



# ARTS3122

Dfc [ fUa 'UbX'F YdYfrc]fY. 'H\YUhfYž'DYfZcfa UbW'UbX  
8 UbW

HYfa 'H\fYY'##'&\$%-

GWXcc``cZHAY'5ftg'UbX'A YXJU``# 'I BGK ``5ftg'UbX'GcWU``GWYbWg

7ci fgY`Cj Yfj JYk






bj Yg[ UHY`hY`Z]Y`X`cZ5i ghfU]Ub`hYUhfY`zdYfZcfa UbVW`UbX#cf`XUbVW`UbX`hY`gcW]U`z`Yh.]WU`UbX`W`h`fU`  
UgdYVW`g`cZdfcXi W]cb`UbX`V`cbgi a`d]cb

hY`f`Y`h`h`Y`h`Y`U`f`]WU`d`f`U`W`g`z`g`m`Y`g`UbX`V`cbj`Y`b`h`c`b`g`c`Z`5`i`g`h`f`U`]U`b`h`Y`U`h`f`Y`z`d`Y`f`Z`c`f`a`U`b`V`W`U`b`X`#`c`f`X`U`b`V`W`  
h`c`X`Y`j`]g`Y`U`f`h`g`h`W`Z`U`a`Y`k`c`f`\_`g`Z`c`f`d`f`c`[`f`U`a`a`]b`[

(

5dd`m`ig`\_]`g`]b`f`Y`g`Y`U`f`W`U`b`X`W`f`U`h`c`b`h`c`d`f`Y`g`Y`b`h`c`f`[`]b`U`]X`Y`U`g`Z`c`f`d`f`c`[`f`U`a`a`]b`[`]b`d`f`Y`g`Y`b`h`c`b`g`U`b`X`  
k`f`]h`b`[

Hi`fb`]h`b`g`Y`h`b`[`.H\]g`U`gg`[`ba`Y`b`h`g`]g`i`Va`]h`X`h`f`c`i`[\`h`i`fb`]h`b`U`b`X`g`h`X`Y`b`h`g`X`c`b`c`h`g`Y`Y`h`i`fb`]h`b`  
g`]a`]U`f`]m`f`Y`d`c`f`g`"

5gg`Y`g`g`a`Y`b`h`&.`7`i`f`U`h`c`f`U`#`d`f`c`[`f`U`a`a`]b`[`d`f`c`Y`W`h`d`f`Y`g`Y`b`h`c`b`

G`h`U`f`h`X`U`h`Y`.`B`c`h`5`d`d`]W`U`V`Y`

@`Y`b`[`h`.`%`\$`a`]b`

8`Y`h`U`]g`.`8`Y`j`Y`c`d`U`b`X`X`Y`]j`Y`f`U`%`\$`a`]b`i`h`Y`[`f`c`i`d`d`f`Y`g`Y`b`h`c`b`c`Z`h`Y`W`f`U`h`c`f`]U`#`d`f`c`[`f`U`a`a`]b`[`d`f`c`Y`W`h`]b`  
[`f`c`i`d`g`c`Z`(!`\*`g`h`X`Y`b`h`g`X`i`f`]b`[`W`U`g`g`h`a`Y`z`i`g`]b`[`]j`]g`i`U`d`f`c`Y`W`h`c`b`g`f`Y`["`D`c`k`Y`f`d`c`]b`h`g`]X`Y`g`k`k`\\]W`U`f`Y`  
g`i`V`a`]h`X`U`h`h`Y`Y`b`X`c`Z`W`U`g`g`"H\]g`]g`h`Y`Z`]b`U`U`g`g`Y`g`g`a`Y`b`h`U`g`\_`Z`c`f`U`h`Y`b`X`U`b`W`d`i`f`d`c`g`Y`g`"G`h`i`X`Y`b`h`g`k`]`  
f`Y`W`]j`Y`U`f`i`V`f`]W`]b`X`]W`]h`b`[`Y`j`Y`c`Z`d`Y`f`Z`c`f`a`U`b`V`W`U`[`U`]b`g`h`Y`U`W`X`U`g`g`Y`g`g`a`Y`b`h`W`]h`f`]U`z`k`f`]h`Y`b`g`i`a`a`U`h`j`Y`  
Z`Y`X`V`U`W`Z`U`b`X`d`Y`f`W`b`h`U`[`Y`a`U`f`\_`"

5`X`X`]h`c`b`U`X`Y`h`U`]g`.

