



## ARTS3812

A Ub]Ugž'DUb]Wg'UbX'7 fUg\Yg.; `cVU'Dc`j]WU`9Wčbca m  
]b'Ub'9fU'cZ7 f]g]g

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



7ci fgY'8YHJ]`g

7fYX]hDc]bhr`\*`

Gi a a UfmcZ`hY'7ci fgY

Gi V`YWh5fYU. Ba`f[ue S` V ;` fWd Sf[a` S^DWSf[a` e

H\Y`dYf]cX`Zca` h\Y`YUfm%- +\$g`]g`cZYb`bchYX`Ug`U`dUfhW`Ufmj`c`UhY`cbY`Zcf`hY`[ `cVU`dc`]hW`  
YWcbca mfl` D9E`H\]g`j`c`Uh`]m\Ug`g][ b]Z]WUbh]a`d`]WU]cbg`Zcf`hY`k`Umg`]b`k` \]W`k`Y`UfY`UV`Y`Zcf`bch`h`  
]j`Y`ci`f`]j`Yg`h`XUm`UbX`Zcf`hY`Z`h`fY`gi`ghU]bUV]`]mic`Zdc`]hW`!YWcbca`]WdfUW]W`"Mc`i`k`]`VY`Ug`\_YX`]b`  
h`]g`V`ci`fgY`h`c`k`cf`\_`ci`hk` \Uh`h`YgY`]a`d`]WU]cbg`UfY`Z`UbX` \ck` h`Ym` \Uj`Y`Uf]gYb`Z`VmYI`Ua`]b]b[ `h`Y`[ `cVU`  
dc`]hW`YWcbca`m]b`U`j`Uf]Ymic`Z`Z`ca`g`Z`UbX`h`fci`[ \`a`i`h`d`Y`dYfgdYW]j`Yg`"Mc`i`k`]`VY`YbW`ci`fU[ YX`h`c`  
h`]b`\_`fYZYW]j`Y`m`UbX`]a`U[ ]bU]j`Y`m`UVci`hei`Ygh]cbg`]b`h`Y`;` D9`Zcf`k` \]W`h`Y`fY`UfY`bc`YUgm`Ub`gk`Yfg`Z`  
]bWi`X]b[ `ei`Ygh]cbg`c`Z`dck`Yf`Z`df]j`]Y[ Y`Z`W`ca`a`cb`g`YbgY`Z`]bghUV]`]m`UbX`h`Y`cb[ c]b[ `fc`Y`c`Z`W]g]g!Xf]j`Yb`  
WUd]hU]gh[ fck`h`"Mc`i`k`]`VY`Ug`\_YX`h`a`U`\_Y`XYW]g]cbg`UVci`hmc`i`f`j`Yk`g`cb`h`Y`Udd`UfY`bh`m`gm`h`a`]W`  
bU`h`fY`c`Z`WUd]hU]gh]bghUV]`]m`Hc[ Y`h`Yf`Z`k`Y`k`]`XYW]XY`h`k` \Uh`YI`h`Yb`h`UbX`k` \m`z`h`Y`[ `cVU`dc`]hW`  
YWcbca`m` \Ug`V`Y`Y`b`X`ca`]bU`h`X`V`m`W]g]g`Z`XY`j`Y`cd]b[ `Ub`i`b`XY`fg`h`UbX]b[ `c`Z`h`Y`g`h`i`W`h`fY`UbX`dfUW]W]g`c`Z`  
[ `cVU`dc`]hW`!YWcbca`]WfY`U`h]cbg`Z`]b` \]g`h`c`f]W`"UbX`V`cb`h`Ya`dc`fU`f`m`d`Y`fgd`Y`W]j`Y"

