



## ARTS3090

A YX]Už'7i`h`fY`UbX`HYVWbc`c[ m7 Udghc`bY. `A YX]U  
7i`h`fYg

HYfa`Hk`c`#`&\$%-



GWcc`cZH`Y`5ftg`UbX`A`YX]U`#`I`BGK`..5ftg`UbX`GcWU`..GWYbWg

7ci fgY`Cj Yfj ]Yk

`GHUZZ7cbhUWhi8YHU]`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]]m	@cWWhcb	D\cbY
F cXbYmK U`]g	f`k U`]g4 i bgk "YXi "Ui			

GWXcc`7cbhUWhi`bZcfa Uh]cb

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

D\cbY. f\$&L`- ' , ) `( , ) \*

9a U]: [gUa 4 i bgk "YXi "Ui](#)

K YVg]hY: [\hdg.#gUa "Ufhg"i bgk "YXi "Ui](#)

7 ci fgY'8YHJ]`g

7 fYX]hDc]bHg`\*`

Gi a a UfmicZhY'7 ci fgY

Gi VYWh5fYU. ? WWS[St 5g fgdWS` V FWUZ` a`aYk

H\]g`Wci fgY`YI Ua ]bYg`hY`Wca d`YI`fY`Uhc]bg`VYk`YYb`hY`a`YX]Uz`gcWYmz`dc`]h]Wg`UbX`W`h`fYz`YI`d`cf]b[  
hY`X]j`YfgY`k`Umg`]b`k` \]Wk`hY`a`YX]U`]bZi`YbW`UbX`UfY`]bZi`YbW`X`VmXYj`Y`cda`YbHg`]b`gcW]U`UbX`dc`]h]W`  
W`h`fY`"H\Y`A`YX]U`7`Udghc]bY`k`]`UXXfYgg`hc]d]W]`]ggi`Yg`fY`U]b[`]`hc`a`YX]Uz`hY`Wk`bc`c[`m]UbX`W`h`fY`"h`k`]`  
i`gY`fY`W`bhXYj`Y`cda`YbHg`UbX`W`ffY`bhW]UgY`gh`X]Yg`XfUk`b`Zca`U`j`Uf]Y`hmcZgc]fW`g`gi`Wk`Ug`bYk`g`UbX`  
YbH`fU]ba`YbH`ZYV`U]Y`g`cb`gcW]U`a`YX]U`UbX`bYk`]bZca`U]h]cb`hY`Wk`bc`c[`]Ygza`YX]U`W]a`dU]`bgz`UbX`  
dc]d`Uf`W`h`fY`hc`YI`Ua`]bY`hY`Vfc]UXf`gcW]c]dc`]h]W]`WcbH]i`h]b`k` \]Wk`hY`a`YX]U`UfY`c`W]hY`X`"i`g]b[`\_Ym`  
hY`cf]Yg`UbX`WcbW`dhg]h]g`Wci`fgY`k`]`YI`d`cfY`U`fUb[`Y`cZfY`Yj`Ubh]ggi`Yg`h`UhXYa`cbgfU]Y`hY`W`bHfU`]m`  
cZ`hY`a`YX]U`hc`WcbH]a`dc]UfmW`h`fY`"

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

- %`8`Ya`cbgfU]Y`Ub`i`bXYfg]UbX]b[`cZ`W`h`fU`z`Y`Wcbca`]W]UbX`dc`]h]W]`XmbUa`]Mg`Uf]g]b[`Zca`fY`Uhc]bg`  
VYk`YYb`a`YX]U`UbX`W`h`fY`
- &`8`]gd`Um]hY`UV`]m]hc`W]h]W]m]b]j`Ygh[`U]Y`hY`]a`d`]W]h]cbg`cZ`hY`gY`fY`Uhc]bg`]dg`cb`dc]d`i`Uhc]bgz`  
hY`gY`Z`UbX`U`fUb[`Y`cZa`YX]U`]bgh]h`h]cbg`
- '`" `8`Ya`cbgfU]Y`g\_]`g`]b`UbU`m]Wk`f]h]b[`UbX`hY`f][`cfci`g`Udd`]W]h]cb`cZ`hY`cfY]h]W]`WcbW`dhg`hc`  
Yj`Yfm]Um]YI`Ua`d`Yg`cZ`W`h`fU`UbX`a`YX]U`j`U`i`Y`
- (`G`vck`Ub`UV`]m]hc`h]b\_]`bXYdYbXYbhmz`W]h]W]m]UbX`W]YU]h]j`Y`m]UVci`hj`U`i`Y`Zca`U]h]cbg`fYgi`h]b[`  
Zca`hY`fY`Uhc]b`VYk`YYb`a`YX]U`UbX`W`h`fY`
- )`" `8`Ya`cbgfU]Y`Ub`UV`]m]hc`XYj`Y`cd`fYgYUfWk`W]dUW]h]Yg`]b`U`a`YX]U`UfY`U`cZgdYW]Z]W]bH]fYgh`

