



EDST5303

@YUfb]b[žDfcV`Ya `Gc`j]b[žUbX`h`Y`8Yj Y`cda YbhcZ
9I dYfh]gY

GYa YghYf`Hk c`#`&\$%

7 ci fgY`Cj Yfj JYk

`GHUZZ7cbhUW`i8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]`]m	@cWU]cb	D\cbY
G`Uj U? U`mi [U	g" _U`mi [U4 i bgk "YXi "Ui	H\i `%)!%* `cf`Vm Uddc]bha Ybh	>c\b'; ccXgY`z`- ' ,) `% ,) F cca `%)\$)	

GWXcc`7cbhUW`i`bZcfa Uh]cb

GWXcc`cZ9Xi WU]cb

5fng`UbX`GcW]U`GW]YbW]g

@Yj Y`%z>c\b'; ccXgY`i]X]b[`fl &\$£

H. `Z*`f&£`- ' ,) `% ++

9. `YXi WU]cb4 i bgk "YXi "Ui

K . `YXi WU]cb"Ufng"i bgk "YXi "Ui

5hYbXUbW`F Yei]fYa Ybhg

5XX]h]cbU`GWXcc`cZ9Xi WU]cb`UhYbXUbW`fYei]fYa Ybhg

h]g`YI dYW]X`h`UhUbmigh XYbhYbfc`YX`]b`Ub`98GH`Wci fgY`k]h`h`Y`GWXcc`cZ9Xi WU]cb`k]`a U_Y`U
 Wc`a a]ha Ybhlc`h`Y]f`YUfb]b[`UbX`UhYbX`U`WUggYg`]b`Z`k`YfY`Wc`b`h`b`h]g`XY`]j YfYX`]b`U`ZUW]!h`!ZUW
 a cXY`YI W`dh]b`W`f]U]b`W]fW`a`ghUbW]g`k`YfY`UVgYbW]`]g`Xi`Y`h`c`]`b`Ygg`a`]gUXj`Ybh`fY`cf`i`bZc`fYgYYb
 W]fW`a`ghUbW]g`VYmc`bX`h`Y`gh`XYbhg`Wc`b`f`c`"5`a`]b]a`i`a`UhYbXUbW`fYei]fYa YbhicZ, \$i`]g`fYei]fYX`Zc`f
 YUW`Wci fgY`" `b`W`f]U]b`W]fW`a`ghUbW]g`z`U`gh`XYbhia`Uma`]gg`i`d`h`c`&\$i`c`ZU`Wci fgY`k]h`ci`h`Zc`fa`U`
 Udd`]WU]cb`UbX`i`d`h`c`"i`c`ZU`Wci fgY`k]h`Zc`fa`U`XcW`a`YbhU]cb`fgYbhj`]U`Ya`U]`h`c`Wci fgY`Wc`b`Ybc`f`£
 dfcj]X]b[`U`h`Y`fYei]fYa Ybhg`XYHU]YX`VY`ck`UfY`a`Yh`G`h`XYbhg`bcha`YY]b[`h`Y`UhYbXUbW
 fYei]fYa Ybhg`ci`h]bYX`UVcj`Y`k`]`VY`Uk`UfYX`Ub`i`bgU]hgZUW`c`fm: U]`fl`:`£`Zc`f`h`Uh`Wci fgY`fY[UfX`Ygg`c`Z
 h`Y]f`dYf`Zc`fa`UbW]b`h`Y`UggYgga`Ybh]Ug`_`c`f`c`h`Y`f`fYei]fYa Ybhg`Zc`f`h`Y`Wci fgY"

: cf`Z`h`Y`f`]b`Zc`fa`Uh]cb`cb`9Xi`WU]cb`Wci`fgY`UhYbXUbW`fYei]fYa Ybhg`z`d`YUgY`fY`Zf`h`c`h`Y`fY`gdY`W]j`Y`
 98GH`A`ccX`Y`a`cXi`Y`fg`£"

