



ARTS3630

5Xj UbWX'>UdUbYgY'5

HYfa`Cby`#`&\$%-

7ci fgY`Cj Yfj JYk

`GHUZZ7cbhUW`i8YHJ`g`

`7cbj Ybcfg`

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

@cWUjcb. `GWXcc``C ZjWžA cfj Yb`6fck b`6i]X]b[ž`@Yj Y``&ž&),

CdYb]b[`<ci fg.`A cbXUm!`:`f]XUmž`- Ua `!`) da

D\cbY. ž`*%&`- ' ,) `%*, %

: U! . ž`*%&`- ' ,) `; , +\$)

9a Uj`. [\U`4 i bgk "YXi "Ui](#)

7ci fgY'8YHJ]`g

7fYX]hDc]bhtg`*`

Gi a a UfmicZh\Y'7ci fgY

Gi VYWh5fYU.`<SbS` WēWE fgV[Wē

H\]g`Wēi fgY`dfcj]XYg`mci `k]h`i ddYf!]bhYfa YX]UH`Y`Y`h`]hcb`]b`>UdUbYgY`Ub[i U[Y`gh`Xm`i` c`ck]b[`hY`
dfYfYei]g]h`f`bhYfa YX]UH`>UdUbYgY`6fzcf`Yei]j`U`Ybhz`mci`Wēbh]bi`Y`hc`XYj`Y`cd`mci`f`]bhYfW`h`fU`
Wēa`a`i`b]W]h]cb`g_]`g`Ug`k`Y`Ug`YUfb`bYk`>UdUbYgY`ghfi`Wh`fYgž`YI`dfYgg]cbgž`UbX`]bhYfUW]cb`ghfUH`[]Yg`
Mci`k`]`YI`dUbX`mci`f]j`cW]Vi`UfmVm`YUfb]b[`&\$\$_Ub`↑`7i`ffYbhgcW]c!W`h`fU`]ggi`Yg`]b`>UdUb`UFY`h\Y`
h\Ya`Uh]Wz`W`g`cZ`h\Y`Wēi`fgY`"

7ci fgY`@YUfb]b[`Ci hWēa Yg

%`7ca`a`i`b]W]h`_bck`YX[Y`cZ>UdUbz>UdUbYgY`Ub[i U[Y`z`UbX`Wēa`a`i`b]W]h]cb`g_]`gž`]b`cfU`
dfYgYb]h]cbg`gdc`_Yb`]b`>UdUbYgY`
&`K`f]h`fYdcfh`i`g]b[`>UdUbYgY`k`f]h]b[`ghmY`
'`5Wēa`d`]g\`h]g`_g`k`]h`dYYfg`"

HYUW]b[`GhfUH`[]Yg`

@YWh`fYg`XY`]j`Yf`gcW]U`UbX`W`h`fU`]ggi`Yg`fY`UH`X`hc`h\Y`hcd]WcZ`h\Y`k`YY`_`BYk`ghfi`Wh`fYg#`fUa`a`Ufg`UFY`
U`gc`YI`d`U]bYX`"Gh`XYbhtg`dfcUW]j`Y`midUfh]W]dUH`]b`dfUW]W]g`cZbYk`YI`dfYgg]cbgž]`cW]Vi`Uf]Ygž`UbX`?`Ub`↑`
UbX`]bhYfUWh`k`]h`Z`ck`gh`XYbhtg`Uh`h\Y`YWh`fYg`"

@YWh`fYg`UFY`XY`]j`YfYX`i`g]b[`a`cghm>UdUbYgY`hc`Ugg]ghigh`XYbhtg`]b`XYj`Y`cd]b[`h\Y]f`ghYb]b[`UV`]h]Yg`UbX`
VYWēa`]b[`Z]a`]Uf`k`]h`bUh]j`Y`>UdUbYgY`gdYU`YfgfU`_`"H\Y`WēbhY`bhk` \]W]`gh`XYbhtg`UFY`bchUV`Y`hc`
Wēa`dfY`YbX`]b`>UdUbYgY`a`UmVY`YI`d`U]bYX`]b`9b[`]g`"

`Hi`hc]U`g`dfcj]XY`gh`XYbhtg`k`]h`cddcfh`b]h]Yg`hc`dfUW]W]`]bhYfUW]cbž`fYUX]b[`ž`UbX`k`f]h]b[`]b`>UdUbYgY`
Z`ck`]b[`h\Y`]bZ`fa`Uh]cb`]bhf`cXi`W]X`Xi`f]b[`YWh`fYg`UbX`dfcj]XYX`]b`h\Y`hYI`h/cc`_`"H\Y`mU`gc`XYj`Y`cd`
i`bXYfg]UbX]b[`UV`ci`h>UdUbz`]bhYfW`h`fU`Uk`UFYbYggž`UbX`]bhYfW`h`fU`Wēa`a`i`b]W]h]cb`g_]`g`"H\Y`mU`gc`
X]gW`gg`ck`gh`XYbhtg`g\ci`X`XYU`k`]h`U`g]h`Uh]cb`fY`UH`X`hc`h\Y`hcd]WUg`U`gi`W]YggZ`_]b`hYfW`h`fU`
Wēa`a`i`b]W]h]c`f`5`df]a`Ufma`YX]i`a`cZ`Ub[i U[Y`]b`h`hc]U`g`]g`>UdUbYgY`]b`cfXYf`hc`XYj`Y`cd`gh`XYbhtg`
cfU`#]i`fU`g_]`g`"Gh`XYbhtg`UFY`ghfcb[`mYbWēi`fU[YX`hc`i`gY`>UdUbYgY`Xi`f]b[`WUggYg`"

