



## HUMS2007

F YgYUfVX `D`UW`a Ybh=ž`5 fhg`UbX`GcWU`GWYbWg

HYfa `H\fYY`##`&\$&\$

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	6mUddc]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](#)

7 ci fgY'8YHJ]`g

7 fYX]hDc]bHg`%&`

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

h`h]g`W`ci fgY`z`mci `k ]`Yb[ U[ Y`]b`U`fYU`! ]Z`U`WUXYa ]WfYgYUfW`YI dYf]YbW`cb`U`a U`c`f`dfc`Y`W`h`Y`X`Vm  
I`B`G`K` `g`W`c`U`fg`]b`5`f`g`/` `G`c`W`U` `G`W`Y`b`W`g`" `M`c`i` `k` ]` `k` c`f`\_`k` ]h` `U` `Y`U`X`]b[ `g`W`c`U`f`z`W`a` d`Y`h` `c`f`][ ]b`U`  
f`Y`g`Y`U`f`W` `U`b`X` `k` f`]h` `U` `d`U`d`Y`f`U`V`c`i` h`m`c`i` f`U`f`Y`U` `c`Z`f`Y`g`Y`U`f`W`"

7 ci fgY`@YUfb]b[ `Ci h`W`a` Yg

%` 9I`Y`W` h`Y`U`gg][ bYX`f`Y`g`Y`U`f`W` `h`U`g`\_`g`]b`U` `W`a` d`Y`h`b`h`z`d`f`c`Z`Y`g`g`]c`b`U` `U`b`X` `h`a` Y`m`a` U`b`b`Y`f`  
&` 7`f`]h`W` `m`f`Y`Z`Y`W`h`c`b` `m`c`i` f`f`Y`g`Y`U`f`W` `h`U`g`\_`g`z`X`Y`a` c`b`g`f`U`h`]b[ `m`c`i` f`i` b`X`Y`f`g`h`U`b`X`]b[ `c`Z`m`c`i` f`f`Y`g`Y`U`f`W`  
d`f`c` `Y`W`h`]b` `][ `h`c`Z`g`c`a` Y`f`Y`j` U`b`h`]h`f`U`h` f`Y`  
' ` " `F`Y`Z`Y`W`h`c`b` `m`c`i` f`Y`I` d`Y`f`]Y`b`W` `c`Z`k` c`f`\_]b[ `c`b`U` `f`Y`g`Y`U`f`W` `d`f`c` `Y`W`h`

HYUW`X`]b[ `G`h`f`U`h`[ ]Yg`

H`h`]g`W`U`g`g`k` ]` `W`X`]Y`Z`m`V`Y` `h`U`i` [ `h`h`h`f`c`i` [ ` `c`b`Y`!`c`b`Y` `c`f`g`a` U` `][ `f`c`i` d`a` Y`Y`h`]b[ `g`k` ]h` `m`c`i` f`f`Y`g`Y`U`f`W`  
g`i` d`Y`f` ]g`c`f`"

M`c`i` f`g`i` d`Y`f` ]g`c`f`k` ]` `][ ]j`Y` `m`c`i` `U` `W`c` `Y`f`Y`b`h`g`a` U` `!`g`W`U`Y` `d`f`c` `Y`W`h`h`c` `k` c`f`\_`c`b`" `h`a` U`m`]b`W`i` X`Y` `d`f`]a` U`f`m`f`Y`g`Y`U`f`W` `#`  
X`U`h`U` `U`b`U` `m`g`]g` `U`b`X` `#` `f` `g`Y`W`c`b`X`U`f`m`f`Y`g`Y`U`f`W`" :` c`f`Y`I` U`a` d`Y`z`m`c`i` `a` U`m` `Y` `d` `h`c` `f`Y`g`Y`U`f`W` `U` `V`c`c`\_`c`f` `c`i` f`b`U`  
U`f`h`]W`Y` `Z`c`f` `h` `Y`a` z`X`c` `g`W`c`d`]b[ `f`Y`g`Y`U`f`W` `Z`c`f`U` `b`Y`k` `d`f`c` `Y`W`z`c`f` `Y` `d` `h`c` [ `U`h` `Y`f`z`h`f`U`b`g`W`]V`Y`z`]b`X`Y`I` `U`b`X` `U`b`U` `m`g`Y`  
d`f`]a` U`f`m`f`Y`g`c`i` f`W`g`z`]b`h`Y`j` ]Y`k` g`c`f`c`h`Y`f`X`U`h`U`"

