

# **ARTS3290**

9a d]fYg^]b^K cfX^< ]ghcfm

HYfa 'Hk c''##'&\$%-

## 7ci fgY<sup>-</sup>Cj Yfj ]Yk

## GHJZZ7cbHJWh8YHJ]`g`

'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`] <b>m</b>	@cWUhjcb	D\cbY
GU`]\U'6Y`a Yggci g	g"VY`a Yggci g4 i bgk "YXi "Ui	: f]XUmž <sup>*</sup> ;%%*Ua 'hc';&&	A 6' *&	-',)&'*&

## GWXcc``7cbHJWhʻ±bZcfa Uh]cb

GWkcc`cZ<iaUb]hJYg'UbX'@Ub[iU[Yg

@c\\U||cb. G\\cc``C\\Z|\\\žA\cfj\Yb'6fck\b'6i]\X]b[\z'@\j\Y``&z'&),

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

D\cbY.'Ž\*%'&'-',)'%\*,%

: UI . 'Ž \* %'&'-' , ) ', +\$)

9a U]`. \<u>\U`4 i bgk "YXi "Ui</u>

## 7ci fgY 8YHJ] g

#### 7 fYX]hDc]bhg \*

#### Gi a a UfmcZh\Y 7ci fgY

 $\label{thm:condition} $$H\Y'gh XmcZYa\ d]fY']g'Wf]hWU'']b'i\ bXYfghUbX]b['h\Y'dcghWc'cb]U''dfYgYbhz'h\Y'fY!Ya\ Yf[YbW''cZYa\ d]fYz dYfg]gh]b['dfcV'Ya\ g'cZ+bX][Ybci\ g'f][\hg'UbX'hc'WcbhYa\ dcfUfmi bXYfghUbX]b[g'cZ\i a\ Ub'f][\hg'a\ cfY[YbYfU''m''+h\]g'Wci\ fgY'k]'''dfcj]XY'U'Wf]hWU''YI Ua ]bUh]cb'cZ9i fcdYUb'Wc'cb]U'']XYc'c[]Yg'UbX'dfUWhWyg''+h k]'''U'gc'ZcW'g'cb'h\Y']a\ dYf]U''YI dYf]YbW'g'cZWc'cb]nYX'dYcd'Ygz''cc_]b['Uhk Umg']b'k \]W''h\YmYb[U[YXk]h\Ya\d]fY'UWfcqq'd'UWYg'UbX'ha\Y''$ 

9a d]fYg`]b`K cfX`< ]ghcfmk ]``cZYf`mci 'h\Y`cddcfh b]lmhc'i bXYfghUbX`k \Uh`]a dYf]U`]ga 'k Ug`UVci hž\ck `]h W\Ub[YX`h\Y`ZUW`cZh\Y`k cfX`UbX`]rg`]a dUWhcb`h\Y`dfYgYbh'`H\Y`Wci fgY`k ]```ZJa ]`]Uf]nY`mci 'k ]h\`\_Ym WcbW\drgž`hYI hg`UbX`a Yh\cXc`c[]Yg`Zcf`h\Y`ghi XmcZWca dUfUh]j Y`]a dYf]U`]ga 'Ug`k Y```Ug`YUf`m!a cXYfb`UbX a cXYfb`\]ghcfm'`H\cgY`k \c'gi WWggZ\``mWca d`YhY`h\]g`Wci fgY`k]```ghfYb[h\Yb`h\Y]f`UbU`mh]WU``UbX fYgYUfW\`g\_]``g`Ug`k Y```Ug`h\Y]f`\]ghcf]WU``\_bck `YX[Y"

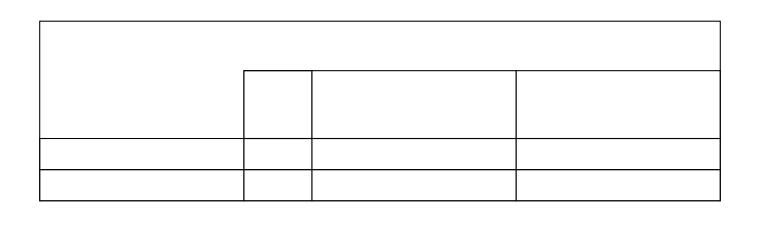
#### 7 ci fgY @YUfb]b[ Ci hWca Yg

%" 5 bU`mgY`\_Ym`Yj Ybhgž']XYUgž'dYcd`Y`UbX'hfYbXg']b`]a dYf]U``\]ghcfm
&" F YUX``cb[!hYfa 'dUhhYfbg']b'Wc`cb]U`]ga 'UbX']a dYf]U``\]ghcfm'UbX'i bXYfghUbX'h\Y]f'g][ b]Z]WUbW'
' " 9 b[ U[ Y'k ]h\ 'Wf]h]WU``XYVUhYg'cb']a dYf]U`]ga 'UbX']hg``Y[ UW]Yg
( " 5 bU`mgY`UbX']bhYfdfYhXcW a Ybhg
) " 7 cbXi Wh]bXYdYbXYbhgWkc`Uf`mYbei ]fm

