



7ci fgY'Cj Yfj JYk

'GHUZZ7cbhUWhi8YHU]`g`

'7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]]m	@cWU]cb	D\cbY
B]W_ F]WXUfXgcb	b]Wc`Ug"f]WXUfXgcb4 i bgk "YXi "	6mUddc]bha Ybh	K YVghYf`F a &' %9	- ' ,) *'))

GWcc`7cbhUWhi`bZcfa Uh]cb

Fcca " %&ž`Yj Y"" `F cVYfhK YVghYf`6i]X]b[

D\cbY.`f\$&Ł`- ' ,) `(,) *

9a U]: [gUa 4 i bgk "YXi "Ui](#)

K YVg]hY: [\hfdg.#gUa "Ufng"i bgk "YXi "Ui](#)

H\Y`GWcc`cZhY`5fng`UbX`A YX]U`k ci `X`_Y`hc`F YgdYWz`m5W_bck`YX[Y`hY`HfUX]hcbU`7i`ghcX]Ubgž`hY`6YXY[U`fP`Ybg]b[hcb`WUa`di`gŁž;`UX][U`fP`]mUbX`5fhi`8Yg][b`7 Ua`di`gYgŁ`UbX`hY`B [i`bbUk`U`dYcd`Y`fBi`ghfU]Ub`8YZ`bWV`:`cfW`5WUX`Ya`m]b`7`UbVYffUŁ`cZhY`UbXg`k`YfY`YUW`WUa`di`g`cZI`BGK`]g`cWU`hY`X"

5 hY`bX`Ub`W`F`Yei`]f`Ya`Y`bhg

5`gh`XYbh]g`YI`dYW`X`hc`UhY`bX`U`WUgg`W`b`h`U`W`h`ci`fg`Z`c`f`U`Z`J`W`!`h`!`Z`J`W`f`l`&`Ł`c`f`V`Y`b`X`Y`X`W`Ł`i`fg`Y`Ub`X`W`Ł`a`d`Y`h`U`U`W`U`j`]h`Y`g`Z`c`f`U`V`Y`b`X`Y`X`c`f`Z`m`c`b`]`b`Y`W`Ł`i`fg`Y"

5`gh`XY`bhk`c`U`ff`j`Y`g`a`c`f`Y`h`Ub`%`a`]`bi`h`g`U`h`a`Um`V`Y`d`Y`b`U`]`g`Y`X`Z`c`f`b`c`b`!`U`h`Y`b`X`Ub`W`"Z`gi`W`U`d`Y`b`U`m`]`g`]`a`d`c`g`Y`X`ž`h`Y`gh`XY`bh`i`gh`V`Y`]`b`Z`c`f`a`Y`X`j`Y`f`V`U`m`U`h`h`Y`Y`b`X`c`Z`W`U`g`U`b`X`U`X`j`]`g`Y`X`]`b`k`f`]`h`b`[`k`Y`k`)

: cf`YggYbh]U`gh XYbh]bZcfa Uhcb`fY`Uh]b[`rc. `fYei Ygrg`Zcf`YI hYbg]cb/fYj]Yk `cZa Uf_g/cVW dUhcbU`\\YU`h
UbX`gUZ`hm/YI Ua]bUhcb`dfcW`Xi fYg/gdYW]U`Wcbg]XYfUhcb`]b`h`Y`Yj YbhcZ]`bYgg`cf`a]gUXj Ybh fY/
gh XYbhYei]mUbX`X]gUV]`]m`UbX`ch`Yf`YggYbh]U`UWXYa]W]bZcfa Uhcbž
gYY`[\hdg.#k.k"Ufng"i bkg "YXi "Ui #W ffYbhgh XYbng#UWXYa \]W\]bZcfa Uhcb#dfcfcW`g!\[i \]XY`\]bYg#](#)