h`k`Y`Y`\_`m`c`f` `Z`c`f`h`b][ `h`i`m`a` Y`Y`h`]b[ `g`z`m`c`i` f`g`i` d`Y`f` ]g`c`f`k` ]` `gi` [ [ Y`g`h`f`Y`U`X`]b[ `g` `z`c`f` `m`c`i` `h`c` `X`c`z`X`]g`W`g`g` `m`c`i` f`  
d`f`c` [ f`Y`g`g`z`h`U`\_`h`c` `m`c`i` `U`V`c`i` h`m`c`i` f`Y`j` c`j` ]b[ `i` b`X`Y`f`g`h`U`b`X`]b[ `c`Z`h`Y` `f`Y`g`c`i` f`W`g` `m`c`i` ` `U`j`Y`V`Y`Y`b`]b`g`f`i` W`Y`X` `h`c`  
k` c`f`\_`c`b` `U`b`X` `Y` `d` `m`c`i` `d` `U`b` ` `c`k` `h`c` `a` c`j` Y` `h`Y` `d`f`c` `Y`W`h` `Z`c`f`k` U`f`X`" 5`Z`h`f`Y`U`W` `a` Y`Y`h`]b[ `z`m`c`i` `g` `l`c`i` `X` `g`Y`b`X` `U`  
Z`c` `c`k` `i` d`Y`!`a` U`] `W`c`b`Z`f`a` ]b[ `m`c`i` f`i` b`X`Y`f`g`h`U`b`X`]b[ `c`Z`h`Y` `h`U`g`\_`U`gg][ bYX` `U`b`X` `f`Y`W`c`f`X`]b[ `m`c`i` f`d`f`c` [ f`Y`g`g`" H`Y`g`Y`  
W`c`a` a` i` b`]W`h`]c`b`g`k` ]` `d`f`c`j` ]X`Y`]a` d`c`f`h`U`b`h`Y`j` ]X`Y`b`W` `Z`c`f` `m`c`i` f`d`c`f`h`c`]c`"

M`c`i` f`a` U`c`f`k` f`]h`b[ `h`U`g`\_`g`U`f`Y`U` `f`Y`g`Y`U`f`W` `d`c`f`h`c`]c` `h`U`h`[ `U`h` `Y`f`g` `Y`j` ]X`Y`b`W` `c`Z`U`b`X` `f`Y`Z`Y`W`h`]c`b`g`c`b` `m`c`i` f`  
f`Y`g`Y`U`f`W` `Y`I` d`Y`f`]Y`b`W` `U`b`X` `U` `f`Y`g`Y`U`f`W` `f`Y`d`c`f`h`h`U`h`X`Y`a` c`b`g`f`U`h`Y`g` `m`c`i` f`W`d`U`W`]h`m`h`c` `X`c`]b`X`Y`d`Y`b`X`Y`b`h`g`W`c` `U`f`m`  
k` c`f`\_`]b` `h`Y` `U`f`Y`U` `c`Z`m`c`i` f`f`Y`g`Y`U`f`W`"

# 5ggYgga Ybh

## 5ggYgga YbhHUg\_g`

5ggYgga YbhHUg_	K Y][ \h	8i Y'8UHŸ	Gh XYbh@YUfb]b[ Ci hWta Yg'5ggYggYX
F YgYUfW`DcfhZ`]c`	( \$i	%* #/0/#&\$&\$ \$) . \$\$ DA	%Z
F YgYUfW`F Ydcfh	( \$i	%* #/0/#&\$&\$ \$) . \$\$ DA	&
F YgYUfW`Gi dYfj ]gcf 5ggYgga Ybh	&\$i	Bch5dd`]WVY	%

## 5ggYgga Ybh8YHJ]`g

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

GhUfhXUHŸ. `K YY\_`C bY

@Yb[ h. ` \$\$\$!) \$\$\$

8YHJ]`g.

hYfbg\]d`dcfhZ`]c`fl \$\$\$!) \$\$\$`k cfXgŁ`H\Y`dcfhZ`]c`g\ci`X`VY`UggYa`VYX`h\fc[ ]\ci`h\Y`h\fa`" `h\ci`X`XcW`a`Ybh`mci`f`Yi`dYfj]YbW`gZ`dfc[`fYgg`UbX`fYZYW]cbg`cZmci`f`F`@dfc[`fUa`" `8cW`a`YbhU]cb`]bW`XYg`Zcfb][` \hmi`fYdcfhgZ`UbX`Yj`]XYbW`cZ`fYgYUfW`i`bXYfU`Yb`" `h\ci`X`U`gc`]bW`XY`U`W]hWU`fYZYW]cb`cb`mci`f`dfc`W`ggZ`dfc[`fYggZ`UbX`k` \hVcbgh]h`h`g`U`gi`WV`ggZ`" `fYgYUfW`dfc`YWh]b`h\]g`ZY`X`" `Mci`k`]`k`cf`g\cd`mci`f`dcfhZ`]c`k`]h`mci`f`Vcbj`Ybcf`cf`XY`Y[`UH`UbX`fYW]j`Y`Zcfa`UHj`Y`ZYXVUW`cb`mci`f`dfc[`fYgg`Uh`h`Y`a`]Xdc]bhcZ`h`Y`h`fa`" `H\]g`dcfhZ`]c`k`]`VY`[`fUXYX`Vm`h`Y`Vcbj`Ybcf`cf`XY`Y[`UH`]b`Vcbgi`hU]cb`k`]h`mci`f`gi`dYfj]gcf`":`YYXVUW`k`]`VY`[`]`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`F Ydcfh

GhUfhXUHŸ. `K YY\_`)

@Yb[ h. `&\$\$\$

8YHJ]`g.

