



# ARTS3450

5Xj UbWX'7 \]bYgY'5

HYfa `Cby`#`&\$%-

7ci fgY`Cj Yfj ]Yk

`GHUZZ7cbhUW`i8YHJ`g`

`7cbj Ybcfg`

B Ua Y	9a U]`	5j U]UV]`]m	@WU]hcb	D\cbY
DfcZ8f`>cb`j cb ?ck U`]g`	^_ck U`]g4 i bkg "YXi "Ui	: f]XUm) da `!`*da	A cfj Yb`6fck b &' -	- ' , ) `%\$&\$

`@YW`i fYfg`

B Ua Y	9a U]`	5j U]UV]`]m	@WU]hcb	D\cbY
<i Ub[ \i Ub[ `7\Yb	\i Ub[ \i Ub[ "WXYb4 i bkg "YXi "U i			

`Hi hcfg`

B Ua Y	9a U]`	5j U]UV]`]m	@WU]hcb	D\cbY
8f`M]b[ `]Gi b	m]b[ `]gi b4 i bkg "YXi "Ui			

GWXcc``7cbhUW`i`bZcfa Uh]cb

GWXcc``cZ<i a Ub]hYg`UbX`@Ub[ i U[ Yg

@WU]hcb. GWXcc``C Z]WZ`A 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 bkg "YXi "Ui](#)



# 5ggYgga Ybh

## 5ggYgga YbhHUg\_g`

5ggYgga YbhHUg_	K Y][ \h	8i Y`8UHŸ	Gh XYbh@YUfb]b[ Ci hWta Yg`5ggYggYX
HYgh%	&\$i	K YY_) `hi hcf]U`f&#\$' #&\$%- cf`&#\$' #&\$%- ƒ"	%ž&ž ž(
; fci d`F YgYUfW`Dfc`YWŸg`	( \$i	HfUbg`Uh]cb`]g`Xi Y`]b`k YY_`& f\$` #` #` #&\$%- ƒžk YY_`( f%+`#` #` #&\$%- ƒžk YY_`* f1`%#` #` #&\$%- ƒžUbX`k YY_`; f%(`#(`#&\$%- ƒ/; fci d` DfYgYbhUh]cb`]g`Xi Y`]b`k YY_` , `f%#`#(`#&\$%- `cf` %&#(`#&\$%- ƒžk YY_`- f%`#(`#&\$%- ƒ`cf`k YY_`%\$ f&*`#(`#&\$%- ƒ/F YgYUfW` DUdYf`]g`Xi Y`cbY`k YY_`UžYf` mci f`[ fci d`dfYgYbhUh]cb"	%ž&ž ž)
7i `hi fU`7ca dcbYbh	&\$i	E i ]n`cbY`]b`YWh`fY`k YY_) f&#`#` #` #&\$%- ƒ/E i ]n`&`]b` `YWh`fY`k YY_`%% f1`\$#(`#&\$%- ƒ"	(
HYgh&`	&\$i	K YY_`%%Hi hcf]U`g` f1`\$#(`#&\$%- `cf`\$%#`#` #&\$%- ƒ"	%ž&ž ž(

## 5ggYgga Ybh8YHJ]`g`

### 5ggYgga Ybh%`HYgh%

GHUfhXUHŸ. `Bch5dd`]WUV`Y`

8YHJ]`g. `7ca dfY`Ybg] Y`HYghcZ`hY`žfghZ`k`W`UdhYfg`f%) `aci fgƒ": YYXVUW`\_j ]U`]bX] ]Xi U`Wta a Ybhž  
fi Vf]WžUbX`]b!WUgg`X]gW`gg]cb"

Hi fb]h]b`gYH]b[ . `H\]g`]g`bchU`Hi fb]h]b`Ugg][ ba Ybh

### 5ggYgga Ybh&.`; fci d`F YgYUfW`Dfc`YWŸg`

GHUfhXUHŸ. `Bch5dd`]WUV`Y`

8YHJ]`g. `Gh XYbhg`Wta d`YH`rk`c`[ fci d`dfc`YWŸg. `%ƒHfUbg`Uh]cb`f%\$i ƒžUbX`&ƒF YgYUfW`cb`hY]f`WcgYb`  
hcd]Wžk`\\W`]W`XYg`U`fYgYUfW`dUdYf`gi Va ]H]X`cb!]bY`f%) i ƒžUg`k Y`Ug`U`[ fci d`dfYgYbhUh]cb`f%) i ƒ`  
H`Y`WUgg`dfYgYbhUh]cb`f1`a`]bi`h`g`dYf`dYfg`cbƒ]g`UggYggYX`cb`]bX] ]Xi U`VUg]gžk`\\Y`h`Y`fYgYUfW`dUdYf`  
f%) \$!&\$\$\$`W`UfUWŸfgƒ`fYWŸ]j Yg`cbY`a`Uf\_": YYXVUW`\_j ]U`fi Vf]WUUbX`]b!WUgg`X]gW`gg]cb"

