



ARTS3021

7 fYUhj Y`K f]h[b[`#hYfbg\]d

GYa YghYf`Hk c`#`&\$%



GWcc`cZH Y`5ftg`UbX`A YXJU`#`I BGK `5ftg`UbX`GcWJU`GWYbWg

7 ci fgY`Cj Yfj]Yk

`GHUZZ`7 cbhUW`8YHU]`g`

`7 cbj Ybcfg`

B Ua Y	9a Uj`	5j Uj`UVj]m	@cWUhc b	D\cbY
F Ua Ugk Ua] < Uf]bXfUbuUk	f`\Uf]4 i bgk "YXi "Ui	H\i fgXUmg - "" \$!%\$" \$	&&&Z`F cVYfh K YVghYf	

GW`cc`7 cbhUW`bZcfa Uh]cb

F cca " %&Z`Yj Y"" `F cVYfhK YVghYf`6i]X]b[

D\cbY. f\$&L`- ' ,) `(,) *

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

K YVg]hY: [\hfdg.#gUa "Ufng"i bgk "YXi "Ui](#)

H\Y`GW`cc`cZ`hY`5fng`UbX`A`YX]U`k`ci`X`_]`Y`hc`F`YgdYW`Z`m`5W`bck`YX[`Y`h`Y`HfUX]h]cbU`7`i`g`hcX]Ubgz`h`Y`6YXY[`U`f`P`Ybg]b[`h`cb`W`Ua`di`g`Lz`;`UX][`U`f`7`]m`UbX`5`f`h`8`Yg][`b`7`Ua`di`g`Yg`U`b`X`h`Y`B`[`i`bb`U`k`U`d`Y`cd`Y`f`5`i`g`h`U`]`U`b`8`Y`Z`b`W`:`c`f`W`5`W`U`X`Y`a`m]`b`7`U`b`V`Y`f`U`E`c`Z`h`Y`U`b`X`g`k`Y`Y`f`Y`U`U`W`W`U`a`di`g`c`Z`I`B`G`K`]`g`c`W`U`h`X`"

5 hY`bX`U`b`W`F`Yei`]f`Ya`Y`b`hg

5`gh`XY`bh]g`YI`d`Y`W`X`h`c`U`h`Y`b`X`U`W`U`g`g`W`c`b`h`U`W`h`c`i`fg`Z`c`f`U`Z`J`W`!`h`c`!`Z`J`W`f`l`&`E`c`f`V`Y`b`X`Y`X`W`c`i`fg`Y`U`b`X`W`c`a`d`Y`h`U`W`U`W`j`]h`Y`g`Z`c`f`U`V`Y`b`X`Y`X`c`f`Z`m`c`b`]b`Y`W`c`i`fg`Y`"

5`gh`XY`bhk`c`U`ff]j`Y`g`a`c`f`Y`h`U`b`%`a`]b`i`h`Y`g`U`h`Y`a`U`m`V`Y`d`Y`b`U`]g`Y`X`Z`c`f`b`c`b`!`U`h`Y`b`X`U`b`W`"Z`g`i`W`U`d`Y`b`U`m`]g`]a`d`c`g`Y`X`Z`h`Y`g`h`XY`bh`i`a`i`gh`V`Y`]b`Z`c`f`a`Y`X`j`Y`f`V`U`m`U`h`h`Y`Y`b`X`c`Z`W`U`g`g`U`b`X`U`X`j`]g`Y`X`]b`k`f`]h`b[`k`]h`]b`&(`\`c`i`fg`"