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

%` ÆYbh]Zm`UbX`ci`h]bY`h`Y`V`cb`h`gh`h`X`UbX`X]j`YfgY`W`UfUW]f`c`Z`h`h`fb`U`h]cbU`Dc`]hW`"9Wcbca`m`fUg`  
UWUXYa`]W]g]W]d`]bY`E`UbX`h`Y`[ `cVU`dc`]hW`YWcbca`m`fUg`Ub`UfY`bU`E`/  
&"`8YgW]VY`UbX`X]gW`gg`U`j`Uf]Ymic`Z`XYV`U`h`Y`g`UbX`Udd`f`c`U`W`X`Y`g`gi`ffci`bX]b[ `UW]cb`UbX`dc`]W`h`a`U`\_]b[  
]b`h`Y`[ `cVU`dc`]hW`YWcbca`m`  
'`" `@cWU]h`Z`df]c]f]h]gY`UbX`Udd`m`Udd`f`c`df]U`h`Y`]b`Z`ca`U`h]cb]b`#`c`h`h`fb`U`h]cbU`Dc`]hW`"9Wcbca`m`f`D9E`]b`  
U`g`cd` \]g]h]WU]h`X`UbX`dYfgi`Ug]j`Y`a`Ubb`Yf`Z`i`g]b[ `WYUf`UbX`Y`Z`Y`W]j`Y`c`fU`UbX`k`f]h`Y`b`V`ca`a`i`b]WU]cb`  
g\_]`g`/  
(`" `5bU`mgY`Z`YI`d`U]b`UbX`W]h`ei`Y`UX`j`UbW`X`" ]h`fU`h`fYg`UbX`]X`Y`Ug`fY`U`h]b[ `h`c`h`Y`h`Y`c`f]Y`g`UbX`dfUW]W]g`  
c`Z`D9E`]bWi`X]b[ `U`j`Uf]Ymic`Z`V`b`W`d`h`g`Z`h`Y`c`f]Y`g`UbX`WU]h`[ `c`f]Y`g`c`Z`UbU`mg]g`/  
)`" `Gi`a`a`Uf]gY`UbX`Y`j`U`i`U`h`Y`XYV`U`h`Y`g`UbX`Udd`f`c`U`W`X`Y`g`]b`#`c`D9E`]b`Z`ca`YX`V`m`Ub`i`b`XY`fg`h`UbX]b[ `c`Z`  
Y`h`WU`]g`gi`Y`g`UbX`U`g`Y`Z`f`Y`Z`YI`]j`Y`U`k`UfY`b`Y`gg`c`Z`h`Y`f`Y`U`g`c`b`Y`X`j`]Y`k`g`c`Z`c`h`Y`fg`"

HYUW]b[ `G`h`fU`h`Y`[ ]Yg`

F`U`h]cbU`Y`

H\]g`V`ci`fgY`g`YY`\_`g`h`c`Y`bW`ci`fU[ Y`UbX`fYk`UfX`gh`XYbhr`Ug`]bXYdYbXYbh`YUfbYfg`k` \c`Udd`f`c`U`W`h`Y`j`f`  
gh`X]Yg`k`]h`Y`b`h`i`g]Uga`UbX`X]j[ YbW`"G`h`XYbhr`k`]`Z`bX`a`i`W`c`Z`h`]g`V`ci`fgY`XYa`UbX]b[ `UbX`a`Ubmic`Z`  
h`Y`h`Y`c`f]Y`g`UbX`Udd`f`c`U`W`X`Y`g`k`Y`k`]`V`c`j`Y`f`UfY`]b`f]b`g]WU`m`W`U`Y`b[ ]b[ " `#`]g`]a`dc`f`U`b`h`h`U`h`gh`XYbhr`f`m`  
U`k`Umg`h`c`YI`dfY`gg`h`Ya`gY`j`Yg`]b`U`g`Y`Z`Uk`UfY`UbX`Zi`Y`b`h`a`Ubb`Yf`Z`h`U`h`h`Y`f]b`h`f`d`Y`fg`c`bU`g\_]`g`UfY`i`g`Y`X`  
h`c`h`Y`j`f`a`U`I`]a`i`a`Z`h`U`h`h`Y`j`f`W]hW`"UbU`mg]g`UbX`df`c`V`Ya`!gc`j`]b[ `g\_]`g`UfY`VY]b[ `YI`h`Y`b`XY`X`UbX`df`ca`c`h`X`  
U`h`U`"h`a`Yg`UbX`h`U`h`h`Y`m`UfY`Z`f`Y`h`c`h`]b`\_`WYU]j`Y`m`i`5gg][ ba`Ybhr` \Uj`Y`V`Y`Y`b`XYg][ bYX`h`c`Z`Z`f`gh`XYbhr`  
ZYI`j]j]m`UbX`W`c]W`Z`k` \]Y`f`Ye`i`f]b[ `g`ci`bX`c`f[ Ub]gU]h]cbU`UbX`V`ca`a`i`b]WU]cb`g\_]`g`"