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5ggYgga YbhHUg_g`

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5ggYgga Ybh8YHU]`g

5ggYgga Ybh% 'GdYU_]b['hYgh

GHUfhXUH. 'Bch5dd']WUVY

8YHU]`g. '9UW 'gh XYbhk]`dYfZca 'U'fc'Y'd'Umk]h 'Ubch\Yf'gh XYbh(f) !* 'a]bg#dU]fL'K f]hYb'ZYXVUW_k]`
VY '[]j Yb'j]U'bi a Yf]W` [fUXY 'UbX'k f]hYb 'Wta a Ybh'

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

GYY'A ccXY'Zcf'XYHU]`g

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

5ggYgga Ybh&. ':]bU`YI Ua]bUH]cb

GHUfhXUH. '

8YHU]`g. 'Gh XYbtrg'k]`Wta d'YH'Z]bU`YI Ua]bUH]cb'Xi f]b['YI Ua 'dYf]cX": YXVUW_k]`VY '[]j Yb'i dcb
fYei Ygh'

5ggYgga Ybh' . 'Dfc YWñ

GHUfhXUH. '&) #&#&\$%- '\$- .\$\$'5A

8YHU]`g. 'Gh XYbtrg'k]`Yb[U[Y]b'U'j Uf]YhmcZUW]j]hYg'hc''YUfb'>UdUbYgY''Ub[i U[Yž'W 'h fYž'UbX
]bhYfW 'h fU'Wta a i b]W]h]cbž'Wcbg]gh]b['cZUddfcI "'&\$!' '\$a]bg'cb'U'k YY_'mVUg]g" 'H\Y'UW]j]hYg']bW' XY'U
[fci d#bX]j]Xi U'dfYgYbh]h]cb'f# 'a]bgž'd'Um]b['U'fc'Y'Ug'h hc]f]U''YUXYfž'UbX]bhYfUW]b['k]h'>UdUbYgY
dYcd'Y#g'dYU_Yfg'UhUb'Yj Ybh\Y'X'ci hg]XY'I 'BGK "'Gh XYbtrg'k]`hYb'fYZYWñUbX'k f]h'U'fYdcfhf(\$\$!) \$\$
WUfUWYfg#Ydcfh]cb'hY]f'YI dYf]YbW'g"K f]hYb'ZYXVUW_k]`VY '[]j Yb'j]U'bi a Yf]W` [fUXY"

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

GYY'A ccXY'g'Zcf'XYHU]`g

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

		Di V`]W<c`]XUm
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K YY_`%% `&- `5df]`!`% A Um	@YWh fy	@`
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F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

- 6cc_-'HcV]fU); UHk UmHc`5Xj UbW`X`>UdUbYgY`@YUfb]b[`H\fc i [\ `7 cbYbhUbX`A i `hja YX]U f&\$\$- 7
- 6cc_-'; fUa a Uf`Dck Yf.`9I YfW]gYg`; cf`A UghYfmf&\$\$%\$7
- 6cc_-'Dck Yf`I d`? Ub`j, \$\$`6Ug]W? Ub`j`5g`5`; UHk UmHc`5Xj UbW`X`>UdUbYgY`f&\$\$%\$7

F YWca a YbXYX`F Ygci fWg

- HcV]fU`k YVg]hY`""\hd.##rcV]fUk YV"- *(\$`d#
- [`\hd.##k k "\[Uj c"ti \]hc. mc"UWd#c`UX#d\fUg\]b\[#bXYI](#)

Gi Va]gg]cb`cZ5ggYgga YbhHUg_g

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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`Ubmch`Yf`fY`Yj UbhXcW a YbHgk`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 bYghmiUbX`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`Ug`
dfYgYbhU]cbg`k \YfY`gca YcbY`dfYgYbh]g`UbchYf`g`]XYUg`cf`k cfXg`k]h`ci hWYX]h`

hUddfcdf]UHY`dUfUd`fUg]b[.`7`Ub[]b[`U`ZYk `k cfXg`UbX`d`fUgYg`k \]Y`a cghmiFYhU]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 hWYX]hU`bX`hc`
d]YW]b[`hc[YhYf`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'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']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'fg'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'hd.##gi V'Y'W'f'i \]X'Y'g"'\]VfUfm'i bgk "Y'X'i "U'i #' \]g'Y'#J'V'ci h' \]g'Y](#)

5 WUXYa]WbZcfa Uhcb`

: cf`YggYbh]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`chYf`YggYbh]U`UWUXYa]W]bZcfa Uh]cbz`gYY

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

→ W[Y`Y`Z`YX]h