



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]Yk

'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`%`>c\b'; ccXgY`i]X]b[`f] &\$£

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`UhUbm]gh XYbhYbfc`YX`]b`Ub`98GH`Wci fgY`k]h`h`Y`GWXcc`cZ9Xi WU]cb`k]`a`U`Y`U`
 Wci a]ha Ybh]c`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`XYbh]g`Wc`b`f`c`" `5`a`]b]a`i`a`UhYbXUbW`fYei]fYa Ybh]cZ, \$i`]g`fYei]fYX`Zc`f`
 YUW]`Wci`fgY`" `b`W`f]U]b`W]fW`a`ghUbW]g`Z`U`gh`XYbh]a`Uma`]gg`i`d`h`c`&\$i` `cZU`Wci`fgY`k`]h`ci`hZcfa`U`
 Udd`]WU]cb`UbX`i`d`h`c`" `i` `cZU`Wci`fgY`k`]h`Zcfa`U`XcW`a`YbhU]cb`fgYbhj`]U`Ya`U]`h`c`Wci`fgY`Wc`b`Ybcf£`
 dfcj`]X]b[`U`" `h`Y`fYei]fYa Ybh]g`XYHU]YX`VY`ck`UfY`a`Yh`" `Gh`XYbh]g`bcha`YY]b[`h`Y`UhYbXUbW]
 fYei]fYa Ybh]g`ci`h]bYX`UVcj`Y`k`]`VY`Uk`UfYX`Ub`i`bgU]hgZUW]c`fm: `U]`f] : `£`Zc`f`h`Uh`Wci`fgY`fY[`UfX`Ygg`cZ`
 h`Y]f`dYfZcfa`UbW]`b`h`Y`UggYgga`Ybh]Ug`_`c`f`c`h`Y`f`fYei]fYa Ybh]g`Zc`f`h`Y`Wci`fgY`"

: cf`Z`f`h`Y`f]bZcfa Uh]cb`cb`9Xi WU]cb`Wci`fgY`UhYbXUbW`fYei]fYa Ybh]g`Z`d`YUgY`fY`ZY`f`h`c`h`Y`fY`gdYW]j`Y`
98GH`A`ccX`Y`a`cXi`Y`f]g£`"

5WUXYa]W`bZcfa Uh]cb`

: cf`YggYbh]U`gh`XYbh]bZcfa Uh]cb`fY`Uh]b[`h`c`fYei`Ygh]g`Zc`f`YI`h`Y]bg]cb/fYj`]Yk`cZa`Uf_g/cW]W`dUh]cbU` \YU`h`
 UbX`gUZY]m/YI`Ua`]bUh]cb`dfcW]Xi`fYg/gdYW]U`Wc`bg]XYfUh]cb`]b`h`Y`Yj`Ybh]cZ]`bYgg`cf`a`]gUXj`Ybh`fY/
 gh`XYbhYei]mUbX`X]gUV]`]m`UbX`c`h`Y`f`YggYbh]U`UWUXYa]W]bZcfa Uh]cb`z`
 gYY` \`h`d`g`#`k`k`"Ufng"i`bgk`"YXi`"Ui`#W`ffYbh]gh`XYbh]g`#UWUXYa]W]bZcfa Uh]cb`#dfc`h`Wc`gl`[i`]XY`]bYg#`

7 ci fgY'8YHJ]`g

7 fYX]hDc]bHg '*`

K cf_`cUX

%) \$\`ci fg]bWf X]b[`WUgg`WcbHWH\ci fgžfYUX]b[gžWUgg'dfYdUfUf]cbžUggYgga YbžZc``ck`i d`UWHj]hYgž YHW