5WUXYa]W`bZcfa Uh]cb`

: cf`YggYbh]U`gh`XYbh]bZcfa Uh]cb`fY`Uh]b[`h`c`fYei Yghg`Zc`f`YI`h`Y]b]cb/fYj`]Yk`c`Za`Uf`_`g`/c`W]W`d`Uh]cb`U`Y`YU`h`
 UbX`g`U`Z`Y`h`m`/YI`Ua`]b`Uh]cb`dfc`W`Xi`fYg`/gd`Y`W]U`Wc`bg]X`Y`f`Uh]cb`]b`h`Y`Yj`YbhicZ]`b`Ygg`cf`a`]gUXj`Ybh`fY`/
 gh`XYbhYei]h`m`UbX`X]g`UV]`]h`m`UbX`c`h`Y`f`YggYbh]U`U`WUXYa]W]bZcfa Uh]cb`z
 gYY`[\`h`d`g`#`k`k`"Ufng"i`bgk`"YXi`"Ui`#`W`fYbh\]gh`XYbhg`#`UWUXYa \]W\]bZcfa Uh\]cb`#`dfc`h`Wc`gl`\[`i`\]XY`\]bYg`#`](#)

7ci fgY'8YHJ]`g

7fYX]hDc]bmg`*`

Kcf_`cUX

%)\$`ci fg]bWi X]b[`WUgg`WcbUWh\ci fgžfYUX]b[gžWUgg`dfYdUfU]cbžUggYgga YbžZc``ck`i d`UW]j]hYgž YhW

Gi a a UfmicZ`h`Y`7ci fgY

[H\Y`a`U`cf`ZcW`g`cZ`h`g`W`i`fgY`\]g`fc`YI`Ua`\]bY`\ck`\i`a`Ub`W`\[`b\]h\]`Y`ghfi`W`i`fYg`UfY`cf`\[`Ub\]gYX`\]bhc`U`W`c`\YfYbhUfW`\]hYWh`fY`YbUV`\]b\[`i`nci`fc`YUfbž`h`\]b`žfYUgcb`UbX`gc`j`Y`dfcV`Ya`g`"H\Y`W`btfU`fc`Y`d`UmYX`Vm`UW\]j`Y`YUfb\]b\[`\]b`h`g`UfW`\]hYWh`fY`\]g`Ya`d`Ug\]gYX`"H\Y`W`i`fgY`YI`Ua`\]bYg`\ck`YI`dYfhgY`XYj`Y`cdg`UbX`](#)

5i ghfU`]Ub`DfcZYgg]cbU`'; fUXi UhY`HYUWx]b[`GHUbXUfXg

GHUbXUfX	8YgW]dh]cb
%"%&	I`gY`hYUWx]b[`ghfUHY[]Yg`VUgYX`cb`_bck`YX[Y`cZgh`XYbhgf`id\mg]WU`žgcWU`UbX]bhY`YVW`U`XYj Y`cda`YbhUbX`WX`UfUWYf]gh]Wg`hc`ja`dfcj`Y`gh`XYbh`YUfb]b["
%"&"	9I`dUbX`i`bXYfghUbX]b[`cZ\ck`gh`XYbhg`YUfb`i`g]b[`fYgYUfW`UbX`k`cf_d`UWY _bck`YX[Y"
%) "&	8Yj Y`cd`hYUWx]b[`UWYj`]hYg`h`Uh]bW`fdcfUHY`X]ZYfYbh]UHYX`ghfUHY[]Yg`hc`a`YYh`h`Y gdYW]Z]WYUfb]b[`bYYXg`cZgh`XYbhg`UWf`cgg`h`Y`ž` ``fUb[Y`cZUV`]hYg"

5ggYgga Ybh

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\h	Gh XYbh@YUfb]b[Ci hWta Yg 5ggYggYX	5 #HG@DfcZYgg]cbU` ; fUXi UHY HYUW\]b[`GHUbXUfXg`5ggYggYX	8i Y 8UHY
A Ucf`YggUmi) \$i	&Z ž(ž)	%) "&	&* #/\$#& \$% \$) .\$\$ DA
7`Ugg dfYgYbhU]cb`	` \$i	&Z ž)	%"%&	
7`Ugg`HYgh	&\$i	%ž&	%"%&ž%&" ž%) "&	&' #\$, #& \$% \$+.\$\$ DA

D`YUgY`fYZf`h`3gefD`fS` BdaXWee[a` S^E fS` VSdVe XadFWSUZWte`cb`hY`dfYj`]ci`g`dU[Y

5ggYgga Ybh8YHU]`g

5ggYgga Ybh%`A Ucf`YggUm

GHUfhXUHY. `Bch5dd`]WUV`Y

8YHU]`g. `K`f]h`Ub`YggUmVUgYX`cb`hY`a`UHf]U`Wcj`YfYX`]b`hY`Wci`fgY`Zc`W`g]b[`cb`]hg`Udd`]WU]cb`hc