Z`U`gh`XY`bh`YI`d`Y`f`Y`b`W`g`]`b`Y`g`g`Z`a`]g`U`X`j`Y`b`h`f`Y`c`f`c`h`Y`f`c`W`W`f`Y`b`W`h`U`h`a`U`_`Y`g`U`V`g`Y`b`W`Z`c`a`U`W`U`g`g`#`U`W`j`]m`i`b`U`j`c`]X`U`V`Y`Z`c`f`YI`d`Y`W`g`h`c`V`Y`U`V`g`Y`b`h`Z`c`a`U`Z`c`f`h`W`c`a`]b[`W`U`g`g`#`U`W`j`]m`Z`h`Y`m`i`g`l`c`i`X`g`Y`Y`_`d`Y`f`a`]g`g`]c`b`Z`c`a`h`Y`7`c`i`fg`Y`5`i`h`c`f`]m`Z`U`b`X`k`Y`f`Y`U`d`]W`U`V`Y`Z`h`Y`f`f`Y`e`i`Y`g`h`g`l`c`i`X`V`Y`U`W`W`c`a`d`U`b`]Y`X`V`m`U`b`c`f`[`]b`U`c`f`W`f`h`Z`Y`X`W`c`d`m`c`Z`U`a`Y`X`]W`W`f`h`Z`W`U`h`c`f`c`h`Y`f`Z`c`a`c`Z`U`d`d`f`c`f`]U`h`Y`j`]X`Y`b`W`"

5`7`c`i`f`g`Y`5`i`h`c`f`]m`a`U`m`YI`W`g`Y`U`gh`XY`bh`Z`c`a`W`U`g`g`Y`g`c`f`U`W`j`]h`Y`g`Z`c`f`i`d`h`c`b`Y`a`c`b`h`"<`c`k`Y`j`Y`f`Z`h`Y`m`a`U`m`U`g`g`[`b`U`X`X`]h]c`b`U`U`b`X`#`f`U`h`Y`f`b`U`h]j`Y`h`U`g`_`g`h`c`Y`b`g`i`f`Y`W`c`a`d`]U`b`W`"5`7`c`i`f`g`Y`5`i`h`c`f`]m`W`c`b`g`]X`Y`f`b[`h`Y`[`f`U`b`h]b[`c`Z`U`V`g`Y`b`W`a`i`gh`V`Y`g`U`h]g`Z`Y`X`U`gh`XY`bh`k`]`g`h`V`Y`U`V`Y`h`c`a`Y`Y`h`h`Y`W`c`i`fg`Y`g`Y`U`f`b]b[`c`i`h`W`c`a`Y`g`U`b`X`#`f`j`c`i`a`Y`c`Z`Y`U`f`b]b[`5`gh`XY`bh`g`Y`Y`_]b[`U`d`d`f`c`j`U`h`c`V`Y`U`V`g`Y`b`h`Z`c`f`a`c`f`Y`h`U`b`c`b`Y`a`c`b`h`a`i`gh`U`d`d`m`]b`k`f`]h`b[`h`c`h`Y`8`Y`U`b`U`b`X`d`f`c`j`]X`Y`U`c`f`[`]b`U`c`f`W`f`h`Z`Y`X`g`i`d`d`c`f`]b[`X`c`W`a`Y`b`h`U`h]c`b`"

:`c`f`a`c`f`Y`]b`Z`c`f`a`U`h]c`b`U`V`c`i`h`h`Y`U`h`Y`b`X`U`b`W`d`f`c`h`W`c`g`]b`h`Y`:`U`W`m`i`c`Z`5`f`ng`U`b`X`G`c`W`U`G`W`Y`b`W`g`[\hfdg.#k`k`k`"Ufng"i`bgk`"YXi`"Ui`#W`f`Y`b`h`g`h`XY`b`hg`#U`W`U`X`Y`a`\]W`\]b`Z`c`f`a`U`h\]c`b`#d`f`c`h`W`c`g`!`i`\]X`Y`\]b`Y`g`#`](#)

5 W`U`X`Y`a`]W`b`Z`c`f`a`U`h]c`b`

: cf`YggYbh]U`gh XYbh]bZcfa Uhcb`fY`Uh]b[`rc.`fYei Ygrg`Zcf`YI hYbg]cb/fYj]Yk `cZa Uf_g/cVW dUhcbU`\\YU`h
UbX`gUZ`hm/YI Ua]bUhcb`dfcW`Xi fYg/gdYW]U`Wcbg]XYfUhcb`]b`h`Y`Yj YbhcZ]`bYgg`cf`a]gUXj Ybh fY/
gh XYbhYei]mUbX`X]gUV]`]m`UbX`ch`Yf`YggYbh]U`UWXYa]W]bZcfa Uhcbž
gYY`[\hdg.#k.k"Ufng"i bkg "YXi "Uj #W ffYbhgh XYbng#UWXYa \]W\]bZcfa Uhcb#dfcfcW`g!\[i \]XY`\]bYg#](#)

