



HUMS2006

F YgYUfWX `D`UW`a Ybłž`5 fng`UbX`GcWU`GWYbWg

HYfa `Hk c`#`&\$&%

GWXcc`cZ<i a Ub]hYg`UbX`@Ub[i U[Yg`#`i BGK `5ftgž8Yg][b/ `5fWX]hYWñ fy

7ci fgY`Cj Yfj]Yk

GHJZZ'7cbHJW`i8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cWJhcb	D\cbY
@gU]: cfX	""ZcfX4 i bgk "YXi "Ui	VmUddc]bħa Ybh	' (- `A 6	

GWXcc``7cbHJW`i`bZcfa Uh]cb

GWXcc``cZ<i a Ub]hYg`UbX`@Jb[i U[Yg

@cWJhcb. `GWXcc``C Z]W`žA cfj Yb`6fck b`6i]X]b[ž@Yj Y``&ž&),

C dYb]b[`<ci fg. `A cbXUm! : f]XUmž`- Ua `!') da

D\cbY. `Ž*%&`-' ,) `%* , %

: U! . `Ž*%&`-' ,) ; , +\$)

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

7ci fgY'8YHJ]`g

7fYX]hDc]bfg '*`

Gi a a UfmcZh\Y'7ci fgY

h`h]g`Wci fgYžmci `k]`Yb[U[Y']b`U`fYU!']Z'UWUXYa]WfYgYUfW`YI dYf]YbW`cb`U`a Učf`dfc`YWh`YX`Vm
I BGK `gWkc`Ufg]b`5fng/ `GcWU`GWYbWg"McI `k]`k cf_`k]h`U`YUX]b[`gWkc`Ufz`Wca d`Yh`cf][]bU`
fYgYUfW`UbX`k f]h`U`dUdYf`UVci hmcI f`UfYU`cZfYgYUfW`"

7ci fgY`@YUfb]b[`Ci hWca Yg

%" 9I YW hY`Ugg][bYX`fYgYUfW`hUg_g]b`U`Wca dYhYbž`dfcZYgg]cbU`UbX`hja Y`ma UbbYf
&" 7f]h]W`mifYZYWhcb`mci f`fYgYUfW`hUg_gžXYa cbgfU]h]b[`mci f`i bXYfghUbX]b[`cZmci f`fYgYUfW`
dfc`YWh]b`][\hcZgca Y`fY`Yj Ubh`]h`fUh`fY
' " F YZYWhcb`mci f`YI dYf]YbW`cZk cf_]b[`cb`U`fYgYUfW`dfc`YWh

HYUW\]b[`GhfU]h[]Yg`

H\]g`WUgg`k]`W]YZmVY`hU [\h\h`fci [\`cbY!cb!cbY`cf`ga U``[fci d`a YYh]b[g`k]h`mci f`fYgYUfW`

5ggYgga Ybh

5ggYgga YbhHUg_g

5ggYgga YbhHUg_g	K Y][\h	8i Y'8UH	Gh XYbh@YUfb]b[Ci Hwta Yg'5ggYggYX
F YgYUfW 'DcfhZ`]c`) \$i	\$&#\$, #&\$&%\$) . \$\$ 'DA	%ž'
F YgYUfW 'F Ydcfh	(\$i	\$&#\$, #&\$&%\$) . \$\$ 'DA	&
F YgYUfW 'Gi dYfj]gcf 5ggYgga Ybh	%\$i	Bch5dd`]WVY	%

5ggYgga Ybh8YHJ]`g

5ggYgga Ybh% 'F YgYUfW 'DcfhZ`]c`

GhUfhXUH. 'K YY_`%

@Yb[h. ' \$\$\$

8YHJ]`g.