8`Y`j`Y`c`d`U`b`X`X`Y`]j`Y`f`U`%`\$`a`]b`i`h`Y`[`f`c`i`d`d`f`Y`g`Y`b`h`c`b`c`Z`h`Y`W`f`U`h`c`f`]U`#`d`f`c`[`f`U`a`a`]b`[`d`f`c`Y`W`h`]b`[`f`c`i`d`g`c`Z`  
(!`\*`g`h`X`Y`b`h`g`X`i`f`]b`[`W`U`g`g`h`a`Y`z`i`g`]b`[`]j`]g`i`U`d`f`c`Y`W`h`c`b`g`f`Y`["`D`c`k`Y`f`d`c`]b`h`g`]X`Y`g`k`k`\\]W`U`f`Y`g`i`V`a`]h`X`U`h`  
h`Y`Y`b`X`c`Z`W`U`g`g`"

D`Y`U`g`Y`W`c`j`Y`f`.

- W`c`b`W`d`h`c`f`d`f`c`Y`W`h`h`Y`a`Y`#`\_`Y`m`]X`Y`U`
- V`U`W`\_`[`f`c`i`b`X`g`h`U`h`Y`a`Y`b`h`Y`I`d`U`]b`b`[`h`Y`]X`Y`U`U`b`X`h`Y`Y`h`]W`U`z`g`c`W`U`U`b`X`d`c`]h`W`U`]g`g`i`Y`g`]h`f`U`]g`Y`g`
- d`f`c`d`c`g`Y`X`U`f`h`g`h`g`U`b`X`U`f`h`k`c`f`\_`g`f`U`f`c`i`b`X`%`\$`/`h`U`h`]g`!`%`&`k`
- X`]g`W`g`g`]c`b`c`Z`j`Y`b`i`Y`z`g`]h`Y`U`b`X`h`U`f`[`Y`h`U`i`X`]Y`b`W`"
- ]g`h`c`Z`f`Y`Z`f`Y`b`W`g`

h`h`]g`d`f`Y`g`Y`b`h`c`b`m`c`i`U`f`Y`Y`I`d`Y`W`h`X`h`c`X`Y`a`c`b`g`h`U`h`Y`.

- U`W`Y`U`f`m`U`f`h`W`U`h`Y`X`j`]g`]c`b`Z`c`f`k`U`h`m`c`i`f`g`Y`U`g`c`b`#`Z`Y`g`h`j`U`d`U`b`g`h`c`U`W`X`]Y`j`Y`z`U`b`X`h`Y`U`i`X`]Y`b`W`]h`]g`  
U`]a`Y`X`U`h`



UggYgga YbhWf]hYf]Užk f]hYb`Zcfa Uhj Y`ZYXVUWžUbX`dYfWbHJ[ Y`a Uf`"

5XX]h]cbU`XYHJ]g.

⊕`fYgdcbgY`hc`hY`fYj ]g]cb`cZ\_Ym]ggi YgžWčbWdHg`UbX`hYa Yg`UWfcgg`hY`H\YUhfY`UbX`DYfZcfa UbWV  
Gh X]Yg`UbX`8 UbWV`A U`c fgžk f]hY`U`&ž) \$\$`k`c fX`YggUmYI d`c f]b[ ` \ck`fYgYUfWYfYg`UfY`fYgdcbX]b[ `hc  
Ufh]gh]W]bbcj Uh]cbg`]b`hY`Z]Y`XžUbX`Včbf]Vi h]b[ `bYk` ]XYUg`hc`Ufh]gh]WdfUWf]WV"

: 998657? .`F i Vf]W]bX]W]h]b[ ``Yj Y`cZdYfZcfa UbWV`U[ U]bghYUWV`UggYgga YbhWf]hYf]Užk f]hYb`Zcfa Uhj Y`  
ZYXVUWžUbX`dYfWbHJ[ Y`[ fUXY"

5ggYgga Ybh7f]hYf]U.