HYUWk]b[`G]hFU]Y[`]Yg`

H\]g`]g`hY`"Yj`Y`" `A`YX]U`7`Udghc]bY`Wci`fgY`"h`Vi`]Xg`cb`g\_]`g`XYj`Y`cdYX`UbX`\_bck`YX`[`Y`[`U]bYX`]b`Yj`Y`g`%`  
UbX`&`Wci`fgYgz`UbX`U`ck`g`gh`XYbHg`hc`XYj`Y`cd`g\_]`g`]b` \][` \Yf`cfYf`UbU`mg]g`UbX`gY`Z]X]fY`W]Y`X`Y`Ufb]b[`"  
H\Y`Wci`fgY`]g`XY`]j`YfYX`]j`]U`U`Y`VW]i`fY`UbX`U`gYa`]bUfY`UWk`k`YY`\_"G`Ya`]bUfg`k`]`VY`cdYb`hc`X]U`c[`i`Y`UbX`  
X]g]W`gg]cbz`k`]h`hY`U]a`cZ]Y`d`cf]b[`hY`fYUX]b[`g`UbX`fY`U]hY`X`W]UgY`gh`X]Yg`UbX`ei`Ygh]cbg`]b`U`  
Wc`UVcfU]h]j`Y`UbX`f][`cfci`g`k`Um`

H\Y`Wci`fgY`]g`bch]UVci`h]fchY`Y`Ufb]b[`z`Vi`h]fU]hY`f]b]j`c`]Yg`UW]h]j`Y`m]h]b\_]b[`U]Vci`h]UbX`Yb[`U[`]b[`k`]h`U`  
bi`a`VYf`cZ`\_Ym]ggi`Ygz`XYj`Y`cda`YbHg]z`WcbW`dhg]z`dYfgdYW]h]j`Ygz`hY`cf]Yg`UbX`XYV`U]h]g`"5`g`h]g`]g`U`  
7`Udghc]bY`Wci`fgYz`gh`XYbHg`UfY`YI`dY`W]Y`X`hc`XYa`cbgfU]Y`U`g]h]cb[`[`fUgd`cZa`YX]U`]ggi`Ygz`WcbH]i`hgz`  
hY`cf]Yg`UbX`Y`h]W]g`k` \]Wk` \]Uj`Y`VY`Yb` \cbYX`h]fci`[` \`dfYj`]ci`g`Wci`fgYk`cf`\_"G`h`XYbHg`UfY`YI`dY`W]Y`X`hc`h]U`\_Y`  
WcbH]c`cZ`hY`f`ck`b`Y`Ufb]b[`z`fU]hY`f`h]Ub`dUgg]j`Y`mk`U]h]b[`Zca`]bZca`U]h]cb`hc`VY`XY`]j`YfYX`"H\]g`k`]`Ugg]gh`  
]b`hY`f`fUbg]h]cb`]b]hc`hY`k`cf`Zca`fW`"

5`"gh`XYbHg`UfY`YI`dY`W]Y`X`hc`Wca`Y`hc`YUWk`gYa`]bUf`k`Y`"dfYdUfYX`k`]h`bch]g`cb`hY`fYUX]b[`g`UbX`Zca`  
hY`Y`W]i`fYgz`Ug`k`Y`"Ug`Ub]m]XYUg`cf`]ggi`Yg`hY`mik`Ub]hc`di`f]gi`Y`"H\Y`fYUX]b[`g`UfY`]bH]bXYX`hc`VY`h]ci`[`\h`  
dfcj`c\_]b[`UbX`gh`XYbHg`k`]`bY`YX`hc`XYj`ch`U`h`Y`Ugh`(!)`\`ci`fg`dYf`k`YY`\_`hc`dfYdUfU]h]cb`"H\Y`Wci`fgY`]g`  
U]a`YX`UhVi`]X]b[`dfcXi`W]h]j`Y`UbX`]j`Y`m]Wca`a`i`b]h]Yg`cZ]bei`]fm`

5ggYgga Ybh

5ggYgga YbhHUg\_g`

5ggYgga YbhHUg_	K Y][ \h	8i Y'8UH	Gh XYbh@YUfb]b[ Ci hWta Yg'5ggYggYX
Dcfhzc`jc`	' )l	% # \$ + # & \$ % - ' \$ * . \$ \$ ' DA	%z&z
7`Ugg`DfYgYbhUH]cb`	%)l	@Ughh hcf]U`	%z&z ž(
9ggUm	) \$l	%( # \$ , # & \$ % - ' % % \$ \$ ' DA	%z&z ž( ž)