HYUW]b[ `G`h`fU`h`Y`[ ]Yg`

GYa ]bUfg'UbX'Wci fgY'UggYgga YbHg'UfY'h\Y'\_Ymia YUbg'Vmik \]W\`YUfb]b[ `ci hWca Yg'UfY'Yj U'i UH\X`]b'h.]g  
Wci fgY"5h\h\Y" \$\$\$`Yj Y`žgh XYbHg'UfY'YI dYW\X'hc'Uhh\bx'h\fYY`\ci fg'cZgYa ]bUfg'U'k YY\_"H\]g'Wci fgY

# 5ggYgga Ybh

@UH'dYbU'h]Yg'k ]''VY']a dcgYX'Uh'hY'i gi U''fUH'cZ) i 'dYf'XUm'

9I h'bg]cbg'a i ghVY'gci [ \hj ]U'hY'W'bfU']gYX'gmghYa 'UbX'a i ghVY'Udd']YX'Zcf'VY'Zcf'Y'hY'Xi Y'XUH'

K cfx'Wci bh]bZ]b[ Ya Ybhg'k ]''VY']a dcgYX'Uh'hY'fUH'cZ' i 'Zcf'Yj Yfm%\$\$'k cfxg'f'cf'dUfh'hYfYcZ'hUh mci f'Ugg][ ba Ybh]g'cj Yf'hY'gYh']a ]h'H\YfY' ]g'Ub'U'ck UbW'cZ'Z'cf'-%\$i /]'Y'' ]Zmci f'YggUm]g'' '\$\$ k cfxg' ]b''Yb[ h' ]hk ]''bchVY'dYbU']gYX''-Z]h]g'' '\$%k cfxg'mci 'k ]''cgY'' i ''-Z]h]g'' ( '\$%k cfxg'mci 'k ]'' fYW' ]j Y'U'\* i 'dYbU'mz'UbX'gc'cb''H\Y'k cfx'Wci bh]bWi XYg'U''hY' h]b'hY'a U]b'VeXmicZ'hY'Ugg][ ba Ybh' b! hY' h'fYZfYbW'g'UfY' ]bWi XYX''C b'm'hY'fYZfYbW'' ]ghcf'V]V' ]c[ fUd\mUbX'hY'cj YfU''h'hY' ]g'YI W' XYX''

5'dYbU'hmcZ' i 'k ]''VY']a dcgYX'Zcf'ZU]i fY'hc' i gY'hY'<Uf] UfX'f]b!hY' h'gmghYa 'cZfYZfYbW]b[ ''GYY \h'hdg.#gh XYbh'i bgk "YXi "Ui #Uf] UfX'fYZfYbW]b[ "

Mci 'ghUbX'hc''cgY'VY'hk'YYb') 'UbX'&\$'a Uf\_g'Zcf'dccf'fYZfYbW]b[ 'UbX'Uhh]Vi h]cb'cZgci fW'g''H\YfY' ]g'5 @C'H'cZUgg]ghUbW'Uj U]UV'Y'hc'mci 'hc'\Y'd'mci ''YUfb'UVci h'fYZfYbW]b[ z'Uhh]Vi h]cb'UbX'Uj c]X]b[ d'U[ ]Uf]ga ''-Zmci 'UfY'bchigi fY'>I GH'5G? ''GYY'\h'hdg.#gh XYbh'i bgk "YXi "Ui #gi ddcfh'fYZfYbW]b[ ! Ugg][ ba Ybhg''

-Zmci 'gi Va ]hk cfx'Zcf'h]g'Wci fgY'hUhmc' i \Uj Y'U'fYUXmigi Va ]hYX'Zcf'UggYgga Ybh]b'Ubch'Yf'Wci fgY'Uh h' ]g' i b]j Yfg]h'icf'Ub'ic'hYf' ]bgh]h' h]cbz' ]b'k \c'Y'cf' ]b'dUfh'z'cf' ]Zmci 'W'c'dma U'hY'f]U'Z'ca 'Ubch'Yf'gci fW' 'UbX Xc' bch'Uhh]Vi h' h'Uh'a U'hY'f]U'hc' ]hg'cf][ ]bU''Ui h'cfz'mci f'k cfx'k ]''VY'fYZfYX'hc'hY'GW'cc''Gh XYbh'9h' ]Wg