%`7cbhYbh`-mci f`Ufh]W`Uh]cb`cZ`hY`]ggi YžWčbWdHicf`hYa Y`mci`UfY`ZcW`g]b[ `cb  
&`7f]h]WV`UddfcUWV`-`UbU`mg]g`cZ`UbX`Wf]h]WV`Yb[ U[ Ya Ybhk ]hž`hY`\_YmihYI hg`mci`UfY`XfUk ]b[ `Zca  
'`" Gfi Vh`fY`-`cf[ Ub]gUh]cb`cZ`mci f`YggUm]b`U`WYUf`UbX`c[ ]WV`k Um  
(`GmiY`-`Zi Ybhž`WYUf`UbX`VčbW]gY`k f]h]b[

@YUfb]b[ `Ci`hWča Yg`5XXfYggYX

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⊕j Ygh[ UH`hY`Z]Y`X`cZ5i ghU]Ub`hYUhfYž`dYfZcfa UbWV`UbX`#cf`XUbWV`UbX`hY`gcW]Už`Yh]WV`UbX`W`h`fU`  
UgdYWg`cZdfcXi W]cb`UbX`Včbgi a dh]cb

&

5bU`mgY`g][ b]Z]W]bhk cf\_g`cZ`hYUhfYž`dYfZcfa UbWV`UbX`#cf`XUbWV`]b`fY`Uh]cb`hc`gWVc`Uf`mfYgYUfWV`UbX`  
Ufh]gh]WdfUWf]WV

(

5dd`mg\_]`g`]b`fYgYUfWV`UbX`W`fU]cb`hc`dfYgYbhicf][ ]bU`]XYUg`Zc`dfc[ fUa a ]b[ `]b`dfYgYbH]cbg`UbX`  
k f]h]b[

Hi fb]h]b`gYh]b[ .`H\]g`Ugg][ ba Ybh]g`gi Va ]hYX`h`fci [ \`Hi fb]h]b`UbX`gh`XYbh]Xc`bchgYY`Hi fb]h]b`  
g]a ]Uf]hmifYdcf]g"




F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

F YWca a YbXYX`F Ygci fWg

9I dYWX`fYgci fWg`Zcf`hY`Wci fgY`UFY`Uj U]UV`Y`hfcI [ \`@Y[ Ubhc`cb`hY`Wci fgY`A ccX`Yž`hY`I BGK  
`]VfUfmUbX`W`h`fU`]bgh`h`h`cbg"

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

DYf]cX]W`mghi XYbhYj U`i Uh] Y`ZYXVUW`cb`hY`Wci fgY`]g`[ U`hYfYXž`i`g]b[ `Ua cb[ `chYf`a YUbgž`I BGK f]g  
Gh XYbhGi fj YmidfcWgg" Gh XYbhZYXVUW`]g`hU`Yb`gYf]ci g`mž`UbX`Wc`bh]bi U`]a dfcj Ya Ybhg`UFY`a UXY`hc  
hY`Wci fgY`VUgYX`]b`dUfhcb`gi W`ZYXVUW`"G][ b]Z]WbhW]Ub[ Yg`hc`hY`Wci fgY`k`]"`VY`Wca a i b]W]hYX`hc  
gi VgYei YbhWc`cfhg`cZgh XYbhg`hU`]b[ `hY`Wci fgY`"

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

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

≠mci`YbWci bHYf`U`dfcV`Ya`k`Yb`U`HYa`dh]b[`hc`gi`Va`]hmc`i`f`Ugg][`ba`Ybh`h`fci`[`\`Hi`fb]h]b`z`d`YUgY`  
HY`Yd`cbY`9I`HYfbU`Gi`ddcfhcb`-`,`)`''`'`%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`fI`\*)`XUmg`U`mY`UfL`≠mci`  
UfY`i`bUV`Y`hc`gi`Va`]hmc`i`f`Ugg][`ba`YbhXi`Y`hc`U`ZU`hik`]h`Hi`fb]h]b`mci`a`Um`Udd`mi`Zc`f`Ub`YI`HYbg]cb`z`Vi`hmc`i`  
a`i`ghfY`hU]b`mci`f`h]W`Yhbi`a`VYf`Zca`9I`HYfbU`Gi`ddcfhfU`cb[`k`]h`Ubmc`h`Yf`fY`Yj`UbhXcW`a`Yb`hgL`hc`  
]bWi`XY`Ug`Yj`]XYbW`hc`gi`ddcfhmc`i`f`YI`HYbg]cb`Udd`]W]h]cb`≠mci`Ya`U]`9I`HYfbU`Gi`ddcfhmc`i`k`]`