F YgYUfW`F Ydcfhf&\$\$\$`k cfXgŁ`Mci`f`fYgYUfW`fYdcfhdfc]`]XYg`Ub`cddcfh`b]mhc`k`f]h`U`fYgYUfW`dUdYf`VUgYX`cb`Ub`UgdYWhcZmci`f`fYgYUfW`h`Uh`Ug`dUfhW`UfmgdUf`\_YX`mci`f`]b`h`fYghZ`cf`h`fYZYW]cb`mci`f`fYgYUfW`d`UW`a`Ybh`Yi`dYfj]YbW`" `Mci`g\ci`X`dfc`dcgY`mci`f`dfc`YWh]b`k`f]h]b[`UbX`\Uj`Y`]hUddfcj`YX`Vmimci`f`gi`dYfj]gcf`UbX`h`Y`Vcbj`fY`Vcbj`Ybcf`VY`Zc`fY`h`Y`a`]XX`Y`cZ`h`Y`h`fa`" `h`a`Um`Uj`Y`Ub`cfU`dfYgYbU]cb`Vcb`a`dcbYbh`-`h`c`VY`XY`h`fa`]bYX`]b`Vcbgi`hU]cb`k`]h`mci`f`gi`dYfj]gcf`" `H\]g`k`]`VY`Xci`V`Y`a`Uf`\_YX`Vmimci`f`Vcbj`Ybcf`cf`XY`Y[`UH`UbX`mci`f`gi`dYfj]gcf`":`YYXVUW`k`]`VY`[`]`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

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`fY`ZYffYX`hc`gi dYfj ]gcf]g`hc`[ i ]XY`h\Ya` ]b`g`gfi Wi`f]b[ `a UH\Yf]U`Zcf  
Z`h`fY`<| A G&\$+\$`fYgYUfVW`]bh`fbg`": YYXVUW`cb`h\Y`Wci fgY`k ]`VY`i gYX`hc`UX`g`gha`cXYg`cZ  
UggYgga Ybh`

Gi Va ]gg]cb 'cZ5ggYgga YbhiHUg\_g

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

# 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`U`g`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`fYU]b]b[ `hY`cf][ ]bU`ghf`W`fY`UbX`#`f`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`Yf`ei`c`hYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k`\c`Y`z`k`]h`ci`hUddfcdf]UHY`fY`ZYfYbW]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`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`dYfZc`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`\]W\`Uj`Y`bchVYYb`fYUX`z`k`]h`ci`hUW`bck`YX[ ]b[ `hY`gYW`bXUfm`gci`fW`Zca`k`\]W`\_`bck`YX[ Y`cZ`hY`a`\Ug`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`ci`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`cbW`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]U`fY`U`gc`fYa`]bXYX`h`Uh`W]fY`Z`i`h]a`Y`a`UbU[ Ya`Ybh]g`Ub`]a`dc`f]U]bh`dUf]hc`Z`gh`Xm`UbX`cbY`cZ`hY`]XYbh]Z]YX`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]Y`bh]h]a`Y`Zc`f`fYgYUfW`z`X`fU]Z]b[ `UbX`d`fcdYf`fY`ZYfYbW]b[ `cZ`gci`fW`g`]b`dFYdUf]b[ `U`UggYgga`Ybh]hYa`g`

I BGK `@]VfUfmU`gc`\Ug`hY`9@G9`hc`Uj`U]UV`Y`hc`Ugg]ghmci`k`]h`mci`f`gh`XmUhi`BGK`"9@G9`]g`XYg][`bYX`hc`]bhc`Xi`W`bYk`gh`XYbh]hc`gh`Xm]b[ `Uhi`BGK`Vi`h]hW]b`U`gc`VY`U[ `fYU]h]fY`ZYg`Yf`Xi`f]b[ `mci`f`



- i bXYfgHUbX'mci f'f][ \hg'UbX'fYgdcbg]V]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[ ]Uf]ga ž'Wcdmf][ \hž' BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5WwdfUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wñ

5 WUXYa ]W**⊖**Zcfa Uh]cb

: cf`YggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[ `tc.