



## HUMS2007

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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	

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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\*%&`-' , ) `%\* , %

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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`"Mci `k ]`k`c`f`\_`k ]h`U`Y`UX]b[ `g`W`c`U`f`z`W`a`d`Y`h`c`f][ ]bU`  
fYgYUfW`UbX`k`f]h`U`d`UdYf`UVci hmc`i`f`U`fYU`c`Z`fYgYUfW`"

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

%`9I`Y`W`h`Y`U`gg][ bYX`fYgYUfW`hUg\_g`]b`U`W`a`d`Y`h`b`h`z`d`f`c`Z`Y`g`g]cbU`UbX`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]`j`g`c`f`"

Mci`f`g`i`d`Y`f]`j`g`c`f`k ]`i`[ ]j`Y`m`c`i`U`W`c`Y`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`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`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`f]`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`m`a`Y`Y`h]b[ `g`z`m`c`i`f`g`i`d`Y`f]`j`g`c`f`k ]`i`g`i [ [ `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`k`i`d`Y`I`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`g`g][ 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`Z`]c`"

Mci`f`a`U`c`f`k`f]h]b[ `h`U`g`\_`U`f`Y`U`f`Y`g`Y`U`f`W`d`c`f`h`Z`]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`

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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

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GhUfhXUHŸ. `K YY\_`C bY

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8YHJ]`g.

hYfbg\]d`dcfhZ`]c`f! \$\$\$!) \$\$\$`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][` \hmfYdcfhgZ`UbX`Yj`]XybW`cZfYgYUfW`i`bXYfU`Yb`" `h\ci`X`U`gc`]bW`XY`U`W]hWU`fYZYW]cb`cb`mci`f`dfcW`ggZ`dfc[`fYggZ`UbX`k` \hVcbgh]h`h`g`U`gi`WVggZ`" `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`]bhfYghZ`cf`h`fYZYWhc`b`mci`f`fYgYUfW`d`UW`a`YbhYi`dYfj]YbW`" `Mci`g\ci`X`dfcdcgY`mci`f`dfc`YWh]b`k`f]h]b[`UbX`\Uj`Y`]hUddfcj`YX`Vmimci`f`gi`dYfj]gcf`UbX`h`Y`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`dcbYbh`-`h`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`g`fi 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`fi Wi`f]b[ `a UH\Yf]U`Zcf  
Z`h`fY`<I A G&\$+\$`fYgYUfVW`]bh`fbg`": YYXVUW`cb`h\Y`Wci fgY`k ]`VY`i gYX`hc`UX`g`ha`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`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`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`cghmfYU]b]b[ `hY`cf][ ]bU`ghf`W`fY`UbX`#`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`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`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`dYf`Z`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`Z`f`W`ca`d`Y]b[ `UWXYa`]Wk`cf\_]`

#Uddfcdf]UHY`W]U]cb.`7`h]b[ `gci`fW`g`k`]W`U]j`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\_]b`k`c`Y`cf]b`dUf]z`k`YfY`]h`U`g`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 cffYW]fYZYfYbW]b[ `dfUW]W]g.

- DUfUd`fUg]b[ `zgi`a`a`Uf]g]b[ `zYggUmk`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`U]U]UV`Y`cb`fYei`Ygh`Z`ca`H`Y`@YUfb]b[ `7`YbhY`f`h`h`d`#`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`dcffU]bhdUfhcZ`gh`XmiUbX`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]Ybh]h]a`Y`Z`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`@G9`hc`U]U]UV`Y`hc`Ugg]ghmci`k`]h`mci`f`gh`XmiUhi`BGK`"9`@G9`]g`XYg][ `bYX`hc`]bhcfXi`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`



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- VY'Uk UfY'cZd'U[ ]Uf]ga ž'Wcdmf][ \hžI BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5WwdfUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wñ

5 WUXYa ]W**ϕ**Zcfa Uh]cb

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