

6CB?!A Ya Y`7c]b`G]Y\h`k]`XY
DfY]ggWk Ub_i b[Yb`i bX`a Ugg]j Y
=b\UVYf_cbnYbhfUh]cb` `5`hWc]bg

B UW`XYb`5``nY]h\cWg`XYf`? fmdhc k Å\fi b[gdfY]gY`ja` `J\ f
&\$&%žXYa` `@Y]XYb`i bhYf`XYf`@ bU!`a d`cg]cb`j cb`&\$&&i bX
XYa` `5bV`]W_`i bnÅ\`][Yf`? fmdhc! I bhYfbY\`a Ybž`X]Y`XYb`6UW
fi bhYf[Y\Ybž`\UVYb`k]f`Y]bYb`bYi Yb`HY]`bY\`a Yf`Ua` `A Ya
Wc]b`GnYbYž`X]Y`ja` `Gc`UbU!BYhmk Yf`_[YghUfhYh`k i fXY``8 Ug
? fmdhc! 5ggYh`6cb_` `bi` `f6CB? Łj YfZØ[h`ØVYf`Y]b
n]f_i` `]YfYbXYg`Hc_Yb!5b[YVchj cb`fi bX`(`%ž)`6``]cbYb`i bX
\Uh`Yg`[YgWUZZhž`Y]bY`A Uf_h_Ud]hU`g]Yfi b[`j cb`fi bX`*`
A]``cbYb`I G!8c``Uf`ni` `YffY]WYb``6CB?`g]Y\hž`XUgg`X]Y
A Uf_h_Ud]hU`g]Yfi b[`Ui Z`&\$(`A]``cbYb`I G!8c``Uf`ghY][hž
VYj cf`g]Y`]bbYf\U`V`j cb`&(`Gh`bXYb`Ui Z`*` `A]``cbYb`I G!
8c``Uf`UVghØfnh`8]Y`? fmdhc k Å\fi b[g!7ca`a`i`b]hm`\Uh`ØVYf
Y]b`bYi Yg`A Ya Y!Hc_Yb`bUa Ybg`Vcb_`]bi` `f6CB? ŁY]b
8c[YWc]b`fBC; 9Łi bX`/ Ua`d^Y``]d/

B UWX`XYb`5``nY]h\cW\g`XYf`? fmdhc k A\fi b[gdfY]gY`]a`>U\ f
&\$&%ž`XYa`@Y]XYb`i bhYf`XYf`@i bU! =a d`cg]cb`j cb`&\$&&
i bX`XYa`5bV`]W_`i bnA\`][Yf`? fmdhc!| bhYfbY\`a Ybž`X]Y
XYb`6UWX`fi bhYf[Y\Ybž`\UVYb`k]f`Y]bYb`bYi Yb
HY]`bY\`a Yf`Ua`A Ya`W\]b`GnYbYž`X]Y`]a`Gc`UbU!BYhnk Yf_
[YghUfhYh`k i fXY"8 Ug`? fmdhc!5 ggYh`6cb_`=bi`f6CB?Ł
j YfZØ[h`ØVYf`Y]b`n]f_i`Y]YfYbXYg`Hc_Yb!5b[YVch]j cb`fi bX
(%ž)`6]`]cbYb`i bX`\Uh`Yg`[YgW\UZZhž`Y]bY
A Uf_h_Ud]hU`]g]Yfi b[`j cb`fi bX`*`A`]`]cbYb`I G!8c``Uf`ni
YffY]W\Yb"

6CB?`g]Y\hž`XUgg`X]Y`A Uf_h_Ud]hU`]g]Yfi b[
Ui Z`&\$(`A`]`]cbYb`I G!8c``Uf`ghY][hž`VYj cf`g]Y
]bbYf\U`V`j cb`&(`Ghi bXYb`Ui Z`*`A`]`]cbYb
I G!8c``Uf`UVghØfnh

8]Y`? fmdhc k A\fi b[g!7ca`a i b]hm`\Uh`ØVYf`Y]b`bYi Yg`A Ya`Y!
Hc_Yb`bUa`Ybg`Vcb_`]bi`f6CB?ŁY]b`8c[YW\]b`fBC;`9Łi bX
G\]VU`=bi`fG<`=Ł`A`ØW\hY[Yfb`XUg`]gh`Ymh`XUg`gYW\gh[f`Ø»`hY
a Ya`Y`W\]b`J Yfa`Ø[Yb`\Yi hY" @Ui h`XYa`6CB?!9bhk]W_`i b[ghYUa
i bX`gY]bYb`9]bgY]hYf`ž6cb_`]gh`XYf`YfghY`Gc`UbU!<i bX`W\]b
ZØf`X]Y`A YbgW\Ybž`j cb`XYb`A YbgW\Ybž`k cVY`) \$`i`XYf`[YgUa`hYb
J Yfgcf[i b[`]b`XYf`Gc`UbU!; Ya`Y]bXY`UV[Yk cfZYb`k i fXYb"

