X`f`U`h\_]`ca`Y`h`Y`f`b" fE i Y`Y. `B`5`G`5`Ł

&" Fi gg`UbX`i bX`dUb`a ØggYb`bcW`Y]bYb` : f]YXYbgj YfhfU[  
ni f`6YYbX][ i b[ `XYg`Nk Y]hYb`K Y`h\_f]Y[ g`i bhYfnY]W`bYbž  
XUb`\_Y]bYg`GhfY]hg`i a`X]Y`?i f]Ybž`X]Y`g]W`j cb`XYf  
`UdUb]gW`Yb`b`gY`<c\_\_U]Xc`V]g`ni f`GØXgd]hnY`XYf  
fi gg]gW`Yb`<U`V]bgY`? Ua`hgW`Uh`U`YfghfYW`Yb`"fE i Y`Y`.  
667ł

' " Gdi hb]\_ž`XYf`YfghY`GUhY``h`XYf`K Y`hž`k i fXY`%- ) + j cb`XYf  
Gck`^hi`b]cb`[ YghUfhYh`"fE i Y`Y`. `B`5`G`5`ł

( " 9]bY`XYf`]bhYfYggUb`hY`ghYb`HUhgUW`Yb`ØVYf`F i gg`UbX`]ghž  
XUgg`F i gg`UbX`i bX`X]Y`i G5`Ub`]fYa`Yb[ ghYb`Di`b`h`bi`f`(  
\_a`f&ž)`A`Y]Ybł`j`cbY]bUbXYf`YbhZYfbhg]bX`"6][`8]ca`YXY  
-g`UbX`[ Y`Øfh`ni`F i gg`UbX`ž`k`À`fYbX`@]h`Y`8]ca`YXY`-g`UbX  
ni`a`Ua`Yf]\_Ub]gW`Yb`6i`bXYgghUUh`5`Ug`U`[ Y`Øfh`"fE i Y`Y`.  
A`Yff]Ua`!K`YVghYf`g`7c``Y[ ]UhY`9bWmWcdYX]Uł

`U`h1` ]bhYfYggUb`hY`ZU`hYb`ØVYf`fi`gg`UbX`.`k`]f`i`bX`fi`gg`UbX`g]bX  
bi`f`(`a`j`cbY]bUbXYf`YbhZYfbh`2`7fYUh]j`Y`7ca`a`cbg`5b`]fYa  
Yb[ ghYb`Di`b`h`ig]bX`F i gg`UbX`i bX`X]Y`i G5`bi`f`(`a`j`cbY]bUbXYf  
YbhZYfbh`f7fYUh]j`Y`7ca`a`cbgł

%" b`F i gg`UbX`VYZ]bXYhg]W`X]Y`À`hY`ghY`5b`U[ Yž`X]Y`Ya`U`g  
fY[ YbYf]Yfh`k`i`fXY`"9g`k`i`fXY`Ui`g`" &"\$\$\$`d`fY`U`hYb  
GUa`Yb`[ YnØW`hYh`"fE i Y`Y`. `B`Uh]cbU`"; Yc[ fUd`]Wł

&" 8]Y`J`c`f`k`U`l`ZØf`F i gg`UbX`]gh`\$\$+`"fE i Y`Y`.  
@`AbXYfj`c`f`k`U`ł

@`cbY`m`D`UbY`hi`F i gg]U`]gh`Y]b`i`a`ZUggYbXYf`FY]gYZØ`fYf`ZØf  
F i gg`UbX`ž]XYU`ZØf`X]Y`Yb][ Ybž`X]Y`gck`c`l`X]Y`k`]W`h][ ghYb  
GY`Yb`gk`ØfX][`\_Y]hYb`Yf`\_i`bXYb`U`g`Ui`W`k`Yb][ Yf`VY`ZU`fYbY  
GhfU» Yb`k`À`Y`b`a`ØW`hYb`"

@Y]hV]`X`.5h`Ug`/`6c`chg

6Ygi WYb'GjY'i bg'Ui Z'Y]bY!fY]gY"XY