



# HUMS2007

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

HYfa `Cby`#`&\$&%

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

7ci fgY`Cj Yfj ]Yk

GHJZZ7cbHJW`i8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]m	@cW]h]cb	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]h]Yg`UbX`@Jb[ i U[ Yg

@cW]h]cb. `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`UWUXYa ]WfYgYUfW`YI dYf]YbW`cb`U`a U`c`f`dfc`YWh`YX`Vm  
I BGK `gW`c`Ufg`]b`5fg`/ `GcW`U`GW`YbW`g`"Mci `k ]`k`cf`\_`k ]h`U`YUX]b[ `gW`c`Ufz`W`a`d`YH`c`f][ ]bU`  
fYgYUfW`UbX`k`f]h`U`d`UdYf`UVci`h`mci`f`UfYU`c`ZfYgYUfW`"

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

%`9I`YW`h`Y`Ugg][ bYX`fYgYUfW`hUg\_g`]b`U`W`a`d`YH`b`h`z`dfc`Z`Y`gg]cbU`UbX`h`a`Y`ma`UbbYf  
&`7`f]h]W`m`fY`ZY`W`h`c`b`mci`f`fYgYUfW`hUg\_g`z`X`Ya`cbgfU`h]b[ `mci`f`i`bXYfghUbX]b[ `cZmci`f`fYgYUfW`  
dfc`YWh]b`][ \`hc`Z`gca`Y`fY`Yj`Ubh`]h`fU`h`fY`  
'`" `F`YZY`W`h`c`b`mci`f`YI`dYf]YbW`c`Z`k`cf\_]b[ `cb`U`fYgYUfW`dfc`YWh`

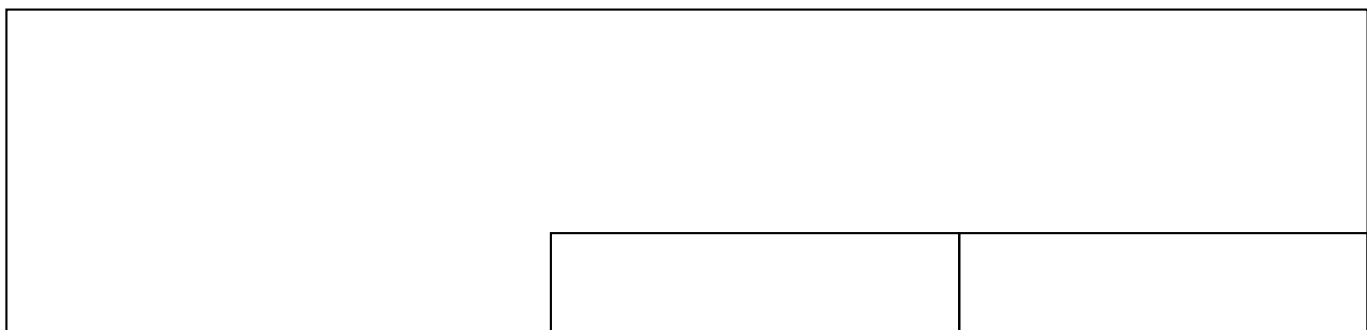
HYUW`X]b[ `G`h`f`U`h`[ ]Yg`

H\]g`W`U`gg`k`j`"W`]Y`Z`m`V`Y`h`U`i`[ \`h`h`f`ci`[ \`cb`Y!`cb!`cb`Y`c`f`ga`U`" [ fci`d`a`Y`Y`h]b[ `g`k`]h`mci`f`fYgYUfW`  
gi`d`Yf`]`g`c`f`"