hYfbg\]d`dcfhZ`]c` fl \$\$\$ k cfXgŁ 'H\Y`dcfhZ`]c`g\ci `X'VY`UggYa V'YX'hłci [\ci hłY'łfa "'`hıg\ci `X
XcW`a Ybhıci f`Yi dYf]YbW`gždfc[fYgg`UbX`fYZYW]cbg`cZıci f`F`@dfc[fUa "'8cW`a YbhU]cb`]bWı XYg
Zcfb][\hımfYdcfhgž`UbX`Yj]XYbW`cZfYgYUfW`i bXYfU`Yb"'`hıg\ci `X`U`gc`]bWı XY`U`W]hWU`fYZYW]cb`cb
ıci f`dfcW`ggždfc[fYggž`UbX`k` \hV`bgh]h`h`g`U`gi W`W`ggZ`f`YgYUfW`dfc`Y`W]b`h`]g`Z`Y`X`"Mci`k`j`
k`cf`g`l`cd`ıci f`dcfhZ`]c`k`]h`ıci f`V`bj`Ybcf`cf`XY`Y[U`h`'UbX`fY`W]j`Y`Z`fa`U`h`j`Y`Z`Y`X`V`U`W`cb`ıci f`dfc[fYgg
U`h`h`Y`a`]X`dc]b`h`c`Z`h`Y`'łfa`"H\]g`dcfhZ`]c`k`j`"VY`[fUXYX`V`m`h`Y`V`bj`Ybcf`cf`XY`Y[U`h`'j`b`V`bgi`h`U]cb`k`]h`
ıci f`gi dYfj]gcf": YXVUW`k`j`"VY`[]j`Yb`j`]U`U`a`Uf`_]b[`fi`Vf]WUbX`]b`k`f]h]b["

Gi Va]gg]cb`bchYg. 'J]U`Ya`U]

Hi fb]h]b`gYH]b[. H\]g`]g`bchU`Hi fb]h]b`Ugg][ba Ybh

5ggYgga Ybh& 'F YgYUfW 'F Ydcfh

GhUfhXUH. 'K YY_`)

@Yb[h. '&\$\$\$`K`cfXg

8YHJ]`g.

F YgYUfW 'F Ydcfhf&\$\$\$ k cfXgŁ 'Mci f`fYgYUfW`fYdcfhdfc]]XYg`Ub`cddcfh] b]m]h`k`f]h`U`fYgYUfW`dUdYf
VUgYX`cb`Ub`UgdYW`h`cZıci f`fYgYUfW`h`U`h`U`g`d`U`f]W`U`f`m`gd`U`f`_`Y`X`ıci f`]b`h`f`Y`g`h`z`c`f`h`c`f`YZYW]cb`ıci f`
fYgYUfW`d`U`W`a`YbhYi dYf]YbW`"Mci`g\ci`X`dfc`dcg`Y`ıci f`dfc`Y`W]b`k`f]h]b[`UbX`\Uj`Y`]h`Uddfcj`YX`V`mıci`f`
gi dYfj]gcf`UbX`h`Y`V`ıci f`g`Y`V`bj`Ybcf`VY`Z`fY`h`Y`a`]XX`Y`c`Z`h`Y`'łfa`"'`hıa`U`m`\`U`j`Y`U`b`c`f`U`d`f`Y`g`Y`b`h`U]cb
V`ta`d`cb`Y`bh`-`h`c`VY`X`Y`łfa`]b`Y`X`]b`V`bgi`h`U]cb`k`]h`ıci f`gi dYfj]gcf": H\]g`k`j`"VY`Xci`V`Y`a`Uf`_Y`X`V`mıci`f`
V`bj`Ybcf`cf`XY`Y[U`h`'UbX`ıci f`gi dYfj]gcf": YXVUW`k`j`"VY`[]j`Yb`j`]U`U`a`Uf`_]b[`fi`Vf]WUbX`]b`k`f]h]b["

Gi Va]gg]cb' bchYg. 'J]U'9a U]

Hi fb]h]b'gYH]b[. 'H\]g']g' bchU'Hi fb]h]b'Ugg][ba Ybh

5ggYgga Ybh' . 'F YgYUfW\ 'Gi dYfj]gcf'5ggYgga Ybh

GHUfhXUH\ . 'Bch5dd']WV\Y

8YHU]`g.