A U_Y`U`%\$!a]bi h`dfYgYbHh]cb`cb`Ub`Udd`]W]h]cb`cZHY`h`YcfmWtj`YfYX`]b`h`]g`Wt`i`fgY`i`g]b[`U`g\cfh`h`UW]b[`Yd]gcXY`cZU`tc]d]WfW]cgYb`Vm`h`Y`gh`XYbH`

5`Wt`bW]gY`gi`a`a`UfmcZHY`dfYgYbHh]cb`g\ci`X`VY`dfcj`]XYX`fa`U`i``\$\$`k`cfXgk`

5ggYgga`Ybh`. `7`Ugg`hYgh`

GhUfhXUHY.`

8YH]`g.`5`&\$`]hYa`a`i`h]d`Y`W]c]W`hYghcb`\i`a`Ub`Wt`[`b]h]Y`UfW]hYW]fY`H]a`Y.`&\$`a`]bi`hYgGh`XYbHg`k`]`fYW]j`Y`ZYXVUW`_k`]h`%\$`Vi`g]bYgg`XUmg`cZgi`Va`]gg]cb`"

5XX]h]cbU`XYH]`g.`

`b!WUgg`a`i`h]d`Y`W]c]W`hYghf&\$`]hYa`g]cb`a`U`cf`Wt`a`dcbYbHg`UbX`dfcW]ggYg`cZ\i`a`Ub`Wt`[`b]h]Y`

GdYWZjW7 f]hYf]U

flē—————2fēēē

@YWhi fYf

F YWē a a YbXYX. ' #&\$'fi @DG'7F'8B'<8ē

k Y][\h]b[. '&\$i

'B 6. 'h]g'h]W_g]b'hY'j Uf]ci g'Vcl Yg'UbX'XYg][bYX'hc'dfcj]XY'ZYXVUW'hc'ghi XYbHg/hYmUFY'bch[]j Yb
 Yei U'k Y][\h]b'XYh'fa]b]b['hY'fYWē a a YbXYX'[fUXY''8YdYbX]b['cb'hY'bUh fY'cZ'hY'UggYgga YbhUg_ž
 'YWhi fYfg'a UmU'gc'Wēbh'i h U']nY'UbX#ēf'Ua YbX'hYgY'gdYWZjW7f]hYf]U''H\Y'fYWē a a YbXYX'[fUXY']g
 hYbhUj] Y'cb`mžgi Va 'YWh'hc'ghUbXUfX]gUh]cb'dfcWggYg'UbX'Uddfcj U'Vm'hY'GW\cc`'cZ9Xi WUh]cb
 @YUfb]b['UbX'HYUW\]b['7ca a]hY"Y"

I BGK 'G7 < CC @ 'C: '98I 75H€B 'FI 6F ⇒ # 998657? 'G < 99H'

98GH) ' \$'

5ggYgga YbhHUg_ '7 'Ugg'dfYgYbhUH]cb

GdYW]Z]W7 f]hYf]U	''flŁ—————2fŁŁ			
I bXYfghUbX'cZħY'ei Ygh]cb'cf']ggi Y'UbX'ħY'_'Ym'Wc'bW'dhg]bj'c'j YX				
8Ydħ'cZUbUmg]g'UbX#f'W]hei Y'j'b'fYgdcbgY'hc'ħY'ħUg_				
: Ua]]Uf]m]k]ħ'UbX'fY'Yj bW'cZdfcZYgg]cbU'UbX#f'fYgYUfW ']hYfUħi fY'i gYX'hc'gi ddcfhfYgdcbgY				
Għfi Wħi fY'UbX'cf[Ub]nUH]cb'cZfYgdcbg				
DfYgYbhUH]cb'cZfYgdcbgY U'Wc'fX]b['hc'Uddfcdf]UH'UWUXYa]WUbX ']b[i]gh]Wwcbj Ybh]cbg				
; YbYfU'Wc'a a Ybhg#fYWc'a a YbXUH]cbg'Zcf'bYI h]ħa Y.'				