Mci`f`gi`d`Yf`]`g`c`f`k`j`" [ ]`j`Y`mci`U`W`c`Y`f`Y`bh`ga`U`!`g`W`U`Y`d`f`c`Y`Wh`h`c`k`cf`\_`cb`" `h`a`Um]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`YI`Ua`d`Y`z`mci`a`Um`Y`d`h`c`f`Y`g`Y`U`f`W`U`V`cc`\_`c`f`c`i`f`b`U`  
U`f]h]W`Y`Z`c`f`h`Ya`z`X`c`g`W`c`d]b[ `fYgYUfW`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`YI`U`b`X`U`b`U`m`g`Y`  
d`f]a`U`f`m`f`Y`g`ci`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`ma`Y`Y`h]b[ `g`z`mci`f`gi`d`Yf`]`g`c`f`k`j`"gi`[ [ `Y`gh`f`Y`U`X]b[ `g`z`c`f`mci`h`c`X`c`z`X]g`W`g`g`mci`f`  
dfc`[ `f`Y`g`g`z`h`U`\_`h`c`mci`U`V`ci`h`mci`f`Y`j`c`j`]b[ `i`b`X`Y`f`g`h`U`b`X]b[ `c`Z`h`Y`f`Y`g`ci`f`W`g`mci`U`j`Y`V`Y`Y`b`]b`g`f`i`W`Y`X`h`c`  
k`cf`\_`cb`U`b`X`Y`d`mci`d`U`b`c`k`h`c`a`c`j`Y`h`Y`d`f`c`Y`Wh`Z`c`f`k`U`f`X`"5`Z`h`f`Y`U`W`a`Y`Y`h]b[ `z`mci`g`l`ci`X`g`Y`b`X`U`  
Z`c`k`i`d`Y`!`a`U`]`W`c`b`Z`f`a`]b[ `mci`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[ `mci`f`d`f`c`[ `f`Y`g`g`"H`Y`g`Y`  
W`c`a`a`i`b]W`h]c`b`g`k`j`"d`f`c`j`]X`Y`]a`d`c`f`h`U`b`h`Y`j`]X`Y`b`W`Z`c`f`mci`f`d`c`f`h`Z`]c`"

Mci`f`a`U`c`f`k`f]h]b[ `hUg\_g`U`fY`U`fYgYUfW`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]c`b`g`c`b`mci`f`  
fYgYUfW`YI`dYf]YbW`UbX`U`fYgYUfW`fYd`c`f`h`h`U`h`X`Y`a`cbgfU`h`Y`g`mci`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`cf`\_]b`h`Y`U`fY`U`c`Z`mci`f`fYgYUfW`"



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`dYfZcfa UbW`U[ U]bghdfcj ]XYX`W`]Hf]U" `K f]Hb`ZYXVUW`z  
fi 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\Yf]U`Zcf  
Z`h`fY`<I 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< cbYghmiUbX'D`U[ ]Uf]ga

D`U[ ]Uf]ga ]g'i]b[ 'hY'k cfXg'cf]XYUg'cZcH.Yfg'UbX'dfYgYbh]b[ 'hYa 'Ug'mci f'ck b" #WUb'fU\_Y'a Ubm  
Z'ca gZ'Zca 'XY'VYfUHY'WX.YU]b[ 'hc'UW]XYbhU'mWcdm]b[ 'Zca '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] [ cf]Yg.

7 cdm]b[ .i]g]b[ 'hY'gUa Y'cf'j Yfmg]a ]Uf'k cfXg'hc'hY'cf][ ]bU'hYi hcf'XYU'k ]h'ci hUW\_bck 'YX[ ]b[ 'hY'  
gci fW'cf'i]g]b[ 'ei chU]cb'a Uf\_g" 'H\]g'U'gc'Udd'Yg'hc ]a U[ YgZ'UfhUbX'XYg][ b'dfc YWgZ'Ug'k Y''Ug  
dfYgYbhU]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch.Yf'g]XYUg'cf'k cfXg'k ]h'ci hWYX]h'

#Uddfcdf]UHY'dUfUd\UfUg]b[ .7\Ub[ ]b[ 'U'Zk'k cfXg'UbX'd\UfUg'k \]Y'a cghmfYU]b]b[ 'hY'cf][ ]bU'  
ghf' W'fY'UbX#f'dfc[ fYgg]cb'cZ]XYUg'cZcH.Y'cf][ ]bU'z'UbX']bZ'ca U]cb'k ]h'ci hUW\_bck 'YX[ Ya Ybh'H\]g'U'gc  
Udd'Yg]b'dfYgYbhU]cbg'k \YfY'gca YcbY'dUfUd\UfUg'g'Ubch.Yf'g]XYUg'cf'k cfXg'k ]h'ci hWYX]h'UbX'hc  
d]YW]b[ 'hc[ Y'hYf'ei chYg'UbX'dUfUd\UfUg'g]bhc'U'bYk'k \c'Yz'k ]h'ci hUddfcdf]UHY'fYZYfYbW]b[ "