7ci fgY'8YHJ`g

7fYX]hDc]bhr`*`

Gi a a UfmicZhY'7ci fgY

Gi VYWh5fYU. '5dMsf[hWI dff` Y`

H\]g`Wci fgY`dfcj]XYg`mci `k]h`Ub`cddcfh b]mhc`i bXYfhU_Y`k cf_!]bhY[fUHx`YUfb]b[`UbX`[U]b`]bXi gHfm
YI dYf]YbW`k]h`U`cgchcf[Ub]gUhc]b`WcgY`mfY`UHx`hc`mci f`A U`cf`]b`7 fYUhj`Y`K f]h]b[``Mci `a UmU`gc`Udd`m
hc`k cf`_cb`UHUW`a Ybhc]b`Ub`UWXYa]WfYgYUfV`dfc`YWhcf`k cf_]b`Ub`YX]hc]f]U`fc`Y`Zcf`Ub`UWXYa]W
`ci fbU``X`YU`m`mci `k]`i bXYfhU_Y`Ub`]bhYfbg\]d`UZhf`mci `Uj`Y`W`a d`YH`X`%) `mYUfg`cZ`Z`!`h`a`Y`gh`Xmfcf
Yei]j`U`Yb`h`UbX`W`a d`YH`X`U`a]b]a`i`a`cZ`%`!`C`7`]b`h`Y`A`U`cf`5`h`h`Y`YbX`cZ`h`Y`]bhYfbg\]d`mci `k]`
dfcj]XY`U`gi`a`a`U`hj`Y`fYdcfhcZ`mci`f`YI`dYf]YbW`g`UbX`k`cf`_YI`Ua`d`Yg`W`a`d`YH`X`Xi`f]b[`h`Y`]bhYfbg\]d`

H\Y`]bhYfbg\]d`fYei]fYg`U`hc]U`W`a`a`]h`a`YbhcZ`%\$!%)`\$`\ci`fg`cZ`k`cf`_k`]h`U`cgchcf[Ub]gUhc]b`UbX`a`Um
bcfa`U`m`VY`hU`Yb`]b`Z]fgh`gYW`bX`cf`gi`a`a`Yf`g`Ya`Ygh`f``b`h`Yfbg\]d`cddcfh`b]hYg`UfY`UXj`Yfh]gYX`j`]U`h`Y
G`W`cc`cZ`h`Y`5`f`g`UbX`A`YX]U`b`h`Yfbg\]d`B`Y`k`g`Y`h`f`5`h`f`b`U`h`j`Y`m`mci`a`UmUddfcUW`U`fY`Y`j`Ubh
cf[Ub]gUhc]b`hc`Udd`m`Zcf`Ub`]bhYfbg\]d`D`f`cf`hc`g`Y`Y`_]b[`Ub`]bhYfbg\]d`z`mci`g`ci`X`U`h`b`X`Ub`]bhYfbg\]d
]b`Z`fa`U`hc]b`g`Y`gg]cb`fi`b`V`m`h`Y`G`W`cc`cZ`h`Y`5`f`g`UbX`A`YX]U`

Hc`VY`Y`][]V`Y`Zcf`h`g`W`ci`fgY`z`mci`a`i`gh`U`j`Y`U`a`]b]a`i`a`K`5A`cZ`+`\$`"

5h`h`Y`W`b`W`i`g]cb`cZ`h`]g`W`ci`fgY`h`Y`g`h`i`XY`b`h`k`]`V`Y`U`V`Y`hc`

%` \Uj`Y`[`U]bYX`YI`dYf]YbW`cZ]bXi`ghfmdfcW`ggYg`UbX`dfUW]W`g
&`Udd`m`h`Y`cfY]W`W`W`b`W`d`g`UbX`dfUW]W`g`_]`g`[`U]bYX`]b`h`Y`dfc[`fUa`hc`fYU`!`k`cf`X`W`b`h`Y`h`g
'` ``\Uj`Y`Yb`UbW`X`h`Y]f`W`d`U`W`m`Zcf`]bXY`d`Y`b`XY`b`h`Y`b[`U[`Ya`Y`b`h`k`]h`]bXi`ghfmdfcj`]XY`g`