Mci f'fYgYUfW\ 'gi dYfj]gcf'k]''UggYgg'mci f'dYfZ:fa UbW\ 'U[U]bghdfcj]XYX'W']Hf]U": YYXVUW_]b'k f]h]b['UbX
Vmfi Vf]W

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

BchUj U]UV`Y

F YWca a YbXYX`F Ygci fWg

BchUj U]UV`Y

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

Gh XYbhZYXVUW_k]`VY [UH\YfYX`j]U`Ya U]`UhiH\Y`YbX`cZH\Y`Wci fgY`VmiH\Y`Wci fgY`Wcbj Ybcf`"Gh XYbfg
k]`VY`fYei YghYX`hc`dfcj]XY`ZYXVUW`cb`h\Y]f`Ugg][bYX`dfc`YWhf]bWi X]b[`ei U]`micZ
gi dYfj]g]cb/k cf`cUX/hfUbgZfUV]`]micZfYgYUfVW`g_]`g/\ck`Yb[U[]b[`h\YmZci bX`h\Y`Ugg][bYX`dfc`YVW`
H\Ymk]`U`gc`VY`fYei YghYX`hc`Wca a Ybhcb`h\Y`cj YfU`g`gfi Wi`fY`cZH\Y`Wci fgY`UbX`]hg`UggYgga Ybfg`"
: YYXVUW`cb`]bX]j]Xi U`dfc`YVWg`k]`VY`fYZYffYX`hc`gi dYfj]gcf]g`hc`[i]XY`h\Ya`]b`g`gfi Wi`f]b[`a UH\Y]U`Zcf
Z hi fY`<| A G&\$*\$`fYgYUfVW`]bh`fbg`": YYXVUW`cb`h\Y`Wci fgY`k]`VY`i gYX`hc`UX↑gha`cXYg`cZ
UggYgga Ybh`

Gi Va]gg]cb 'cZ5ggYgga YbhiHUg_g

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

≠Zmci 'YbWci bHYf'U'dfcV'Ya 'k \Yb'UH'Ya dh]b['hc'gi Va]hmc' f'Ugg][ba YbhiH'fci [\ 'Hi fb]h]bž'd'YUgY
HY'Yd\cbY'9I HYfbU'Gi ddcfh'cb'-' ,) " ' ' %cf'Ya U] 'H'Ya 'cb'YI HYfbU'HY'hgi ddcfh4 i bgk "YXi "Ui "'Gi ddcfh
\ci fg'UfY' , .\$Ua '—%\$. \$\$da 'cb'k YY_XUmg'UbX'-. .\$Ua '—) . \$\$da 'cb'k YY_YbXg'f1 *) 'XUmg'U'm'UfL" ≠Zmci
UfY'i bUV'Y'hc'gi Va]hmc' f'Ugg][ba YbhiXi Y'hc'U'Zi 'hk]H'Hi fb]h]b'mci 'a UmiUdd'm'Z'f'Ub'YI HYbg]cbž'Vi hmc' i
a i ghfYHU]b'mci f'h]W_Yhbi a VYf'Z'ca '9I HYfbU'Gi ddcfh'fU'cb['k]H'UbmicH'Yf'fY'Y] UbhXcW a Yb'gk'hc

5 WUXYa]W< cbYgmiUbX`D`U[]Uf]ga

D`U[]Uf]ga]g`i]b[`hY`k cfXg`cf]XYUg`cZc`hYfg`UbX`dFYgYbh]b[`hYa`Ug`mci`f`ck`b`" #WUb`hU`Y`a`Ubm`Zc`fa`g`z`Zca`XY`]VYfUHY`WX`YU]b[`hc`UW]XYbhU`mW`cdm]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[`WU]Y[cf]Yg.

7 cdm]b[.`i`g]b[`hY`gUa`Y`cf`j`Yfmg]a`]Uf`k`cfXg`hc`hY`cf][]bU`hY`hcf`]XYU`k`]h`ci`hUW`bck`YX[]b[`hY`gci`fW`cf`i`g]b[`ei`c`hU]cb`a`Uf`g`"H\`g`U`gc`Udd`Y]g`hc`]a`U[`Yg`z`Ufh`UbX`XYg][`b`dfc`YWg`z`Ug`k`Y`Ug`dFYgYbhU]cbg`k`YfY`gca`YcbY`dFYgYbh]`Ubch`Yf`g`]XYUg`cf`k`cfXg`k`]h`ci`hWYX]h`