8Yf`5]fXfcd`\Uh`XYb`DfY]g]j cb`Gc`UbU`fGC`@Ł]b`YmhYf`NY]h`bUW\
XYa`Dfc`Y`_h`]b`X]Y`<Ø\Y`[Yhf]YVYb`I a`[Ub[`a`]h`BY[Uh]j]hAh
Ui g`ZfØ\YfYb`6Yn]Y\i b[Yb`ni`GUa`6Ub_a`Ub!; f]YXž`5`Ua`YXU
FYgYUfW\`i bX`HL`" 8]Y`A`]hk]f_YbXYb`j cb`6cb_`\UhYb`X]Y
[]Z][Yb`5`Ua`YXU`!Hc_Ybca`]W`gUh`i bX`k c``hYb`Y]bY`i gh][Y
A Ya`W\]b`a`UW\Ybž`VY]`XYf`YXYf`Y]bY`ZU]fY`7\UbW\`VY`_ca`a`h`ž
Yf_`Àfh`6cb_g`C`bY`DU[Yf`k`Y]hYf"

5a ') "'>Ubi UfžXUg'6CB?!HYUa 'gU[hY') '6]''cbYb'XYf'A Ya Y!
Hc_Yb'k UfYb'Yg'nYfghÖfh"8UfØVYf'\]bUi g'[]Vh'Yg'%%\$"\$%+'6CB?!
⊕\UVYf'i bX'Wc]bWUfd"Wca '8UhYb'nY][h'UbžXUgg'X]Y'Hcd!HYb!
⊕\UVYf' *ž %i 'XYg'5b[YVchg'_cbhfc``]YfYb"&\$'6CB?!⊕\UVYf
j YfZØ[Yb'ØVYf'(*ž %i 'XYg'5b[YVchg'i bX'), ž &i 'j cb'6CB?
k YfXYb'j cb'%%\$'XYf'fY]WghYb'6cb_!⊕i !5XfYggYb'[Y\U'hYb"

K Ug'XYb_gh'Xi 'ØVYf'XUg'Gc'UbU!A Ya 3'Wc]b'[YbUbbh
6CB?3'HY]'Yb'G]Y'i bg'⇒fY'; YXUb_Yb'ni 'X]YgYa 'H\Ya U'ja
?ca a YbhUfVYfY]W' i bhYb'a]h"

⋈Ja]Y'FYXa Ub'

⋈Ja]Y'FYXa Ub']gh'XYf'B UW f]W hYb`Y]hYf'VY]'6]hWc]b"Wca 'BYk g'i bX'Y]b']b': `cf]XU
'YVYbXYf'∞ci fbU`gh'ZØf':]bUbnhYW bc`c[]Y"FYXa Ub']gh'gY]h'&\$%'U_h]j Yg'A]h[`]YX
XYf'? fmdhck Å\fi b[g!7ca a i b]hm"9f'\Uh'Y]bY '@Y]XYbgW UZh'ZØf'6]hWc]bž'CdYb!Gci fW!
7cXY'i bX'XYnYbhfU'Y'5bk YbXi b[Yb"GY]h'GYdhYa VYf'&\$%) '\Uh'FYXa Ub'a Y\ f'U'g
*"\$\$\$'5fh]_Y'ZØf'6]hWc]b"Wca 'BYk g'ØVYf'X]Y'\Yi hY'Ui Z_ca a YbXYb'X]gfi dh]j Yb
Dfchc_c``Y'[YgW f]YVYb"

6]`XbUWk Y]g. `G\i hhYfghcW_ž'D]l UVUmž'K]_]7ca a cbg

6Y`]YVhYfY`B UW f]W hYb

: U`g`8i `Yg`j YfdUggh`\Ugh

f[bWh]cbfXž'gž']XŁ'o`j Uf`gž'Z'g'1`X"[Yh9`Ya Ybhg6mHU[B Ua YfgŁQ\$Q'
]Z'fX"[Yh9`Ya Ybh6mXf]XŁŁ'fYhi fb/`g'1`X"WfYUhY9`Ya YbhfgŁ/'g"]X'1
]X/'g"gfWl "`\hhdg.#AŁbbYWh"ZUWVcc_"bYh#bSl G#gX_"g. l ZVa`1 %/
j Yfg]cb1 j' "&"/Z'g"dUfYbhBcXY"]bgYfh6Y ZcfYf'gž'Z'gŁ/'qfXcW a Ybhž
fgWf]d hfž'fZUWVcc_!`ggX_fŁŁ/

8YhU]`g

6Ygi WYb`G]Y`i bg`Ui Z.`_fmdhc!bYk g"Uh