### HYUWX]b[ GhfUhY[]Yg

F UhjcbU`Y. ``H\Y`Wci fgY`]g`XYg][bYX`hc`YbWci fU[Y`ghi XYbhg`hc`Yb[U[Y`Wf]h]WU``mik ]h\`dUghiUbX`WiffYbh XYVUhYg`UVci h'9i fcdYUb`]a dYf]U`]ga `UbX`]hg`]a dUWficb`Wc`cb]gYX`UbX`Wc`cb]g]b[`gcW]Yh]Yg"'=ik ]```U`gc ]bhfcXi WY`ghi XYbhg`hc`fYWYbhfYgYUfW\`cb`\i a Ub`f][\hg`UbX`h\Y`f][\hg`cZ±bX][Ybci g`dYcd`Yg"'9UW\`k YY\_U`gdYW]Z]W]ggi Y`k ]```VY`h\Y`ZcW g`cZh\Y`fYUX]b[gžh\Y`YWhi fY`UbX`h\Y`gYa]bUf`X]gW gg]cb"

Ghruhy [ ] yg. "H\Y 'fyux]b [ gž u```Vugyx cb 'g\W.c`Ur'm`]h\yfuhi fyždfcj ] Xy 'Wcbhy I hi u``]b\Zcfa Uhjcb" 'H\Y 'cby!\ci f `Y\Wi fy 'dfygybhg '9i fcdyub 'j ]g]cbg cZya d]fy 'VmYI d`cf]b [ 'h\Y '\_\_ym]Xy Ugž ]Xyc`c [ ] yg 'UbX 'gmghya g 'h\Uh gi ddcfhy X 'Ya d]fy!\vi ] `X]b [ 'UbX 'a UbU [ Ya Ybh' +b 'h\Y '&bX 'UbX' 'fX '\ci fgž k Y 'k ]```Zc\W g 'cb 'h\Y 'j c]\W g 'cZ Ya d]fy 'Vmghi Xm]b [ 'Xc\W a Ybhg 'dfcXi \W X 'Vmh\cgY 'k \c``]j YX ']b 'h\cgY 'Ya d]fyg 'f\Wc`cb]gy X 'dycd 'Ygž c\Z\M\U`gž gy hhyfg\!" K Y`U]a 'hc'i bXyfghUbX '\ck ']a dyf]U`gi V'Y\Wg 'YI dyf]yb\W X 'Ya d]fyz ']b 'ch\yf 'k cfXgz`\ck h\ym Yb [ U[ Y 'k ]h\ ]hg']Xyc`c [ ] Ygž ghfi \Wi fyg 'UbX'dc`]\Myg" C i f'dyfgdy\W]j Y 'fh\y']a dyf]U`gi V'Y\Wg'' dc]bhcZ j ]Yk \!!U``ck g'Ua cfY '\&a d`YI 'i bXyfghUbX]b [ 'cZ]a dyf]U`]ga 'UbX']hg 'Y\ZY\Wg'cb'gi V'Y\mdycd`yg"



 $\label{thm:condition} \mbox{Hi fb]h]b"gYh]b" Low Ybh"]g"gi Va ]hhYX"h\fci [\h]b" UbX"ghi XYbhg"Xc"bch"gYY"Hi fb]h]b g]a ]`Uf]hmfYdcfhg" \mbox{Hi fb]h]b"UbX"ghi XYbhg"Xc"bch"gYY"Hi fb]h]b g]a ]`Uf]hmfYdcfhg" \mbox{Hi fb]h]b"UbX"ghi XYbhg"Xc"bch"gYY"Hi fb]h]b g]a [\h]b"UbX"ghi XYbhg"Xc"bch"gYY"Hi fb]h]b g]a [\h]b g]a [\h]b g[\h]b g[\h]$ 