7 ci fgY'8YHJ]`g

7 fYX]hDc]bHg '*`

Gi a a UfmicZ\hY'7 ci fgY

Gi VYWh5fYU.'? VW[S

5Xj Yfhg]b[`]g'U'WYUhj] YzUbX'UhiJa Ygz'Wcbfrcj Yfg]U'Wca a i b]WUhj] Y' [YbfY'hUhd'Umg'U'WbhfU'fc'Y']b
Wcbgi a Yf'W'hi fY''H\]g'Wci fgY'k]''WU'Yb[Y'mci 'hc'Wcbg]XYf'bc'hc'b'mhY'WYUhj] Y'X]a Ybg]cbg'cZ
UXj Yfhg]b[`Vi hU'gc'hc'Wcbg]XYf'U'gi ghU]bUVY'gcWU'fc'Y'Zc'f'UXj Yfhg]b[" 'Mci 'k]''VY'WU'Yb[YX'hc
XYj Y'cd'Ub'i bXYfghUbX]b[`cZ\hY'fY'U'hc'bg\]d'VY'hk Y'Yb'UXj Yfhg]b[`UbX'WYUhj]]miUbX'ZcW'g'cb'\ck'hc
XYj Y'cd']b'bcj U'hj] Y'gc'i h'cbg'hc'Wcbh'Ya dcfUfmiUbX'gcWU'Wca a i b]WU'hc'b'dfcV'Ya g''H\Y'Wci fgY'k]''\Uj Y
U'g][b]Z]WU'bhUdd']YX'Wca dcbYbh'mci 'k]''ZcW'g'cb'XYj Y'cd]b[`hY'WYUhj] Y'X]a Ybg]cbg'Zc'f'Ub'UXj Yfhg]b[
W]a dU][b'fY'U'h'X'hc'U'Wcbh'Ya dcfUfmgcWU'']ggi Y'UbX'Yb[U[Y'Ja U[]bU'hj] Y'mk]h'U[YbW'mVf]Y'Zg'Z'YI Ua]bY
\ck]XYUg'UfY'WYUhj] Y'mYI dfYggYX'i g]b[`k cfXg'UbX'Ja U[Yg'UbX'XYj Y'cd'UXj Yfhg]b[`WcbW'dhg'Z'dfY'dUfY
U'WYUhj] Y'd]h'W'z'UbX'YI d'cfY'hY'g'hc'f'm'h'Y'']b[`UbX'Wcd'mk f]h]b[`X]a Ybg]cbg'cZUXj Yfhg]b["

5 h\hY'WcbWi g]cb'cZ\h]g'Wci fgY'h\Y'ghi XYbhk]''VY'UV'Y'hc

%`9Z]W]j] Y'mW]h]ei Y'WYUhj] Y'UXj Yfhg]b[`]b'U'fUb[Y'cZ'Wca a Yf]U'z'Wcbgi a Yf'UbX'gcWU'Wcbh'YI hg
&' I bXYfghUbX'h\Y'fc'Y'cZUXj Yfhg]b[`]b'fY'U'hc'b'hc'gcWY'hm'hcXUm
' " 8Ya cbghfU'h'_bck'YX[Y'cZUbX'UV']]mi'hc'Udd'm'WYUhj] Y'dfUW]W'g'hc'Wca a i b]WU'hc'b']ggi Yg'UbX
dfcV'Ya g
(" ÆYbh]Zm'U'hUf[YhUi X]YbW'UbX'_Ym]bg][\hg'h'fci [\fYgYUfW
)" A UbU[Y'h\Y'XYj Y'cda YbhicZ'_Ym]bg][\hg'h'fci [\h\Y'WYUhj] Y'dfcW'gg

HYUW]b[`GhfU'hY[]Yg`

F U'h]cbU'Y.

H\Y'Wci fgY']g'XYg][bYX'hc']b'f'cXi W'gh XYbhg'hc'ghfU'hY[]WUbX'WYUhj] Y'Udd'fc'UW'Yg'hc'UXj Yfhg]b[`]b
fUd]X'mW'Ub[]b[`a YX]U'Wcbh'YI hg''H\Y'Wci fgY']g'U'gc'XYg][bYX'hc']b_'hc'h\Y'I B'G'K'ghfU'hY[]Wdf]cf]h'c'Z
gi ghU]bUV']]mi'h'fci [\Ub'Ya d\Ug]g'cb'UXj Yfhg]b[`Wca a i b]WU'hc'b'hU'ghi ddc'f'g'gcWU'z'W'hi fU'
Ybj]f'cba Yb'U'gi ghU]bUV']]mi'

HYUW]b[`GhfU'hY[]Yg.

