



# ARTS3124

7c`UVcfUhj Y'DYfZcfa UbWY'A U\_]b[

HYfa `H\fYY`##`&\$&\$

7 ci fgY`Cj Yfj ]Yk

GHJZZ`7 cbHJW`8 YHJ]`g

7 cbj Ybcfg

B Ua Y	9a Uj`	5j Uj`UVj]m	@WJhcb	D\cbY
H\Yfcb`GWa ]Xh	h'gVWa ]Xh i bgk "YXi "Ui	VmUddc]bha Ybh	K YVghYf`%%&	- ' , ) `` &%

GWcc``7 cbHJW`bZcfa Uh]cb

GWcc``cZHY`5 frg`UbX`A YX]U

Fcca ``%&ž@Yj Y`` žF cVYfhK YVghYf`6i ]X]b[ `f] %Ł

D\cbY. f\$&Ł- ' , ) `( , ) \*

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

K YVg]h: [k k k "Ufng"i bgk "YXi "Ui #gUa](#)

H\Y`GWcc``cZHY`5 frg`UbX`A YX]U`k ci `X``\_Y`h`F YgdYWw`m5W\_bck`YX[ Y`h`Y`HfUX]hcbU``7 i ghcX]Ubgž  
h`Y`6YXY[ U`f`P`Ybg]b[ hcb`WJa di gŁž; UX][ U`f`7 ]mUbX`5 ffr`8 Yg][ b`7 Ua di gYgŁ`UbX`h`Y`B [ i bbUk U`  
dYcd`Y`f5i gfrU]Ub`8 YZybW: cfW`5 WUXYa m]b`7 UbVYffUŁcZHY`UbXg`k \YfY YUW`WJa di g`cZI`BGK`]g  
`cWJhYX"



# 5ggYgga Ybh

H\Y'Wci fgY'k ]''fYgi 'h]b'U'Z]bU'dYfZcfa UbW'ci hWca Yz'Vi hi\Y'Zcfa Uhi\Jg'k ]''fU\_Y'k ]''cVj ]ci g'mXYdYbX  
cb'h\Y'g]h U]cb'fY[ UfX]b[ '7CJ =8!%- 'UbX'fYgf]W]cbg'cb'd\mg]W' [ U\Yf]b[ "'H\Y'dYfZcfa UbW'  
ci hWca Y'k ]''fU\_Y'h\Y'gUZ'hmCZU''dUfh]W]dUbhg ]bhc'UW'ci b'z'UbX'Wci 'X' ]bW' XY'Ui X]YbW'g'k \c'UfY''ja ]hYX  
]b'bi a VYf'z'k U\W' ]b[ 'cb' ]bYz'UbX'#c'f'dfYgYbhVi hid\mg]W''m'X]ghUbW'Xz'fU\_]b[ ' ]bgd]fU]cb'Zca 'Ufh]g'k \c  
\Uj Y'k cf\_YX'WYU]h] Y'mk ]h'fYa chY'bYgg'UbX'dUfh]W]dU]cbz'Ug'k Y''Ug'XYj ]g]b[ 'ci f'ck b'gc'i h'cbg"

5hdfYgYb'z'mci 'g\ci 'X' \_YYd'mci f'gV\YXi 'Y'Wca d'Yh'm'WYUf'Zc'f'h\Y'Zc'ck ]b[ 'h]a Yg' ]b'k YY\_ '%%

- 5'HYW\ b]W' 'F Y\YUfgU' 'k ]h' mci f' [ fci d'Xi f]b[ 'h\Y'XUmCZA cbXUmz' &' 'Bcj Ya VYf"
- 5'8fYgg' 'F Y\YUfgU' 'Zca ') !- da 'cb'Hi YgXUmz' &' ('Bcj Ya VYf' 'fMci 'a UmbYYX' 'hc' 'a YYhk ]h' mci f  
[ fci d'Xi f]b[ 'h\Y'XUmUg'k Y''L
- Di V' ]WdYfZcfa UbW'g'UbX'dcghg\ck 'fY!gYh'Zca ') !%\$'da 'K YXbYgXUm: f]XUmz' &) !&+ 'Bcj Ya VYf"


5ggYgga Ybh&. 7`Ugg`W]h]ei Yg

GHUfhXUHy.`

8YhU]`g.