HYUW]b[`G`h`f`U`h`[]Y`g`

H\]g`W`ci`fgY`\Ug`bc`Z`fa`U`h`Y`U`W`]b[`W`a`d`cb`Y`b`h`i`

5ggYgga Ybh

5ggYgga YbhHUg_g`

5ggYgga YbhHUg_	K Y][\h	8i Y'8UH	Gh XYbh@YUfb]b[Ci Hta Yg'5ggYggYX
7 f]h]WU`F YZYW]cb`) \$i	&*`C WcVYF`&\$%	%z&
K cf_`9j]XYbW`) \$i	&*`C WcVYF`&\$%	%z

5ggYgga Ybh8YHU]`g

5ggYgga Ybh%`7 f]h]WU`F YZYW]cb

GHUfhXUH.`

8YHU]`g. `Gh XYbtrg`k]`gi Va]hU`W]h]WU`F YZYW]cb`k \]WVf]YZmXYgW]VYg`hY`hmdY`cZcf[Ub]nU]cb`hYmik YfY
d`UWX`]b`UbX`hY]f`c`Y`k]h]b`]h]XYbh]Z]Yg`U`fY`Yj`Ubhfc`Y`]b`hY`cf[Ub]nU]cb`Uhc`f`WcgY`h`fY`b]f]f]iYj`Y`UbX
hY`g_]`g`UbX`U]f]vi`hYg`bYXYX`h`c`W`a`d`Y`h`gi`W`U`f`c`Y`UXXfYggYg`ck`hY`hmdY`cZk`cf_`hYm`Uj`Y
i`bXYf]U`Yb`#`f`c`Xi`W`X`Xi`f]b[`hY]f`d`UW`a`Ybh`W`b]f]vi`hYg`h`hY]f`cg]h`c`f[Ub]nU]cb`UbX`#`f`fY`Yj`Ubh
]bXi`g]f]f]b`h`g`Ugh`W`a`dcbYbhghi`XYbtrg`g]ci`X`Yi`d`]h]m]fYZYW]cb`gi`W`Z]W`c`fg`Ug`hY`cg]h`#`bXi`g]f]f]m
U[YbXUz`W`U`Yb[Yg`UbX`]bb`k]`%`d]X`Y`m`d`U`d`Z`&`%`b]n]`%`W`h`Y`mik`%`Y`f]b]h`Y`

Gi Va]gg]cb'cZ5ggYgga YbhHUg_g

Gh XYbng'UFY'YI dYW'X'hc'di h'AY]f'bUa Yg'UbX'ghi XYbhbi a VYfg'cb'Yj YfmdU[Y'cZ'AY]f'Ugg][ba Ybng"

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

zmc i 'YbWci bhYf'U'dfcV'Ya 'k \Yb'U'HYa dh]b['hc'gi Va]hmc i f'Ugg][ba Ybh'fci [\ 'Hi fb]h]bzd'YUgY
HY'Yd\cbY'9I HYfbU'Gi ddcfhcb'-' ,) ' ' ' %cf'Ya U]'h'Ya 'cb'[YI HYfbU'HY'fgi ddcfh i bgk "YXi "Ui."](#)Gi ddcfh
\ci fg'UFY' , .\$\$Ua '-'%. \$\$da 'cb'k YY_XUmg'UbX'-. \$\$Ua '-') . \$\$da 'cb'k YY_YbXg'f'*) 'XUmg'U'mYUf'zmc i
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'm'Zcf'Ub'YI HYbg]cbz'Vi hmc i
a i ghfYh]b' mci f'h]W_Yhbi a VYf'Z'ca '9I HYfbU'Gi ddcfhfU'cb['k]h'Ubmc'h'Yf'f'Yj UbhXcW a Ybng'hc
]bWi XY'Ug'Yj]XYbW'hc'gi ddcfhmc i f'YI HYbg]cb'Udd'j]W]h]cb" zmc i 'Ya U]'9I HYfbU'Gi ddcfhmc i 'k]`
Ui 'ca U]W]m'f'YW]j Y'U'h]W_Yhbi a VYfz'Vi h]Zmc i 'HY'Yd\cbY' mci 'k]`b'YX'hc'gdYW]W]m'Ug_'Zcf'cbY"
Hi fb]h]b'U'gc'dfcj]XYg'i dXUHYg'cb'h'AY]f'gmghYa 'ghU'g'cb'Hk]HYf"