Æh'fUW]j] Yz'dUfh]W]dU'hc'fmUbX'fYZYW]j] Y'h'UW]b[`Udd'fc'UW'Yg'k]''VY'df]cf]h]nYX'U'cb[`k]h'WcbW'dh'U'
Z]Ua Yk cf_g'UbX'Udd']YX'a Y'h'cXg"

8YHJ]g.; fci d'UggYgga YbhcZ(!) 'ghi XYbhtg"C b[c]b['h hcf]U'dUfhWdUhc bž%) \$\$'k cfX'd]hX 'XcW a Ybh
UbX'%) 'a]bi h'g'dfYgYbHh]cb"H\]g']g'h\Y'Z]bU'UggYgga YbhfUg_"Gh XYbhtg'k]''fYW]j Y'cb[c]b['ZYXVUW_
cb'h\Y]f'dfc'YWhUg'hXYj Y'cdg"Gh XYbhtg'k]''fYW]j Y'U'bi a Yf]W]' [fUXY'UbX'k f]hYb'ZYXVUW_"''

Gi Va]gg]cb'bcH'g.F YZf'h' A ccX'Y

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

Gh XYbng`UfY`YI dYW`X`hc`di h`h`Y]f`bUa Yg`UbX`gh XYbhbi a VYfg`cb`Yj YfmdU[Y`cZ`h`Y]f`Ugg][ba Ybng"

Hi fb]h]b`Gi Va]gg]cb

- K cf_`gi Va]hYX`%\$`hc`%-`XUmg`UZhYf`h`Y`gh]di`UH`X`XYUX`]bY`k`]`VY`UggYggYX`UbX`ZYXVUW`dfcj`]XYX`Vi`hU`a`Uf`_`cZnYfc`k`]`VY`fYW`fYX`"Z`h`Y`k`cf`_`k`ci`X`Uj`Y`fYW`]YX`U`dUgg`a`Uf`_`Vi`hZcf`h`Y`UH`bYgg`UbX`h`Y`k`cf`_`]g`U`W`a`di`gcfm`W`i`fgY`W`a`dcbYbh`f`i`fX`Y`fYei`]fYa`YbhZ`U`gh`XYbhk`]`VY`XYYa`YX`hc`Uj`Y`a`Yh`h`UhfYei`]fYa`Ybh`
- K cf_`gi Va]hYX`&\$`cf`a`cfY`XUmg`UZhYf`h`Y`gh]di`UH`X`XYUX`]bY`k`]`bchVY`UWW`d`h`X`Zcf`UggYgga`Ybh`UbX`k`]`fYW`]Y`bc`ZYXVUW`za`Uf`_`cf`[`fUXY`"Z`h`Y`UggYgga`Ybh`Ug`_`]g`U`W`a`di`gcfm`W`a`dcbYbh`cZ`h`Y`W`i`fgY`U`gh`XYbhk`]`fYW`]Y`Ub`l`bgUhgZUW`c`fm`:U`]`fl`:`k`[`fUXY`Ug`U`fYgi`hcZ`i`bgUhgZUW`c`fmdYfZ`fa`UbW`]b`Ub`YggYbh]U`W`a`dcbYbh`cZ`h`Y`W`i`fgY`"

H\]g`]bZ`fa`U`h`cb`]g`U`gc`Uj`U]UV`Y`Uh`

[\h`dg`##k`k`k`"Ufng`i`bgk`"YXi`"Ui`#W`ffYbh`gh`i`XYbhg`#JWUXYa`\]W\]bZ`fa`U`h`cb`#dfch`W`c`g`\[`i`\]XY`\]bYg`#`](#)

GdYW]U`7`cbg]XYfU]cb`5`dd`]W]h]cbg`

Mci`W`b`Udd`m`Zcf`gdYW]U`W`cbg]XYfU]cb`k`Y`b`]`bYgg`cf`ch`Yf`W]fW`a`gh`Ub`W`g`]b`h`f`Z`f`Y`k`]h`m`ci`f`UggYgga`Ybh`d`Yf`Z`fa`UbW`"

G]W`bYgg`za`]gUX`j`Ybh`fY`cf`ch`Yf`W]fW`a`gh`Ub`W`g`VY`nc`b`X`m`ci`f`W`c`b`f`c`a`Um`

f`D`f`j`Y`bh`m`ci`Z`ca`W`a`d`Y`h`b`[`U`W`i`fgY`fYei`]fYa`YbhZ`

f`?`Y`d`m`ci`Z`ca`U`h`Y`b`X`]b`[`Ub`UggYggUV`Y`UW]j`]mZ`

f`G`h`d`m`ci`gi`Va`]h]b`[`UggYggUV`Y`k`cf`_`Zcf`U`W`i`fgY`Z`

f`G`[`b`]W]b`h`m`UZZY`W`h`m`ci`f`d`Yf`Z`fa`UbW`]b`UggYggUV`Y`k`cf`_`Z`VY`]h`U`Z`fa`U`Y`b`X`!`c`Z`g`Ya`Y`gh`f`Y`I`Ua`]b`U`h`c`b`Z`U`W`Ugg`h`Y`g`h`Z`U`U`V`c`f`U`h`c`f`m`h`Y`g`h`Z`U`g`Ya`]b`U`f`d`f`Y`g`Y`b`h`U`h`c`b`c`f`U`b`m`c`h`Y`f`Z`fa`c`Z`UggYgga`Y`bh`