7 f]h]WU`Wca dUf]gcb`cZtk c`dYfZcfa UbWg`Vmimci f`dYYfgž]b`fY`Uh]cb`hc`Wci fgY`h\Ya YgžfYUX]b[ gžUbX  
fYZfYbW`X`Ufh]g]g`"%&) \$!%) \$\$`k cfXg"

Hi fb]h]b`Wca a Yb]g"

.

Hi fb]h]b`gYh]b[ . H\]g`Ugg][ ba Ybh]g`gi Va ]h]X`h]fci [ \`Hi fb]h]b`UbX`ghi XYbh]`WU]b`gYY`Hi fb]h]b`ga ]`Uf]hm  
fYdcf]g"

5ggYgga Ybh' .; fci d`dYfZcfa UbW

GHUfhXUHy.`

8YhU]`g.

: ]bU`[ fci d`dYfZcfa UbW`(&) | `[ fci d`a Uf\_`Ž`&) | `]bX]j ]Xi U`Wcb]f]Vi h]cb"Q

.

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

Di V`]WdYfZcfa UbW`]b`k YY\_`%%

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

## 5 HbXUbW F Yei JfYa Ybhg

H\Y`Vei fgY`fi bg`cb`U`d\]`cgcd\mi\U`hV`b`h`bi U`ma U`\_b[ `WYU`h`j`Y`k`cf`\_`z`k`U`h`W`]b[ `c`h`Y`fg`z`Ub`X`[ `]`]b[ `Ub`X`f`Y`W`]j`b[ `Z`Y`X`V`U`W`\_]g`Y`gg`Y`bh`U`h`c`h`Y`Y`U`fb`]b[ `d`f`c`W`g`g`"

5g`U`d`f`U`W`]W`!`V`U`g`Y`X`V`ei fgY`zh`]g`V`ei fgY`]g`d`f`Y`g`Y`bh`mg`W`Y`X`i`Y`X`h`c`fi`b`Z`U`W`!`h`!`Z`U`W`]b`H` `&`\$`&`\$`"5`  
 H`U`W`]b[ `k`]`h`U`\_`Y`d`U`W`]b`h`Y`h`Y`U`h`Y`g`d`U`W`g`c`Z`h`Y`9`ga`Y`H`a`V`Y`fm`7`f`Y`U`h`j`Y`D`f`U`W`]W`@`J`V`z`k`Y`f`Y`h`Y`f`Y`]g`  
 gi`Z`]W`]Y`bh`gd`U`W`]h`c`a`U`]b`h`U`]b`d`l`mg`]W`]X`]g`h`U`b`W`]Z`ca`Y`U`W`]c`h`Y`f`i`b`X`Y`f`W`f`f`Y`bh`[`c`j`Y`f`ba`Y`bh`[`i`]`X`Y`]b`Y`g`"K`Y`  
 k`]`U`gc`i`g`Y`V`f`Y`U`\_`ci`h`gh`X`]c`g`gc`h`U`h`Y`U`W`]`[`f`ci`d`l`U`g`]`h`g`c`k`b`g`d`U`W`]X`i`f`]b[ `h`Y`g`Y`V`c`b`X`U`Z`c`Z`h`Y`V`ei`fg`Y`"