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

D`U[ ]Uf]ga `]g`i g]b[ `hY`k cfXg`cf]XYUg`cZchYfg`UbX`dfYgYbh]b[ `hYa `Ug`mci f`ck b" `hWUb`hU`Y`a Ubm  
Zcfa gZ`Zca `XY`]VYfUHY`WXYU]b[ `hc`UWV]XYbhU`mW`dm]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[ `WUHY`[ 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`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k ]h`ci hW`YX]h`

hUddfcdf]UHY`dUfUd`fUg]b[ .`7`Ub[ ]b[ `U`ZYk`k cfXg`UbX`d`fUgYg`k`Y`a cghmifYU]b]b[ `hY`cf][ ]bU`  
ghfi W`fY`UbX`#`f`dfc[ fYgg]cb`cZ]XYUg`cZ`hY`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`UbchYf`g`]XYUg`cf`k cfXg`k ]h`ci hW`YX]h`UbX`hc`  
d]YW]b[ `hc[ YhYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k \c`Yz`k ]h`ci hUddfcdf]UHY`fYZYfYbW]b[ "

7 c`i g]cb.`k cf\_]b[ `k ]h`chYfg`Vi hdUgg]b[ `cZ`hY`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`UbchYf`gh`XYbhVYZc`fY`hY`Xi Y`XUHY`Zc`f`Zc`hY`di fdcgY`cZ`hY`a

- i bXYfghUbx'mci f'f][ \hg'UbX'fYgdcbg]V]h]Yg'Ug'U'gh XYbhUhl BGK
- VY'Uk UfY'cZd'U[ ]Uf]ga ž'Wc'dmf][ \hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5W'W'dhUV'Y'I gY'cZ I BGK '⇒H'F'Ygci f'W'g'Dc'W'h
- VY'Uk UfY'cZ'U'g'U'f'X'g'c'Z'V'Y'U'j ]ci f'Y'I d'Y'W'X'c'Z'Y'j Y'f'm'c'b'Y' ]b'U'Y'I BGK 'W'c'a a i b]m
- 'c'W'U'h'g'Y'f'j ]W'g'U'bx' ]b'Z'c'f'a U'h'c'b'U'V'c'i h'l BGK 'U'bx'I BGK '@]V'f'U'f'm

Gca Y'cZ'U'g'Y'U'f'Y'U'g'k ]''V'Y'Z'J'a ]]U'f'U'c'm'c'i ž'c'h'Y'f'g'k ]''V'Y'b'Y'k ''; U]b]b[ 'U'g'c'X'i bXYfghUbx]b[ 'cZU''U'Y' f'Y'U'h'X'U'gd'Y'W'g'c'Z'9@-G'9'k ]''\Y'd'm'c'i 'a U\_Y'U'Y'a c'g'h'c'Z'm'c'i f'g'h X]Y'g'U'hl BGK ''

[\h'c'.'#\]j' V'Y'W'f' i \]X'Y'g'' \]V'f'U'f'm'i b'g'k "Y'X'i "U'i #' \]g'Y'#\]V'c'i h' \]g'Y](#)

5 WUXYa ]WbZcfa Uhcb`

: cfYggYbh]U`ghi XYbh]bZcfa Uhcb`fY`Uh]b[ `hc.

- fYei Yghg`ZcfYI hYbg]cb/
- `UhY`gi Va ]gg]cbg`[ i ]XY`]bYg/
- fYj ]Yk `cZa Uf\_g/
- I BGK `<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 ]m]UbX`X]gUV`]m/
- UbX`chYf`YggYbh]U`UWUXYa ]W]bZcfa Uh]cbz`gYY

[\hdg.#k k k "Ufmg"i bgk "YXi "Ui #W ffYbhghi XYbh\]bZcfa Uhcb`dfc\]Vc`g!\[ i \]XY`\]bYg#](#)

⇒ U[ Y`7 fYX]h

D\chc`Vm9f]b`6fUbb][ Ub

7F ⇒ CG

7F ⇒ CG`Dfcj ]XYf`7cXY.`\$\$\$- ;