



HUMS2006

F YgYUfWx 'D`UW'a Ybhz'5 fng'UbX'GcWU`GWYbWg

HYfa `Cby`#`&\$&%

GWcc`cZ<i a Ub]hYg'UbX'@Ub[i U[Yg`#`I BGK `5 fng'UbX'GcWU`GWYbWg

7ci fgY`Cj Yfj]Yk

GHJZZ'7cbHJW`i8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]'UV]'m	@cWJhcb	D\cbY
B Uca]`DUf_]bgcb	b"dUf_]bgcb4 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 UfmicZh\Y'7ci fgY

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

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

%` 9I YW hY`Ugg][bYX`fYgYUfW`hUg_g`]b`U`Wca dYhYbhž`dfcZYgg]cbU`UbX`hja Y`mia 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_	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 Ybh8YHU]`g

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

GhUfhXUH. 'K YY_%

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

8YHU]`g.

hYfbg\]d'dcfhZ`]c`fl \$\$\$k cXgŁ 'H\Y'dcfhZ`]c`g\ci `X'VY'UggYa V'YX'hłfci [\ci hłY'hYfa "'#ig\ci `X
XcW a Ybhmc i f'YI dYf]YbWgždfc[fYgg'UbX'fYZYW]cbg'cZmc i f'F @dfc[fUa "'8cW a YbhU]cb`]bWł XYg
Zcfhb][\hmfYdcfngž'UbX'Yj]XYbW'cZfYgYUfW i bXYftU_Yb"'#ig\ci `X'U'gc`]bWł XY'U'W]hWł'fYZYW]cb'cb

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

8YHJ]`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]`UhihY`YbX`cZhY`Wci fgY`VmihY`Wci fgY`Wcbj Ybcf`"Gh XYbfg
k]`VY`fYei YghYX`hc`dfcj]XY`ZYXVUW`cb`hY]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[`hYmZci bX`hY`Ugg][bYX`dfc`YVW`
H\Ymk]`U`gc`VY`fYei YghYX`hc`Wca a Ybhcb`hY`cj YfU`g`gf] Wi`fY`cZhY`Wci fgY`UbX`]hg`UggYgga Ybfg`"
: YYXVUW`cb`]bX]j]Xi U`dfc`YVWg`k]`VY`fY`ZYffYX`hc`gi dYfj]gcf]g`hc`[i]XY`hYa`]b`gf] Wi`f]b[`a UHf]U`Zcf
Z hi fY`<| A G&\$*\$`fYgYUfVW`]bhYfbg`": YYXVUW`cb`hY`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

Ʒmci`YbWci bHYf`U`dfcV`Ya`k` \Yb`UH`Ya` dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`h`fci`[`\`Hi`fb]h]b`z`d`Y`UgY`
HY`Yd`l`cb`Y`9I`HY`fb`U`Gi`ddc`fh`cb`-`,`),`"`,`'`,`%`cf`Ya`Uj`h`Ya`i`cb`YI`HY`fb`U`HY`hgi`ddc`fh`4`i`bgk`"YXi`"Ui`"Gi`ddc`fh`
l`ci`fg`UfY`,`.\$\$Ua`-`-%\$.\$\$da`i`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`i`cb`k`YY`YbXg`fI`*)`XUmg`U`mY`UfI`"Ʒmci`
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybhi`Xi`Y`hc`U`Zi`h`k`]h`Hi`fb]h]b`mci`a`Um`Udd`m`Zc`f`Ub`YI`HY`bg]cb`z`Vi`hmc`i`
a`i`gh`fY`hU]b`mci`f`h]W`Y`hbi`a`VY`f`Z`ca`9I`HY`fb`U`Gi`ddc`fh`f`U`cb[`k`]h`Ub`mci`h`Y`f`fY`Yj`Ub`h`Xc`W`a`Y`b`hg`L`hc`
]b`Wi`XY`Ug`Yj`]X`Y`b`V`W`hc`gi`ddc`fh`mci`f`YI`HY`bg]cb`Udd`]W`h]cb`"Ʒmci`Ya`Uj`9I`HY`fb`U`Gi`ddc`fh`mci`k`]`
Ui`hc`a`U`h]W`U`m`f`Y`W`]j`Y`U`h]W`Y`hbi`a`VY`f`z`Vi`h]Z`mci`HY`Yd`l`cb`Y`mci`k`]`b`Y`Y`X`hc`gd`Y`W`Z]W`U`m`Ug`_`Zc`f`cb`Y`"
Hi`fb]h]b`U`gc`d`fcj`]X`Y`gi`d`X`U`h`g`i`cb`h`Y`]f`g`m`g`h`Ya`i`g`h`U`h`g`i`cb`Hk`]h`Y`f`"