Z`h`Y`V`ei fgY`fi bg`Z`U`W`!`h`!`Z`U`W`]U`g`d`U`bb`Y`X`z`k`Y`k`]`U`j`Y`h`c`a`Y`Y`h`]b[`g`d`Y`f`k`Y`Y`\_`U`(!`l`ci`f`[`i`]`X`Y`X`  
 k`cf`\_`g`l`cd`f`l`G`h`X`]c`"E`z`k`Y`f`Y`h`Y`V`ei fgY`V`c`b`j`Y`b`Y`f`k`]`Z`U`W`]h`U`h`d`f`U`W`]W`]Y`i`Y`f`W`]g`Y`g`Ub`X`]b`f`c`X`i`W`]`g`h`c`f`]W`  
 Ub`X`V`c`b`h`a`d`c`f`U`f`m`Y`i`U`a`d`Y`g`/`Ub`X`U`"!`l`ci`f`d`f`U`W`]W`]g`l`U`f`]b[ `f`i`C`h`Y`f`"E`k`Y`f`Y`m`c`i`k`]`g`l`U`f`Y`Ub`X`f`Y`W`]j`Y`  
 Z`Y`X`V`U`W`\_`c`b`k`cf`\_`m`c`i` `U`j`Y`X`Y`Y`c`d`Y`X`]b`X`]j`]X`i`U`m`f`k`Y`Y`\_`g`%`d`(`E`Ub`X`]b`[ `f`ci`d`g`f`k`Y`Y`\_`g`)`!`%`\$`E`"

Z`V`f`W`a`g`h`U`b`W`g`f`Y`ei`J`f`Y`h`U`h`h`Y`V`ei fgY`a`c`j`Y`d`U`f`h`U`m`c`f`Y`b`h`f`Y`m`c`b`]b`Y`z`U`h`Y`f`b`U`h`j`Y`h`Y`U`W`]b[ `Ub`X`g`l`U`f`]b[  
 U`f`f`U`b[ `Y`a`Y`bh`g`k`]`V`Y`d`i`h`]b`d`U`W`z`k`]h`a`c`f`Y`Y`a`d`l`U`g`]g`c`b`U`g`m`b`W`f`c`b`c`i`g`h`U`g`\_`g`]b`c`f`X`Y`f`h`c`a`]b`a`]g`Y`  
 c`b`]b`Y`Z`U`h`[`i`Y`"

K`Y`h`Y`f`Z`U`W`]h`c`!`Z`U`W`]c`f`c`b`]b`Y`z`]b`h`Y`g`Y`d`f`U`W`]W`]g`Y`gg`]c`b`g`m`c`i`k`]`U`W`]j`Y`m`Y`b[ `U`[ `Y`k`]h`V`c`f`Y`V`ei`fg`Y`  
 V`c`b`h`b`h`h`U`h`k`]`Y`b`U`V`Y`m`c`i`h`c`X`Y`a`c`b`g`h`U`h`Y`U`h`U`]b`a`Y`b`h`c`Z`f`c`f`Y`d`m`c`i`h`c`U`h`U`]b`E`7`@`%`f`f`5`d`d`m`  
 U`d`d`f`c`d`f`]U`h`h`Y`c`f`Y`h`]W`]Ub`X`d`l`mg`]W`]f`Y`g`Y`U`f`W`]d`f`U`W`]W`]g`]b`h`Y`W`Y`U`h`]c`b`c`Z`d`Y`f`Z`c`a`Ub`W`]E`/7`@`&`  
 f`f`9`j`U`i`U`h`Y`Ub`X`V`c`b`g`f`i`W`]j`Y`m`W`]h`e`i`Y`a`U`h`f`U`[ `Y`b`Y`f`U`h`X`]b`X`]j`]X`i`U`m`Ub`X`]b`[ `f`ci`d`g`U`g`d`U`f`h`c`Z`h`Y`W`Y`U`h`j`Y`  
 d`f`c`W`g`g`E`/`Ub`X`7`@`" `f`i`K`c`f`\_`Y`Z`Y`W`]j`Y`m`]b`g`a`U`[ `f`ci`d`g`z`X`Y`Y`c`d`]b[ `V`c`U`V`c`f`U`h`j`Y`g`\_`]g`Ub`X`g`Y`Z`f`Y`]Ub`W`  
 ]b`d`U`bb`]b[ `Ub`X`Y`i`Y`W`h`c`b`E`"

5 HbXUbW`U`h`U`W`U`gg`Y`g`]g`a`Ub`X`U`h`c`f`m`]b`h`]g`V`ei fgY`"i`b`Y`i`W`g`Y`X`U`V`g`Y`b`W`]Z`ca`a`c`f`Y`h`U`b`&\$i`c`Z`  
 W`U`gg`Y`g`k`]`f`Y`g`i`h`]b`h`Y`U`k`U`f`X`U`Z`]`[ `f`U`X`Y`"