:`cf`Z`f`h`Y`f`XY`h`U`]g`]b`fY`U`h`c`b`hc`GdYW]U`7`cbg]XYfU]cb`]bW`i`X`]b`["K`Y`b`hc`5`dd`m`Z`"<`ck`hc`5`dd`m`UbX`"Gi`dd`c`f`h`b`[`8`c`W`a`Y`b`h`U`h`c`b`"d`Y`U`g`Y`f`Y`Z`f`hc`h`Y`GdYW]U`7`cbg]XYfU]cb`k`Y`V`gh`Y`."

[\h`dg`##gh`XYbh`i`bgk`"YXi`"Ui`#gdYW\]U`W`cbg\]XYfU\]cb`](#)

5 WUXYa]W<c bYghmUbX`D`U[]Uf]ga

D`U[]Uf]ga `]g`i g]b[`hY`k cfXg`cf]XYUg`cZchYfg`UbX`dfYgYbh]b[`hYa `Ug`mci f`ck b" `hWUb`hU`Y`a Ubm
Zcfa gZ`Zca `XY`]VYfUHY`WXYU]b[`hc`UWV]XYbhU`mW`dm]b[`Zca `U`gci fW`k]h`ci hUW_bck`YX[Ya Ybh`

I BGK `[fci dg`d`U[]Uf]ga `]bhc`hY`Zc`ck]b[`WUHY[cf]Yg.

7 cdm]b[.`i g]b[`hY`gUa Y`cf`j Yfmg]a]Uf`k cfXg`hc`hY`cf][]bU`hYI hcf`]XYU`k]h`ci hUW_bck`YX[]b[`hY
gci fW`cf`i g]b[`ei chU]cb`a Uf_g`"H\]g`U`gc`Udd`]Yg`hc`]a U[YgZ`UfhUbX`XYg][b`dfc`YWgZ`Ug`k Y`Ug
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hWYX]h`

hUddfcdf]UHY`dUfUd`fUg]b[.`7`Ub[]b[`U`ZYk `k cfXg`UbX`d`fUgYg`k \]Y`a cghmifYU]b]b[`hY`cf][]bU`
ghfi W`i fY`UbX`#`f`dfc[fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`Z`UbX`]bZcfa U]cb`k]h`ci hUW_bck`YX[Ya Ybh`H\]g`U`gc
Udd`]Yg`]b`dfYgYbhU]cbg`k \YfY`gca YcbY`dUfUd`fUgYg`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hWYX]hU`bX`hc
d]YW]b[`hc[YhYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk `k \c`YZ`k]h`ci hUddfcdf]UHY`fYZYfYbW]b["

7 c`i g]cb. `k cf_]b[`k]h`chYfg`Vi hdUgg]b[`cZ`hY`k cf_]Ug`U`dYfgcb`g`]bX]j]Xi U`k cf_"`7 c`i g]cb`U`gc

7 ci fgY'GWXYXi `Y

[J.Jyk.WUgg.ha.YhUV.Y](#)