#Uddfcdf]UHY`dUfUd`fUg]b[.`7`U]b[]b[`U`Zk`k`cfXg`UbX`d`fUgYg`k`Y`a`cghm`fY]b]b[`hY`cf][]bU`ghf`W`fY`UbX`#`dfc[`fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`z`UbX`]bZc`fa`U]cb`k`]h`ci`hUW`bck`YX[`Ya`Ybh`H\`g`U`gc`Udd`Y]g`]b`dFYgYbhU]cbg`k`YfY`gca`YcbY`dUfUd`fUgYg`Ubch`Yf`g`]XYUg`cf`k`cfXg`k`]h`ci`hWYX]h`UbX`hc`d]YW]b[`hc[`Y`h`Y`f`ei`c`h`g`UbX`dUfUd`fUgYg`]bhc`U`bYk`k`c`Y`z`k`]h`ci`hUddfcdf]UHY`fY`ZY`fY`bW]b["

7 c`i`g]cb.`k`cf_]b[`k`]h`c`hYfg`Vi`hdUgg]b[`cZ`hY`k`cf_]Ug`U`dYfgcb`g`]bX]j`]Xi`U`k`cf_]`7`c`i`g]cb`U`gc`]bW`i`XYg`dfcj`X]b[`mci`f`k`cf_]hc`Ubch`Yf`g`h`XYbh`VY`Zc`fY`hY`Xi`Y`XU]Y`z`cf`Zc`f`hY`di`fdcgY`cZ`hY`a`d`U[]Uf]g]b[`Uh`Ubmi]a`Y`z`dUm]b[`Ubch`Yf`dYfgcb`hc`dYf`Zc`fa`Ub`UWXYa`]W]Ug`_`z`gh`U`]b[`cf`UW`ei`]f]b[`Ubch`Yf`dYfgcb`g`UWXYa`]Wk`cf_]UbX`W`cdm]b[]h`z`Z]f]b[`hc`W`ca`d`Y`h`Ubch`Yf`dYfgcb`g`k`cf_]cf`gY`Y_]b[`dUma`Ybh`Zc`W`ca`d`Y]b[`UWXYa`]Wk`cf_]`

#Uddfcdf]UHY`W]U]cb.`7`]h]b[`gci`fW`g`k`k`]W`Uj`Y`bch`VYYb`fYUX`z`k`]h`ci`hUW`bck`YX[]b[`hY`gY`W`bXUfm`gci`fW`Zca`k`k`]W`_`bck`YX[`Y`cZ`hY`a`U`g`VYYb`c`hU]bYX`

8 i`d`]WU]cb`f]gY`Zd`U[]Uf]ga`E`gi`Va`]h]b[`mci`f`ck`b`k`cf`_`z`]b`k`c`Y`cf`]b`dUf]z`k`YfY`]h`Ug`dFY`]ci`g`m`VYYb`dFYdUfYX`cf`gi`Va`]hYX`Zc`f`Ubch`Yf`UggYgga`Ybhcf`W`ei`fgY`Uhi`BGK`cf`Ubch`Yf`i`b]j`Yfg]h`

7 cffYW]fYZYfYbW]b[`dfUW]W]g.

- DUfUd`fUg]b[`zgi`a`a`Uf]g]b[`zYggUm`k`f]h]b[`UbX`h]a`Y`a`UbU[`Ya`Ybh`
- 5ddfcdf]UHY`i`gY`cZ`UbX`U]h]f]Vi`h]cb`Zc`f`U`fU]b[`Y`cZ`a`U]h]f]U`g`]bW`i`X]b[`hY`h]z`]a`U[`Yg`z`Zc`fa`i`UY`UbX`W`cb`W`d]g`"