## 7 ci fgY`GVW`Y`X`i`Y`

[J`\]`Y`k`W`U`gg`h`a`Y`h`U`V`Y`](#)

H`]`a`Y`h`U`V`Y`

8 U`h`Y`	H`m`d`Y`	7`c`b`h`Y`b`h`
K`Y`Y`_`%`%`(`G`Y`d`h`Y`a`V`Y`f`! %`G`Y`d`h`Y`a`V`Y`f`		h`f`c`X`i`W`]c`b`h`c`V`c`U`V`c`f`U`h`j`Y`a`U`_`b[ `G`Y`Y`]b[ `h`Y` a`]f`U`W`]c`i`g`
K`Y`Y`_`&`&`%`G`Y`d`h`Y`a`V`Y`f`! &`G`Y`d`h`Y`a`V`Y`f`		H`i`Y`g`X`U`m`g`h`X`]c`5`i`h`c`V`]c`[`f`U`d`]W`]d`Y`f`Z`c`a`Ub`W`]Ub`X` ]X`]c`g`m`b`W`]U`h`]W`[`Y`g`h`i`f`Y`g`" :`f`]X`U`m`g`l`U`f`]b[ `G`c`c`h`U`g`_`%`f`U`i`h`c`V`]c`[`f`U`d`]W`]a`U`d`E` d`f`Y`g`Y`b`h`X`]b`!`W`U`gg` .`
K`Y`Y`_`"`.`&`,`G`Y`d`h`Y`a`V`Y`f`! &`C`W`h`c`V`Y`f`		

K YY_) . %&'C WtcVYf! '* C WtcVYf		6Y[ ]bb]b[ ' [ fci d'k cf_
K YY_*. %- 'C WtcVYf!' & C WtcVYf		: 'YI 'k YY_ 'gY'Z[ i ]XYX'[ fci d'YI YfW]gY'hc 'VY Wca d'YhX' ]bXYdYbXYbhm
K YY_+. '&'C WtcVYf!' '\$ C WtcVYf	5ggYgga Ybh	[ fci d'k cf_ 'Z'ZYXVUW_ 7 'Ugg'W]hei Y f%&) \$!%) \$\$'k cfXgŁ'Xi Y') da 'cb A cbXUmž '&'C WtcVYf
K YY_'. '&'Bcj Ya VYf!' '* Bcj Ya VYf		[ fci d'k cf_ 'Z'ZYXVUW_
K YY_'. '- 'Bcj Ya VYf! '% 'Bcj Ya VYf		[ fci d'k cf_ 'Z'ZYXVUW_
K YY_ '%\$. '%* 'Bcj Ya VYf! &\$'Bcj Ya VYf		[ fci d'k cf_ 'Z'ZYXVUW_ K YY_ '%%' DfcXi W]cb'k YY_ 'HYW.b]W]fi b'cb A cbXUm'XfYgg'fY\YUfgU'cb'Hi YgXUm'di V]W dYfZcfa UbW]g'cb'K YXbYgXUnž'H\i fgXUmž UbX : f]XUmfH67 'VUgYX'cb'fYgh]W]cbg'cb [ Uh\Yf]b[ Ł

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

H\YfY`k ]`VY`g\cfhVfYU\_g`Uhgj ]hUV`Y`dc]bfg`Xi`f]b[ `YUWX`k`YY`\_`m`WUgg"i`gY`cZd\cbYg`UbX`Udhdg`k ]`  
bchVY`dYfa ]hYX`Xi`f]b[ `WUgg"i`6f]b[ `hc`YUWX`WUgg. VcHhY`cZk`Uhf`UbX`U`gbUW`z`Wca`ZcfhUV`Y`WcH`Yg`Zcf`  
a`cj`Ya`Ybhz`UbX`U`bchVcc`\_`UbX`dYb"

F YWca a YbXYX`F Ygci fWg

D`YUgY`gYY`@Y[`Ubhc`Zcf`hY`]ghcZfYWca`a`YbXYX`hY`hg`fY`UfYX`hc`YUWX`k`YY`\_`f`hYa`Yzk` \]W`k ]`VY`i`gYZ`  
Zcf`hY`WUgg`W]h`ei`Yg"



