



# HUMS1009

Gci bXg'; ccX. 'A i g]Mž'D`YUgi fY 'UbX'K Y`!VY]b[

Gi a a Yf' #'&\$&\$

7 ci fgY`Cj Yfj ]Yk

`GHJZ`7 cbhJWh`8YHJ`g`

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B Ua Y	9a Uj`	5j U]UV]]m	@cWjhcb	D\cbY
9a YfmGWXi VYfh	Y"gwXi VYfh i bgk "YXi "Ui			

GWXcc`7cbhJWh`bZcfa Uhjcb

Fcca " %&Z`Yj Y`` `F cVYfhK YVghYf`6i ]X]b[

7ci fgY'8YHJ]`g

7fYX]hDc]bHg`\*`

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

K \m]g'a i g]Wgc`Yb`entUV`Yz`UbX`jg`]hifYU`m[ ccX`Zcf`i g3`H\]g`W`ei fgY`UXXfYggYg`U`fUb[ Y`cZei Ygh]cbg  
W`bW`fbYX`k ]h`h`Y`d`YUgi fY`UbX`\YU`h`UgdY`Wg`cZa i g]W`C`h`Yf`ei Ygh]cbg`X]gW`ggYX`]bW`XY.`g`]h  
dcgg]Y`h`c`\UH`a i g]W`g`]h[ ccX`Zcf`mci f`VfU]b3`K \m]Wb`a i g]WVY`i gYX`h`fYUhgca Y`]`bYggYg`UbX  
fYXi W`Ubl ]Ym`B`7`Ub`]hVY`VUX`Zcf`mci 3`5`fUb[ Y`cZUddfcUW`Yg`UfY`W`bg]XYfYXz`Zca`a`Ugg`a`YX]U`UbX  
dYfgcbU`dYfgdY`W]j`Ygzh`fci [ \`h`c`d\]cgcd\]W`]bei ]fmz`UYgh`Yh]Vg`UbX`dgm`W`c`c[ m`H\Y`W`ei fgY`U]a`g`h`c  
W`U`Yb[ Y`ghi XYbHg`UbX`Z`fb]g\`h`Ya`k`]h`g`\_`g`]b`W`]h]W`mYj`U`i`Uh]b[ `j`Uf]ci`g`j`Yk`g`cb`\ck`a`i`g]W  
dfYz`fYbW`UbX`k`Y`VY]b[ `dfc[ fUa`g`Ya`Yf[ Ygzh`UbX`dfYgYbHg`fYW`bh`h`b\_]b[ `cb`h`Y`h`c`d]W`]Hi`h`c`f]U`g`Z`W`g  
cb`XYg[ ]b]b[ `UbX`Y`U`i`Uh]b[ `dfUW`]W`Udd`]W]h]cbg`cZa i g]W]b`\YU`h`UbX`Yb`h`fU]ba`YbHgY`h]b[ g`

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

%`7`f]h]W`mYj`U`i`UH`Uf[ i a`YbHg`UVci`h`h`Y`UW`ei ]g]h]cb`cZa i g]WdfYz`fYbW`g`UbX`\YU`h`fY`UH`X  
ci`hW`a`Yg`h`fci [ \`a`i`g]W]b`h`fj`Yb]h]cb`  
&`5`dd`miU`fUb[ Y`cZgW`c`Uf`ma`Y`h`c`Xg`k`Y`b`]bj`Ygh[ ]Uh]b[ `a`i`g]WUbX`h`Y`Uf`g`  
` `I`bXY`fU`\_`Y`Z`f`h`Y`f`YgYU`fW`cb`ei`Ygh]cbg`W`bW`fbYX`k`]h`a`i`g]W`W`c[ ]b]h]cb`UbX`k`Y`VY]b[ `