7 c`i]g]cb.k cf\_]b[ 'k ]h'c'hYfg'Vi hdUgg]b[ 'cZcH.Y'k cf\_'Ug'U'dYfgcb'g']bX]j ]Xi U'k cf\_"7 c`i]g]cb'U'gc  
]bWi XYg'dfcj ]X]b[ 'mci f'k cf\_'hc'Ubch.Yf'g]h'XYbhVYZ'fY'hY'Xi Y'XUHY'z'cf'Z'f'hY'di fdcgY'cZcH.Ya  
d`U[ ]Uf]g]b[ 'UhUbmi]a Yz'dUm]b[ 'Ubch.Yf'dYfgcb'hc'dYfZ'ca 'Ub'UWXYa ]W]Ug\_z'gh'U']b[ 'cf'UW'ei ]f]b[  
Ubch.Yf'dYfgcb'g'UWXYa ]Wk cf\_'UbX'Wcdm]b[ ]h'cZ'Z]f]b[ 'hc'W'ca d'YHY'Ubch.Yf'dYfgcb'g'k cf\_'cf'gYY\_]b[  
dUma YbhZ'f'W'ca d'Y]b[ 'UWXYa ]Wk cf\_"

#Uddfcdf]UHY'W]U]cb.7 ]h]b[ 'gci fW'g'k \]W\Uj Y'bhVYYb'fYUXz'k ]h'ci hUW\_bck 'YX[ ]b[ 'hY''gYW'cbXUfm'  
gci fW'Z'ca 'k \]W'\_bck 'YX[ Y'cZcH.Ya '\Ug'VYYb'c'fU]bYX"

8 i d']W]cb'f'fY'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'j'h\Ug'dfYj ]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\UfUg]b[ žgi a a Uf]g]b[ žYggUmk f]h]b[ 'UbX'h]a Y'a UbU[ Ya Ybh
- 5ddfcdf]UHY'i gY'cZUbX'Uhf]Vi h]cb'Z'f'U'fU]b[ Y'cZa UHYf]U'g']bWi X]b[ 'hYi hz]a U[ YgZ'Z'ca i 'UY'UbX  
W'cbW'dtg"

#X]j ]Xi U'Ugg]ghU]bW' ]g'Uj U]UV'Y'cb'fYei YghZ'ca 'H\Y'@YUfb]b[ '7YbhY'f'f'hd.#k k k "Wi bgk "YXi "Ui #"  
Gh XYbhg'UfY'U'gc'fYa ]bXYX'hUhW]fYz' ]h]a Y'a UbU[ Ya Ybh]g'Ub ]a dcfU]bhdUfhcZgh XmiUbX'cbY'cZcH.Y  
]XYbh]ZYX'W]i gYg'cZd`U[ ]Uf]ga ]g'dccf'h]a Y'a UbU[ Ya Ybh'Gh XYbhg'g'lc'i 'X'U'ck'gi Z]W]Ybh]h]a Y'Z'f  
fYgYUfW'z'XfU]b[ 'UbX'dfcdYf'fYZYfYbW]b[ 'cZgci fW'g']b'dfYdUf]b[ 'U''UggYgga Ybh]h]a g"

I BGK '@]VfUfmU'gc'\Ug'hY'9@G9'hc'Uj U]UV'Y'hc'Ugg]ghmci 'k ]h'mci f'gh XmiUhi BGK "'9@G9']g  
XYg][ bYX'hc ]bhcXi W'bYk'gh XYbhg'hc'gh X]b[ 'Uhi BGK 'Vi h]hW]b'U'gc'VY'U'[ fYUhfYZYg\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'5W'WdhUV'Y'I gY'cZ I BGK '⇒H'F Ygci f'W'g'Dc`]W'h
- VY'Uk UfY'cZ'Y'ghUbxUfXg'cZVY\Uj ]ci f'YI dY'W'X'cZYj Yfmcby']b'h'Y'I BGK 'W'a a i b]m
- 'cW'W'h'gYfj ]W'g'UbX'j]bZcfa U]cb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZ'Y'gY'UfY'Ug'k ]''VY'ZJa ]]Uf'hc'mci ž'c'h'Y'fg'k ]''VY'bYk "'; U]b]b[ 'U'gc`]X'i bXYfghUbx]b[ 'cZU''h'Y fY'U'Y'X'UgdY'W'g'cZ9@G9'k ]''\Y'd'mci 'a U\_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK ""

[\h'hd.##gi V'Y'W'f'i \]X'Y'g"'\]VfUfm'i bgk "Y'X'i "U'i #' \]g'Y'#J'V'ci h' \]g'Y](#)

## 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"