Gi Va ]gg]cb 'cZ5ggYgga YbhiHUg\_g

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

Ʒmci 'YbWci bHYf'U'dfcV'Ya 'k \Yb'UH'Ya dh]b[ 'hc'gi Va ]hmc i f'Ugg][ ba YbhiH'fci [ \ 'Hi fb]h]bž'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'fl \*) 'XUmg'U'mYUfl" Ʒmci  
UfY'i bUV'Y'hc'gi Va ]hmc i f'Ugg][ ba YbhiXi Y'hc'U'ZU'ihk ]H'Hi fb]h]b'mci 'a UmUdd'm'Zcf'Ub'YI HYbg]cbž'Vi hmc i  
a i ghfYHU]b'mci f'h]W\_Yhbi a VYf'Z'ca '9I HYfbU'Gi ddcfhfU'cb[ 'k ]H'UbmcH'Yf'fY'Yj UbhXcW a YbHg'k'hc  
]bWi XY'Ug'Yj ]XYbVW'hc'gi ddcfhmc i f'YI HYbg]cb'Udd'jW]h]cb" Ʒmci 'Ya U]'9I HYfbU'Gi ddcfhmc i 'k ]`  
Ui 'ca UH]WU'm'fYW]j Y'U'h]W\_Yhbi a VYfž'Vi h]Zmci 'HY'Yd\cbY'mci 'k ]'b'Y'X'hc'gd'Y'W]WU'mUg\_ 'Zcf'cbY"  
Hi fb]h]b'U'gc'dfcj ]XYg'i dXUH'g'cb'H'Y]f'gmgh'Ya 'ghU'h'g'cb'Hk ]H'Yf"

; YbYfU'mž'UggYgga YbhiHUg\_g'a i ghVY'gi Va ]H'Y'X'Y'Y'W'f'cb]WU'mj ]U'Y]H'Y'f'Hi fb]h]b'cf'U'A ccX'Y  
Ugg][ ba YbH' 'b]bg]H'UbVW'g'k \YfY'H'g ]g'bc]hd'cgg]V'Yž'hk ]'VY'gh'UH'X'cb'mci f'Wci fgY'g'A ccX'Y'g]H'k ]H'  
U'HY'fbUH] Y'gi Va ]gg]cb'XYHU]g"

: cf]bZ'fa UH]cb'cb'\ck 'hc'gi Va ]h]Ugg][ ba YbHg'cb]bY'j ]U'A ccX'Y. \H'hdg.#gh XYbH'i bgk "YXi "Ui #ck!  
gi Va ]h]Ugg][ ba YbH'a ccX'Y

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

D`U[ ]Uf]ga `]g`i`g]b[ `h`Y`k`c`f`X`g`c`f`]X`Y`U`g`c`Z`c`h`Y`f`g`i`U`b`X`d`f`Y`g`Y`b`h]b[ `h`Y`a` `U`g`m`c`i`f`c`k`b`" `#`W`U`b`h`U`\_`Y`a` `U`b`m`  
Z`c`f`a`g`Z`Z`c`a` `X`Y`]V`Y`f`U`h`Y` `W`X`Y`U`h]b[ `h`c` `U`W`W`Y`X`Y`b`h`U` `m`i`W`c`d`m]b[ `Z`c`a` `U`g`c`i`f`W` `k` ]h`c`i`h`U`W`\_`b`c`k` `Y`X[ `Y`a` `Y`b`h`

I`B`G`K` `[`f`c`i`d`g`d`U[ ]Uf]ga `]b`h`c` `h`Y` `Z`c` `c`k` ]b[ `W`U`h`Y`[`c`f`]Y`g.

- 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'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]bZ'fa 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'f'g'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 cgh'cZ'mci f'gh X]Yg'Uhl 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'#J'V'c'i h' \]g'Y](#)

5 WUXYa ]W=Zcfa Uh]cb

: cf`YggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[ `tc.

- fYei Ygth`Zcf`Yl Hrbg]cb/