HYUW`X]b[ `G`h`f`UH`Y[ ]Yg`

H\Y`W`ei fgY`W`bg]g`g`cZ`Y`W`i`fYg`UbX`cb`]bY`Y`Ufb]b[ `UW]j`]h]Yg`@Y`W`i`fYg`YI`dcgY`h`Y`gh`XYb`h`c`U`j`Uf]Y`micZ  
k`Um`g`c`Zi`bXY`fg]h]bX]b[ `lck`UbX`k`l`mk`Y`XYj`Y`cd`a`i`g]W]`dfYz`fYbW`gzh`UbX`\ck`h`Y`mi`W`b`W`U`b[ Y`c]`Yf  
h]a`Y`5`j`Uf]Y`micZ`]g`h`c`f]W`]UbX`W`b`h`Y`a`d`c`f`U`f`m`h`Y`c`f]Yg`UbX`a`Y`h`c`Xg`Zcf`U`bgk`Y`f]b[ `gi`W`h`ei`Ygh]cbg`U`fY  
]bj`Ygh[ ]UH`X`D`fYz`fYbW`Z`Y`g`\_`Y`U`l][ \`mid`Y`fgcbU`d`Y`b`c`a`Y`b`c`b`Zcf`a`U`b`m`d`Y`c`d`Y`  
C`b`]bY`Y`Ufb]b[ `UW]j`]h]Yg`U`fY`XYg][ ]bYX`h`Y`b`W`ei`fU[ Y`XY`Y`d`YI`d`c`f`U`h]cb`c`Z`h`Y`g`Y`d`fYz`fYbW`g`UbX`h`c  
fY`W`b`W`Y`h`c`g`Y`k`]h`h`Y`c`f]Yg`d`fYg`Y`b`h`X`]b`Y`W`i`fYg`C`b`]bY`Y`Ufb]b[ `UW]j`]h]Yg`U`gc`U`ck`g`h`XY`b`h`c  
W`U`Y`b[ Y`UbX`Z`f`h`Y`f`Y`U`g`cb]b[ `Zcf`h`Y`U`W`ei ]g]h]cb`cZa i g]W]`h`U`gh`Yg`UbX`d`fYz`fYbW`g`

# 5ggYgga Ybh

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## 5ggYgga Ybh8YHU]`g

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8YHU]`g. `H\]g`Ugg][ ba YbhŸbg]ghg`cZUWŸj ]]Yg`UbX`k f]HŸb`k cf\_`cZUddfcI ]a UHŸ`m%\$\$\$`k cfXg`cb`hcd]WŸ  
fY`UHŸX`tc`a i g]Ÿd`YUgi fY`UbX`YbhŸfHU]ba Ybh`A Uf\_g`k ]`VY`bi a Yf]WŸ`žk ]h`k f]HŸb`ZYXVUW\_`dfcj ]XYX"

5ggYgga Ybh& .@YUfb]b[ `5WŸj ]]m&

GHUfhXUHŸ. `

8YHU]`g. `H\]g`Ugg][ ba YbhŸbg]ghg`cZUWŸj ]]Yg`UbX`k f]HŸb`k cf\_`cZUddfcI ]a UHŸ`m%\$\$\$`k cfXg`cb`hcd]WŸ  
fY`UHŸX`tc`a i g]Ÿd`YU`h`UbX`k Y`VY]b[ ""A Uf\_g`k ]`VY`bi a Yf]WŸ`žk ]h`k f]HŸb`ZYXVUW\_`dfcj ]XYX"

5ggYgga Ybh' .`HYgh

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8YHU]`g. `H\Y`HYghUggYggYg`YWŸ fY`ŸcbŸbhbchUggYggYX`]b`hY`E i ]n`H\Y`hŸghk ]`Ÿbg]ghcZa i `hd`Y  
Wc]WŸ`UbX`g`c`fh`Ubgk Yf`]HŸa g`": YYXVUW\_`k ]`Ÿbg]ghcZU`bi a Yf]WŸ`a Uf\_`"

5XX]h]cbU`XYHU]`g.

GYY`A ccXY`žcf`XYHU]`g"



F Ygci fWg

DfYgW]VYX`F Ygci fWg`

D`YUgY`gYY`A ccX`Y

F YWca a YbXYX`F Ygci fWg

D`YUgY`gYY`A ccX`Y

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

H\]g`]g`hY`Z]fgh]a Y`hY`Wci fgY`]g`fi bb]b[ "