;`Yb`Y`f`U`m`z`Ugg`Y`gga`Yb`hi`U`g`_`g`a`i`gh`V`Y`gi`Va`]h`Y`X`Y`Y`W`f`cb]W`U`m`j`]U`Y`]h`Y`f`Hi`fb]h]b`cf`U`A`cc`X`Y`
Ugg][`ba`Yb`h`i`h`]b`g`h`U`b`V`W`g`k` \Y`f`Y`h`l`g`]g`b`ch`d`c`g`g]V`Y`z`]h`k`]`V`Y`g`h`U`h`X`i`cb`mci`f`W`ci`fg`Y`g`A`cc`X`Y`g`]h`k`]h`
U`h`Y`fb`U`h]`Y`gi`Va`]gg]cb`X`Y`hU]`g`"

:`cf`]b`Z`c`fa`U`h]cb`cb`l`ck`hc`gi`Va`]h`Ugg][`ba`Yb`hg`i`cb`]b`Y`j`]U`A`cc`X`Y`.\`h`d`g`#`gh`XY`b`h`i`bgk`"YXi`"Ui`#`ck`!
gi`Va`]h`Ugg][`ba`Yb`h`a`cc`X`Y`"

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`Z`fa`g`z`Z`ca`XY`]VYfUHY`WX`YU]b[`hc`UW]XYbhU`m`W`cdm]b[`Z`ca`U`gci`fW`k`]h`ci`hUW`bck`YX[`Ya`Ybh`

I`BGK`[`fci`dg`d`U[]Uf]ga`]bhc`hY`Z`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`Z`k`k`cfXg`UbX`d`fUgYg`k`Y`a`cghmfYU]b]b[`hY`cf][]bU`ghf`W`fY`UbX`#`f`dfc[`fYgg]cb`cZ]XYUg`cZ`hY`cf][]bU`z`UbX`]bZ`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`Z`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`XYbhVY`Z`fY`hY`Xi`Y`XU]Y`z`cf`Z`f`hY`di`fdcgY`cZ`hY`a`d`U[]Uf]g]b[`Uh`Ubmi]a`Y`z`dUm]b[`Ubch`Yf`dYfgcb`hc`dYfZ`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`Yf]b[`hc`W`ca`d`Y`h`Ubch`Yf`dYfgcb`g`k`cf_]cf`gY`Y_]b[`dUma`Ybh`Z`f`W`ca`d`Y]b[`UWXYa`]Wk`cf_]`

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

8`i`d`]WU]cb`f]gY`Z`d`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`Z`f`Ubch`Yf`UggYgga`Ybhcf`W`ei`fgY`Uhi`BGK`cf`Ubch`Yf`i`b]j`Yfg]h`

7`c`fY`W`fY`Z`fY`bW]b[`dfUW]W]g.

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

#X]j`]Xi`U`Ugg]ghU]bW`]g`Uj`U]UV`Y`cb`fYe`i`Ygh`Z`ca`H`Y`@`YUfb]b[`7`YbhY`f`h`h`d`#`k`k`"Wi`bgk`"YXi`"Ui`#`"G`h`XYbh]U`fY`U`gc`fYa`]bXYX`h`Uh`WUfY`Z`h]a`Y`a`UbU[`Ya`Ybh]g`Ub`]a`dc`f]UbhdUf]hc`Z`gh`Xm`UbX`cbY`cZ`hY`]XYbh]Z`YX`W`li`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]Y`bh]h]a`Y`Z`f`fYgYUfW`z`X`fU]z]b[`UbX`d`fcdYf`fY`Z`fY`bW]b[`c`Z`gci`fW`g`]b`dFYdUf]b[`U`UggYgga`Ybh]hYa`g`"

I`BGK`@]VfUfmU`gc`U`g`hY`9`@`G`9`hc`Uj`U]UV`Y`hc`Ugg]ghmci`k`]h`mci`f`gh`Xm`Uhi`BGK`"9`@`G`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`Z`Yg`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'Wcdmf][\hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wm
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj]ci f'YI dYW'X'cZYj Yfmcby'jb'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj]Wg'UbX'jbZcfa 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 ""

[\hhd.##ji V'YWf i \]XYg" \]VfUfm'i bgk "YXi "Ui #' \]gY#JVci h' \]gY](#)

5 WUXYa]WbZcfa Uh]cb

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

- fYei Yghg`Zcf`YI H`bg]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`dfcW`Xi fYg/
- gdYW]U`W`bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a]gUXj Ybh fY/
- gh XYbhYei]mUbX`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#dfchW`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"