H]a YhUV`Y`

8UH	HmdY	7cbhYbh
K YY_% '&' >i `m! '&- >i `m	@YWh fY	≠hfcXi W]cb`hc`WfYUhj Y`UXj Yfhg]b[``
K YY_&.` \$>i `m!`) 5i [i gh	Hi hc]U` @YWh fY	≠hfcXi W]cbg!`mci f`Zj ci f]hY`UXj YfhgYa Ybtg F YUX]b[`h\Y`g][bg`
K YY_` .`*`5i [i gh!`%& 5i [i gh	Hi hc]U` @YWh fY	7`]b]WhUg_`fY\YUfgU`!`F YUX]b[`h\Y`g][bg F \Yhc]Wdi nn`Y`UbX`dYfgi Ug]cb`fcb`]bYŁ
K YY_(`.%`5i [i gh!`%` 5i [i gh	Hi hc]U` @YWh fY	7`]b]WhUg_`%`!`F \Yhc]W]b`UXj Yfhg]b[H\Y`dck Yf`cZUXj Yfhg]b[`fcb`]bYŁ
K YY_`.)`&\$`5i [i gh!`&`*` 5i [i gh	Hi hc]U` @YWh fY	7`]b]WhUg_`&`!`H\Y`dck Yf`cZUXj Yfhg]b[5Xj Yfhg]b[.`UfhUbX`gmghYa `fcb`]bYŁ
K YY_`*.`&+`5i [i gh!`& GYdhYa VYf	Hi hc]U` @YWh fY	7`]b]WhUg_`" `!`5fhUbX`gmghYa ≠g][\hZ `VfUbX]b[`fcb`]bYŁ
K YY_`+.`" `GYdhYa VYf!`-` GYdhYa VYf	Hi hc]U` @YWh fY	7`]b]WhUg_`(`!`6fUbX`UbX`]bg][\h H\Y`W]Ybhfj`dYfgdYWhj`Y
K YY_`,`.%\$`GYdhYa VYf!` %*`GYdhYa VYf	Hi hc]U` @YWh fY	H\Y`W]Ybhfj`h\Y`dfc`YWh`h\Y`VfjYZ F YgYUfW\XYj Y`cd]b[`]bg][\hg
K YY_`-`.`%+`GYdhYa VYf!` &`GYdhYa VYf	Hi hc]U` @YWh fY	F YgYUfW\`UddfcUWX`Yg`UbX`UbU`mg]g : cfa i `Uh]b[`U`ghfUfY [m
6fYU_`.&(`GYdhYa VYf!` `\$`GYdhYa VYf	Hi hc]U` @YWh fY	Bc`WUggYg`h\]g`k`YY_`""`≠`bcfY`f]hi`hc]U`fz`hc`Y`Zi` Bc`WUgg`h\]g`k`YY_`""`≠`bcfY`f]YWh`fY`fz`hc`Y`Zi`
K YY_`%\$`.%`C`WtcVYf!`+` C`WtcVYf	Hi hc]U` @YWh fY	F YgYUfW\`dfc[`fYgg.`]bg][\hg`UbX`ghfUfY []Yg 7`fYUhj`]mz`WcbW`dtz`/`Wla`dU][`b
K YY_`%&`.`%`C`WtcVYf!`%(` C`WtcVYf	Hi hc]U` @YWh fY	8Yj Y`cd]b[`Wla`dU][`b`ghfUfY [m/`WcbW`d]b[≠g`h\Y`a`YX]i`a`h\Y`a`YggU [Y3
K YY_`%&`.`%)`C`WtcVYf!` &%`C`WtcVYf	Hi hc]U` @YWh fY	D]hW`dfYgYb]h]cbg.`F`ci`bX`% 7`ci`fgY`K`fUd`i`d
K YY_`%` .`&&`C`WtcVYf!` &`,`C`WtcVYf	Hi hc]U`	D]hW`dfYgYb]h]cbg`fci`bX`&

F Ygci fWg

DfYgW]VYX F Ygci fWg

[\hd.##Jgc"\[cj"Ui #](#)

7ci fgY'9j U'i Uh]cb'UbX'8Yj Y`cda Ybh

H\Y`Wēi fgY`Wēbj Ybcf'UbX'hi hēfg'k Y`Wēa Y'jbZcfa U`ZYXVUW`UVci hēhY`Wēi fgY`hēci [\ci hēhY`gYa YghYf"
: i fēhYfa cFYžgh XYbtg'UFY`YbWēi fU[YX'hē'dUfh]M]dUHY`'b'cb']bY`ZYXVUW`gi fj Ymg`UHf']b`hY`gYa YghYf'"5b
Ya U]'k]`VY`gYbhēc`U`gh XYbtg'UXj]g]b['k \Ybžk \YfYžUbX`\ck`hē'dfcj]XY`ZYXVUW`"

D`YUgY`hU`Y`hY`hja Y`hē'dfcj]XY`ZYXVUW`" `ē`fYWbhimYUfg'hēhY`Wēi fgY`\Ug`VYYb`WUUb[YX`Ug`U`fYgi`hēZ
gh XYbh]bdi h': cf`YI Ua d`YžhY`bi a VYf`cZUgg][ba Ybtg`\Ug`VYYb`fYXi WXX`Zca `(hē" `UbX`hY
dfYgYbhUh]cb`Zcfa Uh\Ug`VYYb`U`hYfYX`"K Y`UFY`U`gc`a U_]b[`gca Y`ga U`WUUb[Yg`hē'[fUX]b[`dfcZcfa Ug`"

⇒a U[Y`7 fYX]h

6cX]Yg/`ēhYfZUWg`&\$%*

7F ⇒CG

7F ⇒CG`Dfcj]XYf`7cXY.`\$\$\$- , ;