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

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Ʒmci`YbWci`bhYf`U`dfcV`Ya`k`Yb`U`H`Ya`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]hb`z`d`YUgY`  
H`Y`d`l`cb`Y`9I`H`fb`U`Gi`ddcfh`cb`-`,`)`'`'`'`%`cf`Ya`U]`h`Ya`cb`YI`H`fb`U`H`h`gi`ddcfh`4`i`bgk`"YXi`"Ui`"Gi`ddcfh`  
`l`ci`fg`UfY`,`.\$\$Ua`-`%\$.\$\$da`cb`k`YY`XUmg`UbX`-`.\$\$Ua`-`).\$\$da`cb`k`YY`YbXg`fI`\*)`XUmg`U`m`Y`UfL`"Ʒmci`  
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`Xi`Y`hc`U`Z`U`h`k`]h`Hi`fb]hb`mci`a`Um`Udd`m`Z`f`Ub`YI`H`bg]cb`z`Vi`hmc`i`  
a`i`gh`f`Y`h]b`mci`f`h]W`Y`h`bi`a`VYf`Z`ca`9I`H`fb`U`Gi`ddcfh`f`U`cb[`k`]h`Ub`m`c`h`Y`f`f`Y`j`Ub`h`X`c`W`a`Y`b`h`g`L`hc`  
]b`W`i`X`Y`U`g`Y`j`]X`Y`b`W`hc`gi`ddcfh`mci`f`YI`H`bg]cb`Udd`]W`h]cb`"Ʒmci`Ya`U]`9I`H`fb`U`Gi`ddcfh`mci`k`]`  
Ui`h`ca`U`h]W`m`f`Y`W`]j`Y`U`h]W`Y`h`bi`a`VYf`z`Vi`h]Z`mci`H`Y`d`l`cb`Y`mci`k`]`b`Y`Y`X`hc`gd`Y`W`]W`m`U`g`\_`Z`f`cb`Y`  
Hi`fb]hb`U`gc`d`fcj`]X`Y`g`i`d`X`U`H`g`i`cb`h`Y`j`f`g`m`g`h`Ya`g`h`U`h`g`i`cb`H`k`]h`Y`f`"

;`Yb`Y`f`U`m`z`Ugg`Y`gga`Ybh`HUg\_g`a`i`gh`V`Y`gi`Va`]h`Y`X`Y`Y`W`f`cb]W`m`j`]U`Y`]h`Y`f`Hi`fb]hb`cf`U`A`cc`X`Y`  
Ugg][`ba`Ybh`h`h`b]bg`h`Ub`W`g`k`Y`f`Y`h`l`g`]g`b`ch`id`c`gg]V`Y`z`]h`k`]`V`Y`g`h`U`H`X`cb`mci`f`W`ci`fg`Y`g`A`cc`X`Y`g`]h`k`]h`  
U`h`f`b`U`h]j`Y`gi`Va`]gg]cb`X`Y`h]g`"

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

5 WUXYa ]W<c bYghmiUbX`D`U[ ]Uf]ga

D`U[ ]Uf]ga `]g`i g]b[ `h`Y`k cfXg`cf`]XYUg`cZch`Yfg`UbX`dfYgYbh]b[ `h`Ya `Ug`mci f`ck b" `h`WUb`hU`Y`a Ubm  
Zcfa gž`Zca `XY`]VYfU`h`W`Y`U`h]b[ `h`U`W`X`Y`b`U`m`W`d`m]b[ `Zca `U`gci f`W`k`h`ci h`U`W`b`ck `Y`X[ `Ya `Y`b`h`



- i bXYfgHUbX'mci f'f][ \hg'UbX'fYgdcbg]V] ]hYg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[ ]Uf]ga ž'Wc'dmf][ \hž' BGK 'Gh XYbh7cXY'cZ7cbXi WñUbX'5Ww'dhUV'Y'I gY'cZ  
I BGK '⇒H'F Ygci fW'g'Dc`]Wñ
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## 5 WUXYa ]W]bZcfa Uh]cb`

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- fYei Yghg`ZcfYI hYbg]cb/
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- I B GK `<YU`h`UbX`GUZY`midc`]WYg/
- YI Ua ]bUh]cb`dfcVWXi fYg/
- gdYW]U`Vc]bg]XYfUh]cb`]b`hY`Yj Ybhcz]`bYgg`cf`a ]gUXj Ybh fY/
- ghi XYbhYei ]hmUbX`X]gUV`]`]m/
- UbX`chYf`YggYbh]U`UWUXYa ]W]bZcfa Uh]cbz`gYY

[\h\]dg.#k k k "Ufng`i b\]gk "YXi "Ui #W ffYbh\]ghi XYbh\]bZcfa Uh\]cb`#dfchVc`g!\[ i \]XY`\]bYg#](#)

⇒ U[ Y`7 fYX]h

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