Gi a a UfmcZ'h\Y'7ci fgY

[H\Y'a Ucf'ZcW'g'cZ'h\]g'Wci fgY'lg'fc'YI Ua \]bY'\ck`i a Ub'Wc\[b\]h\] Y'ghfi Wf fYg'UfY'cf\[Ub\]gYX' \]bhc'U Wc\YfYbhUfW\hYWh fY YbUV\]b\[`nci`fc`YUfbž'h\]b žfYUgcb'UbX'gc'j Y'dfcV'Ya g"H\Y'W'bfU`fc'Y'd'UmYX'Vm UWj Y`YUfb\]b\[\]b'h\]g'UfW\hYWh fY \]g'Ya d\Ug\]gYX"H\Y'Wci 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`XYbhgfid\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`UWfcgg`h`Y`Z` ``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 UcfYggUmi) \$i	&Z ž(ž)	%) "&	&* #/\$#& \$% \$) .\$\$ DA
7`Ugg dfYgYbhU]cb`	' \$i	&Z ž)	%"%&	
7`Ugg`HYgh	&\$i	%ž&	%"%&ž%&" ž%) "&	&' #\$, #& \$% \$+. \$\$ DA

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

5ggYgga Ybh8YHU]`g

5ggYgga Ybh%`A UcfYggUm

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`XYbh]k`j`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`dcbYbh]`UbX`dfcW]ggYg`cZ\i`a`Ub`Wt`[`b]h]`Y`

GdYWZjW7 f]hYf]U

flē—————2fžē

@YWh 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 XYb]g/hYmUfY' bch[]j Yb
Yei U'k Y][\h]b'XYh'fa]b]b['hY'fYWē a a YbXYX' [fUXY" '8YdYbX]b['cb'hY'bUhi fY'cZ'hY'UggYgga YbhUg_ž
'YWh 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
hYbhU]j Y'cb`mžgi Va 'YWh'hc'ghUbXUfX]gUh]cb'dfcW]ggYg'UbX'Uddfcj U'Vmi'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'hY'_'Ym'Wc'bw'dhg]bj'c'j YX				
8Ydħ'cZUbUmg]g'UbX#f'W]hei Y']b'fYgdcbgY'hc'hY'hUg_				
: Ua]']Uf]m]k]ħ'UbX'fY'Yj bW'cZdfcZYgg]cbU'UbX#f'fYgYUfW ']hYfUhi fY'i gYX'hc'gi ddcfhfYgdcbgY				
Għfi Wħi fY'UbX'cf[Ub]nUH]cb'cZfYgdcbg				
DfYgYbhUH]cb'cZfYgdcbgY'UW'cfX]b['hc'Uddfcdf]UH'UWUXYa]WUbX ']b[i]gh]W'cbj Ybh]cbg				
; YbYfU'Wc'a a Ybhg#fYWc'a a YbXUH]cbg'Zcf'bYI h]ja Y.'				

@YWħi fYf

F YWc'a 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/ħYm]UFY'bch[]j' Yb
 Yei U'k Y][\h]b'XYħ'fa]b]b['ħY'fYWc'a a YbXYX'[fUXY''8YdYbX]b['cb'ħY'bUhi fY'cZħY'UggYgga YbhHUG_ž
 'YWħi fYfg'a Um]U'gc'Wc'bhYI h' U']nY'UbX#f'Ua YbX'ħY'gY'gdYW]Z]W]hYf]U''H\Y'fYWc'a a YbXYX'[fUXY']g
 h]b]h]j'Y'cb'mžgi Va 'YWħi'hc'g]h]bXUfX]gUH]cb'dfcW]ggYg'UbX'Uddfcj U'VmiħY'GWX'cc'cZ9Xi WUH]cb
 @YUfb]b['UbX'HYUW]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]UħY'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'XYħf'a]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]hYf]U" 'H\Y'fYW'ca a YbXYX'[fUXY']g
 ħYbHUh]j Y'cb'mžgi Va 'YWħi'hc'gHUbXUfX]gUh]cb'dfcVWggYg'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`]Wn
- 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 Uh'cb'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](#)