@YWħi fYf

F YWc'a a YbXYX.' ' ' #&\$'fl @DG'7F '8B' < 8Ł'

k Y][\ħ]b[' . &\$i

'B 6. ħ.]g'ħ]W_g]b'ħY'j Uf]ci g'Vcl Yg'UbX'XYg][bYX'hc'dfcj]XY'ZYXVUW_ħc'gh'XYbħg/ħYm'UFY'bch[]j Yb
 Yei U'k Y][\ħ]b'XYħfa]b]b['ħY'fYWc'a a YbXYX' [fUXY" 8YdYbX]b['cb'ħY'bUħi fY'cZħY'UggYgga YbhHUg_ž
 'YWħi fYfg'a UmU'gc'Wc'bħYI ħi U']nY'UbX#cf'Ua YbX'ħYgY'gdYW]Z]W]hYf]U" 'H\Y'fYWc'a a YbXYX' [fUXY']g
 ħ]bHUħ]j Y'cb'mžgi Va 'YWħi'hc'għ]bXUfX]gUH]cb'dfcW]ggYg'UbX'Uddfcj U'Vmħ'Y'GWħ.cc'cZ9Xi WUH]cb
 @YUfb]b['UbX'HYUWħ]b['7ca a]ħY"'

I BGK 'G7 < CC @ 'C: '98I 75H€B 'FI 6F ⇒ # 998657? 'G < 99H'

98GH) ' \$'

5ggYgga YbhHUg_ '7 'Ugg'hYgh

GdYWZJW7 f]hYfJU	''flŁ—————2fŁŁ			
I bXYfghUbX'cZħY'ei Ygh]cb'cf']ggi Y'UbX'hY'_'YmWcbW'dhg]bj'c'j YX				
8Ydħ'cZUbUmg]g'UbX#f'Wf]hei Y']b'fYgdcbgY'hc'hY'hUg_				
: Ua]']Uf]m]k]ħ'UbX'fY'Yj bW'cZdfcZYgg]cbU'UbX#f'fYgYUfVX ']hYfUhi fY'i gYX'hc'gi ddcfhfYgdcbgY				
Għfi Wħi fY'UbX'cf[Ub]nUh]cb'cZfYgdcbg				
DfYgYbhU]cb'cZfYgdcbgY U'W'c'fX]b['hc'Uddfcdf]Uħ'UWUXYa]WUbX ']b[i]gh]W'cbj Ybh]cbg				
; YbYfU'W'ca a Ybhg#fYW'ca a YbXUH]cbg'Zcf'bYI h]ja Y.'				

@YWħi fYf

F YW'ca a YbXYX.' ' ' #&\$'fl @DG'7F '8B' < 8Ł'

k Y][\h]b[' . &\$i

'B 6. ħ.]g'h]W_g]b'hY'j Uf]ci g'Vcl Yg'UbX'XYg][bYX'hc'dfcj]XY'ZYXVUW'hc'gh'XYbħg/ħYmUfY'bch[]j Yb
 Yei U'k Y][\h]b'XYħ'fa]b]b['ħY'fYW'ca a YbXYX'[fUXY" 8YdYbX]b['cb'ħY'bUhi fY'cZħY'UggYgga YbhHUg_ž
 'YWħi fYfg'a UmU'gc'W'cbYI h U']nY'UbX#f'Ua YbX'ħYgY'gdYWZJW'f]hYfJU" 'H\Y'fYW'ca a YbXYX'[fUXY:]g
 ħYbHUh]j Y'cb'mžgi Va 'YWħi'hc'gHUbXUfX]gUh]cb'dfcVYggYg'UbX'Uddfcj U'VmiħY'GWX'cc'cZ9Xi WUh]cb
 @YUfb]b['UbX'HYUW]b['7ca a]ħY"'

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 Ybhg"

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

- K cf_`gi Va]hYX`%\$`hc`%-`XUmg`UZhYf`h\Y`gh]di``UhYX`XYUX`]bY

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wcdmf][\hžI BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Ww
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dYW'X'cZYj Yfmcby']b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX']bZcfa Uhcb'UVci hl BGK 'UbX'I BGK '@VfUfm

Gca Y'cZh'YgY'UfYUg'k]`VY'ZJa]]Uf'hc'mci ž'ch'Yfg'k]`VY'byk "; U]b]b['U'gc`X'i bXYfghUbx]b['cZU`h'Y fY'UH'X'UgdYW'g'cZ9@G9'k]`Y'd'mci 'a U_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK "

[f\hd.#gi.VYWfi \]XYg" \]VfUfmi bkg "YXi "Ui #'\]gY#UVci h' \]gYt](#)