; YbYfU'mz'UggYgga YbhHUg_g'a i ghVY'gi Va]HYX'Y'YWfcb]W]mj]U'Y]h'Yf'Hi fb]h]b'cf'U'A ccX'Y
Ugg][ba Ybh' b]bg'U'V'W'g'k \YfY'h']g']g'bchidcgg]V'YZ]hk]`VY'g'U'HYX'cb' mci f'Wci fgY'g'A ccX'Y'g]HY'k]h
U'HYfbU]h] Y'gi Va]gg]cb'XYh]g"

@UH'5ggYgga YbhDYbU'h]Yg

- K cf_gi Va]hYX`%\$`hc`%-`XUmg`UZhYf`h`Y`gh]di`U`hYX`XYUX`]bY`k`j`VY`UggYggYX`UbX`ZYXVUW`dfcj`]XYX`Vi`hU`a`Uf`_`cZnYfc`k`j`VY`fYW`fYX`" `Z`h`Y`k`cf`_`k`ci`X`\\Uj`Y`fYW`j`YX`U`dUgg`a`Uf`_`Vi`hZcf`h`Y`U`h`b`Y`gg`UbX`h`Y`k`cf`_`]g`U`W`a`di`gc`fm`W`i`fgY`W`a`dcbYbhfi`fX`Y`fYei`]fYa`YbhZ`U`gh`XYbhk`j`VY`XYa`YX`h`c`\\Uj`Y`a`Yh`h`UhfYei`]fYa`Ybh`
- K cf_gi Va]hYX`&\$`cf`a`cfY`XUmg`UZhYf`h`Y`gh]di`U`hYX`XYUX`]bY`k`j`bchVY`U`W`W`d`h`Y`Z`cf`UggYgga`YbhUbX`k`j`fYW`j`Y`bc`ZYXVUW`z`a`Uf`_`cf`[`fUXY`" `Z`h`Y`UggYgga`YbhUg`_`]g`U`W`a`di`gc`fm`W`a`dcbYbhicZ`h`Y`W`i`fgY`U`gh`XYbhk`j`fYW`j`Y`Ub`l`bgUhgZUW`c`fm`:`U`]`fl`:`k`[`fUXY`Ug`U`fYgi`h`c`Z`i`bgUhgZUW`c`fmdYfZ`fa`UbVW`]b`Ub`YggYbh]U`W`a`dcbYbhicZ`h`Y`W`i`fgY`"

H\]g`]bZ`fa`U`h`cb`]g`U`gc`Uj`U`]\$ %ofm %o %o %o

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 hWYX]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`i 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 hWYX]hU`bX`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

- i bXYfghUbx'mci f'f][\hg'UbX'fYgdcbg]V]]hYg'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`]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 Uh'cb'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 "

[f\hd.#gi.VYWfi \]XYg" \]VfUfmi bkg "YXi "Ui #'\]gY#UVci h' \]gYt](#)

F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

BchUj U]UV`Y

F YWca a YbXYX`F Ygci fWg

BchUj U]UV`Y

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

Øf]YZmci h]bY`\ck`gh XYbhZYXVUW`fVch`Zcfa U`UbX`]bZcfa U`E`cb`hY`Wci fgY`k]`VY`[U`hYfYXZ`\ck`]h
k]`VY`UbU`mgYX`UbX`\ck`]hk]`VY`UWYX`i dcb`hc`]a dfcj Y`hY`gh XYbh`YUfb]b[`Yl dYf]YbW`": cf`Yl Ua d`Yž
mci `a][\`hX]gW gg`k \Uhk Ug`]XYbh]ZYX`]b`dUghZYXVUW`UbX`\ck`h]g`Wci fgY`k Ug`WU`Ub[YX`hc`UXXfYgg`hY
]ggi Y"Q

⇒ U[Y`7 fYX]h

6cX]Yg/``bhfZUWg`&\$%*

7F ⇒ CG

7F ⇒ CG`Dfcj]XYf`7cXY.`\$\$-` ;