### 5ggYgga Ybh' .`7i `hi fU`7ca dcbYbh

GhUfhXUHY. 'Bch5dd`]WUV`Y

8YHU]`g. 'Gh XYbHg`UfY' [ ] Yb`tk c`]b!WUgg`ei ]nnYg`fi \$`a ]bi h`g`YUWX`E": YYXVUW\_] j ]U`fi Vf]WUbX`]b!WUgg X]gW`gg]cb"

Hi fb]h]b`gYH]b [ . H\]g`]g`bchU`Hi fb]h]b`Ugg][ ba Ybh

5ggYgga Ybh(. `HYgh&

GhUfhXUHY. 'Bch5dd`]WUV`Y

8YHU]`g. `7 ca dfY\Ybg]j Y`h`gh`f%) ` \ci fgE`cZ`h`Y`UghZ`k`W`UdH`fg`g]bW`HYgh%"`Gh XYbHg`fYW`]j Y`U`a Uf\_ UbX`WUb`W`bgi `h`h`Y`h`UWX]b [ `g]UZZ`Z`f`Z`f`h`Y`f`ZYXVUW\_`H\]g`]g`h`Y`Z]bU`UggYgga YbhZ`f`U`h`Y`b`X`U`b`W`di`fdcgY"

Hi fb]h]b`gYH]b [ . H\]g`]g`bchU`Hi fb]h]b`Ugg][ ba Ybh

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F Ygci fWg

DfYgW]VYX F Ygci fWg



Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

Gi Va ]gg]cb`cZ5ggYgga YbhHUg\_g

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

Ẓmci `YbWci bhYf`U`dfcV`Ya `k \Yb`U`H`Ya dh]b[ `hc`gi Va ]hmc`i f`Ugg][ ba YbhHfci [ \`Hi fb]h]bžd`YUgY  
H`Yd\cbY`9I H`fbU`Gi ddcfhcb`-` , ) `` `` ` %cf`Ya U]`H`Ya `cb`YI H`fbU`H`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`m`YUfL` Ẓmci  
UfY`i bUV`Y`hc`gi Va ]hmc`i f`Ugg][ ba YbhXi Y`hc`U`ZU`i`hik ]H`Hi fb]h]b`mci `a UmiUdd`m`Zc`f`Ub`YI H`bg]cbžVi hmc`i  
a i ghfYH]b`mci f`h]W`Yhbi a VYf`Zca `9I H`fbU`Gi ddcfhfU`cb[ `k ]H`Ubmch`Yf`fY`Yj UbhXcW a YbHgE`hc  
]bWi XY`Ug`Yj ]XYbW`hc`gi ddcfhmci f`YI H`bg]cb`Udd`]W]h]cb" Ẓmci `Ya U]`9I H`fbU`Gi ddcfhmci `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 gž`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[ Ygž`UfhUbX`XYg][ b`dfc`YWgž`Ug`k Y`U`g  
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`U`b[ ]b[ `U`ZYk`k cfXg`UbX`d`fUgYg`k`Y`a cghmifYU]b]b[ `hY`cf][ ]bU`  
ghfi W`i fY`UbX`#`f`dfc[ fYgg]cb`cZ]XYUg`cZ`hY`cf][ ]bU`ž`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[ Y`hYf`ei chYg`UbX`dUfUd`fUgYg`]bhc`U`bYk`k \c`Yž`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`XUHYž`cf`Zc`f`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'Wcdmf][ \hž' BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wn
- VY'Uk UfY'cZh'Y'ghUbxUfXg'cZVY\Uj ]ci f'YI dYW'X'cZYj Yfmcby`]b'h'Y'I BGK 'Wca a i b]m
- `cWJh'gYfj ]Wg'UbX' ]bZcfa Uhcb'UVci hl BGK 'UbX'I BGK '@]VfUfm

Gca Y'cZh'YgY'UfYUg'k ]`VY'ZJa ]]Uf'hc'mci ž'ch'Yfg'k ]`VY'byk "; U]b]b[ 'U'gc`X'i bXYfghUbx]b[ 'cZU`h'Y fY'UH'X'UgdYW'g'cZ9@G9'k ]`Y'd'mci 'a U\_Y'h'Y'a cghcZmci f'gh X]Yg'Uhl BGK ""

[\hhd.##ji V'YWf'i \]XYg" \]VfUfm'i bgk "YXi "Ui #' \]gY#JVci h' \]gY](#)

## 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 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`]`hm/
- UbX`chYfYggYbh]U`UWUXYa ]W]bZcfa Uh]cbz`gYY

[\hfdg.#k k k "Ufmg"i bkg "YXi "Ui #W ffYbh\]ghi XYbh\]bZcfa Uh\]cb`dfc\]Vc`g!\[ i \]XY`\]bYg#](#)

⇒ U[ Y`7 fYX]h