5ggYgga Ybh8YHU]`g

5ggYgga Ybh%`Dcfhzc`jc`

GHUfhXUH. `Bch5dd]WVY

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

8YHU]`g. `%) \$\$`k cfXg. `Gh XYbhg`k ]`gi Va ]h` `Ybh]Ygž`Uddfc] ]a UH`m) \$\$`k cfXg`YUWX`YbhfmyI Wl X]b[  
fYZfYbWg" `5`a Uf\_]b[ `g\YYhk ]h`k f]hYb`Vta a Ybhg`UbX`a Uf\_]k ]`VY`dfcj ]XYX`j ]U`Hi fb]h`b"

5ggYgga Ybh&. `7`Ugg`DfYgYbhUH]cb`

GHUfhXUH. `Bch5dd]WVY

8YHU]`g. `Gh XYbhg`k ]`a U\_Y`]bX]j ]Xi U`dfYgYbhUH]cbg`cZUVci h%\$`a ]bi Hg`YUWX`cb`hY]f`hd]WZcf`hY  
9ggUm`H\]g`k ]`cVWV`f`]b`U`h`hcf]U`WUgg`hck`UfXg`hY`YbX`cZ`hY`gYa`YghYf`H\]g`hUg`\_]g`WcgY`migWUZZ`XYX  
h`hY`9ggUmUbX`YbVci`fU[`Yg`gh`XYbhg`h`di`hZcfk`UfX`Ub`Uf[`i`a`Ybh]b`j`YfVU`Zcfa`"5`a`Uf\_]b[`g\YYhk`]h  
U]g`Yb]h`g`Za`U]g`Y]f`fYgYbhUH]cbg`c`Ugg`h`hY]Zc`g`Z`Yh`cZ`hY`g`UWX`b[`gYf"



F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

- F Yei ]fYX`F YUX]b[ g

F YWca a YbXYX`F Ygci fWg

BchiUj U]UV`Y

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Hi fb]hb`Gi Va ]gg]cb

≠mci`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]`hbzd`YUgY`  
H`Y`d`l`cb`Y`9I`H`f`b`U`Gi`ddcfh`cb`-`,`)``%`cf`Ya`U]`h`Ya`cb`YI`H`f`b`U`H`f`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`f`l`\*)`XUmg`U`m`Y`Uf`l`"≠mci`  
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`f`bg]`cb`Z`Vi`hmc`i`  
a`i`gh`f`Y`h]`b`mci`f`h]`W`Y`h`bi`a`VY`f`Z`ca`9I`H`f`b`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`f`bg]`cb`Udd`]W`h]`cb"≠mci`Ya`U]`9I`H`f`b`U`Gi`ddcfh`mci`k`j`  
Ui`h`ca`U`h]`W`m`f`Y`W`j`Y`U`h]`W`Y`h`bi`a`VY`f`Z`Vi`h]Z`mci`H`Y`d`l`cb`Y`mci`k`j`b`Y`Y`X`hc`gd`Y`W`Z`W`m`Ug`\_`Z`f`cb`Y`  
Hi`fb]`hb`U`gc`d`fc`j`]X`Y`g`i`d`X`U`H`Y`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`Y`bh`h`U`g`\_`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`Y`bh`h`h`]`bg`h`U`b`W`g`k`Y`f`Y`h`l`g`]g`b`ch`id`c`gg]`V`Y`Z`]h`k`j`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`f`b`U`h]`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`Y`bh`g`cb`]b`Y`j`]U`A`cc`X`Y`.\`h`td`g`#`gh`X`Y`bh`i`bgk`"YXi`"Ui`#`ack`!  
gi`Va`]h`Ugg][`ba`Y`bh`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" `hWUb`hU`Y`a Ubm  
Zcfa gZ`Zca `XY`]VYfUHy`WXYUh]b[ `hc`UWV]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`h`Y`Zc`ck ]b[ `WUHy[ cf]Yg.

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

hUddfcdf]UHy`dUfUd`fUg]b[ .`7`U`b[ ]b[ `U`ZYk`k`cfXg`UbX`d`fUgYg`k`\]Y`a`cghmiFYhU]b]b[ `h`Y`cf][ ]bU`  
g]fi`W`fY`UbX`#`f`dfc[ fYgg]cb`cZ]XYUg`cZ`h`Y`cf][ ]bU`Z`UbX`]bZcfa`U]cb`k`]h`ci hUW\_bck`YX[ Ya Ybh`H\]g`U`gc  
Udd`]Yg`]b`dfYgYbhU]cbg`k`YfY`gca YcbY`dUfUd`fUgYg`Ubch`Yf`g`]XYUg`cf`k`cfXg`k`]h`ci hWYX]hU`bX`hc`