5 HhYbXUbW F Yei JfYa Ybhg

Gh XYbhg UFY gfhcb [ mYbWci fU[ YX hc UHhYbX U WUggYg UbX fYj ]Yk YWfi fY fYWcfX]b[ g"

7 ci fgY GWXYXi Y

[J Yk WUgg ha YhUVY](#)

Hja YhUV Y

8 UHr	HmdY	7 cbhYbh
K YY_% %* GYdhYa VYf! &\$GYdhYa VYf	GYa JbUf	H\Y VUg]Mg! VYfU YWcbca ]Mg
K YY_&.& GYdhYa VYf! &+GYdhYa VYf	GYa JbUf	H\Y VUg]Mg! A Ufl ]ghYWcbca ]Mg
K YY_." \$GYdhYa VYf! ( C WcVYf	GYa JbUf C b]bY 5Wj] ]m	H\Ycf]g]b[ XYj Y cda Ybh : ]fgh]bXYdYbXYbh YUfb]b[ UWj] ]m
K YY_(.+ C WcVYf! % C WcVYf	GYa JbUf 5ggYgga Ybh	H\Y [ cVU Z]bUbWU gmgHYa g! cf][ ]bg UbX [ cj YfbUbW C b]bY ei ]n
K YY_) .% ( C WcVYf! % C WcVYf	GYa JbUf	: fca ghUV] ]mhc W]g]g. H\Y 5g]Ub : ]bUbWU 7 f]g]g
K YY_*.&% C WcVYf! &) C WcVYf	GYa JbUf	: fca W]g]g hc W]g]g. H\Y ; cVU : ]bUbWU 7 f]g]g
K YY_+. & C WcVYf! % Bcj Ya VYf	GYa JbUf 5ggYgga Ybh	H\Y bYk bcfa U. gYW UFghU[ bU]cb cf U A Ufl ]Ub W]g]g cZWd]hU 3 : ]a UbUmg]g
K YY_) . ( Bcj Ya VYf! Bcj Ya VYf	GYa JbUf C b]bY 5Wj] ]m	H\Y ]bhYfbU]cbU hfUX]b[ gmgHYa f&L H\Y f]g_g UbX fYk UfXg cZdfYZfYbhU]ga &bX ]bXYdYbXYbh YUfb]b[ UWj] ]m
K YY_-. %% Bcj Ya VYf! % Bcj Ya VYf	GYa JbUf	H\Y ]bhYfbU]cbU hfUX]b[ gmgHYa f&L ? Ym Wcbfjcj Yfg]Yg ]b ]bhYfbU]cbU hfUXY
K YY_%. % Bcj Ya VYf! && Bcj Ya VYf	GYa JbUf	H\Y D9 cZ7 ]a UH 7 f]g]g
K YY_%%& Bcj Ya VYf! &- Bcj Ya VYf	5ggYgga Ybh	: ]bU 9ggUm

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

5`a UbXUhfmiUbX`gi dd`Ya YbUfmiYUX]b[ g`Zcf`gYa ]bUfg`k ]`VY`dcghYX`cb`a ccX`Yz`Ug`k ]`fYgci fWg`Zcf`  
hY`ZbU`YggUm`

F YWca a YbXYX`F Ygci fWg

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



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`mYUfL` Ẓmci  
UfY`i bUV`Y`hc`gi Va ]hmc i f`Ugg][ ba YbhXi Y`hc`U`ZU` `hk ]H`Hi fb]h]b`mci `a UmiUdd`miZc`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`UbmchYf`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][ \hžI BGK 'Gh XYbh7cXY'cZ7cbXi W'Ubx'5Ww'dhUV'Y'I gY'cZ I BGK '⇒H'F Ygci fW'g'Dc`]Wm
- 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 ""

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

5 WUXYa ]WbZcfa Uh]cb`

: cfYggYbh]U`ghi XYbh]bZcfa Uh]cb`fY`Uh]b[ `rc.

- fYei Ygh]Zc`fYI hYbg]cb/
- `UhY`gi Va ]gg]cbg`[ i ]XY`]bYg/
- fYj ]Yk `cZa Uf\_g/
- I BGK `<YU`h`UbX`GUZY`mdc`]WYg/