#X]j`]Xi`U`Ugg]ghU]bW`]g`Uj`U]UV`Y`cb`fYei`Ygh`Zca`H\Y`@YUfb]b[`7`YbhY`f`h`hd.`#`k`k`"Wi`bgk`"YXi`"Ui`#`G`h`XYbh]UfY`U`gc`fYa`]bXYX`h`Uh`W]fY`Z`h]a`Y`a`UbU[`Ya`Ybh]g`Ub`]a`dc`f]Ubhd`Uf]hc`Z`gh`Xm`UbX`cbY`cZ`hY`]XYbh]ZYX`W]i`gYg`cZ`d`U[]Uf]ga`]g`d`cc`f`h]a`Y`a`UbU[`Ya`Ybh`G`h`XYbh]g`g`l`ci`X`U`ck`gi`Z]W]Ybh]h]a`Y`Zc`f`fYgYUfW`z`X`fU]z]b[`UbX`d`fcdYf`fY`ZY`fY`bW]b[`cZ`gci`fW`g`]b`dFYdUf]b[`U`UggYgga`Ybh]h]a`g`"

I BGK `@]VfUfmU`gc`U`g`hY`9`@`9`hc`Uj`U]UV`Y`hc`Ugg]ghmci`k`]h`mci`f`gh`Xm`Uhi`BGK`"9`@`9`]g`XYg][`bYX`hc`]bhcf`Xi`W`bYk`gh`XYbh]hc`gh`Xm]b[`Uhi`BGK`Vi`h]hW]b`U`gc`VY`U[`fYUhfY`ZYg`Yf`Xi`f]b[`mci`f`

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[]Uf]ga ž'Wc'dmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5W'W'dhUV'Y'I gY'cZ
I BGK '⇒H'F'Ygci f'W'g'Dc`]W'h
- VY'Uk UfY'cZ'U'g'U'f'X'g'c'Z'V'Y'\U'j]ci f'Y'I d'Y'W'X'c'Z'Y'j Y'f'm'c'b'Y'']b'h'Y'I BGK 'W'c'a'a'i'b]m
- 'c'W'U'h'g'Y'f'j]W'g'U'bx'j'b'Z'c'f'a U'h'c'b'U'V'c'i h'l BGK 'U'bx'I BGK '@]V'f'U'f'm

Gca Y'cZ'U'g'Y'U'f'Y'U'g'k]''V'Y'Z'J'a]]U'f'hc'mci ž'c'h'Y'f'g'k]''V'Y'b'Y'k "; U]b]b['U'gc'X'i bXYfghUbx]b['cZU''h'Y
f'Y'U'h'X'U'gd'Y'W'g'c'Z'9@-G'9'k]''\Y'd'mci 'a U_Y'h'Y'a c'g'h'c'Z'mci f'g'h'X]Y'g'U'hl BGK ""

[\h'c'.#\]j' V'Y'W'f'i \]X'Y'g'' \]V'f'U'f'm'i b'g'k "Y'X'i "U'i #' \]g'Y'#\]V'c'i h'Y' \]g'Y](#)

5 WUXYa]WbZcfa Uh]cb

: cfYggYbh]U`gh XYbh]bZcfa Uh]cb fY`Uh]b[`tc.

- fYei Yghg`Zcf`YI hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk `cZa Uf_g/
- I BGK `<YU`h`UbX`GUZYmidc`]WYg/
- YI Ua]bUh]cb`dfcWYXi fYg/
- gdYW]U`Wc]bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a]gUXj Ybh fY/
- gh XYbhYei]m]UbX`X]gUV`]m/
- UbX`c`hYf`YggYbh]U`UWUXYa]W]bZcfa Uh]cbz`gYY

[\ftdg.#k k k "Uftg"i bgk "YXi "Ui #W ffYbh\]gh XYbh\]UWUXYa \]W\]bZcfa Uh\]cb#dfchWc`g!\[i \]XY`\]bYg#](#)

⇒ a U[Y`7 fYX]h

GmbYf[]Yg`]b`Gci bX`&\$%*`

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7cXY.`\$\$\$- , ;

5W_bck`YX[Ya Ybhcz`7ci b]fm

K Y`UW_bck`YX[Y`hY`6YXY[U`dYcd`Y`k`c`UfY`hY`hfUX]h]cbU`W`ghcX]Ubg`cZ`hY`UbXg`cb`k` \]W`I`BGK
? Ybg]b[hcb`W]a`di`g`]g`cW]hYX"