5ggYgga Ybh' . '7`Ugg'hYgh

GhUfhiXUhY. '%#\$, #&\$%- '\$-.\$\$'5A

@Yb[h\."%\$\$"a]bi hYg

**8YHJ]`g**. `±b!WUgg'H'gh'`cb[ 'Ubgk Yf'ei YgH]cbg"'Gh XYbhg'fYWY]j Y'U'bi a Yf]WU``a Uf\_'UbX'Wcbgi `h'h\Y'`YWh fYf Zcf'Z fh\Yf'ZYYXVUW\_"'

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

i i

K YY_'%%''%&'5i [i gh'!'%*	@YWh fY	7`Ugg'hYgh
5i [i gh		

## FYgci fW/g

### DfYgWf]VYX F Ygci fWYg

K YY\_`ma UbXUhcfmfYUX]b[g'UfY'Uj U]`UV`Y'cb'A ccX`Y"

#### FYWca a YbXYX FYgci fW/g

 $\label{eq:local_continuous_cont$ 

5XX]h]cbU`fYUX]b[g`cb`k YY\_mhcd]Wg`WUb`VY`Zci bX`cb`h\Y`A ccX`Y`Wci fgY`dU[Y"

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

 $Gh XYbhZYXVUW_k]^*VY^[UhYfYX^j]U^A m9I dYf]YbWY^UhhYYbX^cZhY^Wci fgY^UbX^hXfci [``U^Vf]YZ]b!WUgg Yj U^i Uh]cb^Xi f]b[^hY^hf]a YghYf''$ 

Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

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

#mci YbWci bhYf'U'dfcV'Ya 'k \Yb'UthYa dr]b['rc'gi Va ]hmci f'Ugg][ ba Ybht\fci [\'Hi fb]r]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'mYUft'''#mci
UfY'i bUV'Y'hc'gi Va ]hmci f'Ugg][ ba YbhXi Y'hc'U'ZJi 'hk ]h\'Hi fb]h]b'mci 'a Um'Udd'mZcf'Ub'YI hYbg]cbž'Vi hmci
a i ghfYhJ]b'mci f'h]W\_Yhbi a VYf'Zfca '9I hYfbU''Gi ddcfhfU'cb['k]h\'Ubmch\Yf'fY'Yj UbhXcW'a Ybhgt'hc
]bWi XY'Ug'Yj ]XYbWY'hc'gi ddcfhmci f'YI hYbg]cb'Udd']WUh]cb'''#mci 'Ya U]''9I hYfbU''Gi ddcfhmci 'k]''
Ui hca Uh]WJ''mfYWY']j Y'U'h]W\_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k]'''bYYX'hc'gdYW]ZWJ''mUg\_'Zcf'cbY''
Hi fb]h]b'U'gc'dfcj ]XYg'i dXUhYg'cb'h\Y]f'gmghYa 'gfUh' g'cb'Hk]hYf"

; YbYfU``mž'UggYgga YbhiHug\_g'a i ghVY'gi Va ]hhYX'Y`YVWfcb]\W)``mj ]U'Y]h\Yf'Hi fb]hjb'cf'U'A ccX`Y Ugg][ ba Ybh'' =b']bgHJb\W'g'k \YfY'h\]g']g'bchdcgg]V`Yž']hk ]``'VY'gHJhYX'cb'mci f'\\circ i fgY'g'A ccX`Y'g]hY'k ]h\ U`hYfbUhj Y'gi Va ]gg]cb'XYHJ]`g''

cfi]bZcfa Uh]cbicbi\ckihcigi Va ]hUgg][ ba Ybhgicbi]bYij ]UiA ccXiY.i\hdg.#gh XYbh'i bgk "YXi "Ui #\ck! qi Va ]hUgq][ ba Ybha ccXiY

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

D`U[]Uf]ga `]g`i g]b[ 'h\Y`k cfXg`cf`]XYUg`cZch\Yfg`UbX`dfYgYbh]b[ 'h\Ya `Ug`mci f`ck b"'\lefi\Wb'hU\_Y`a Ubm Zcfa gžZfca `XY`]VYfUhY`W\YUh]b[ 'hc`UVW]XYbhU`mWcdm]b[ 'Zfca `U`gci f\W' k ]h\ci hUW\_bck `YX[ Ya Ybh'

IBGK [fcidgdu[]Uf]ga ]bhch\YZc``ck]b[ WUhY[cf]Yg.

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'j Yfmg]a ]`Uf'k cfXg'hc'h\Y'cf][]bU`h\I hcf']XYU'k ]h\ci hUW\_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf\_g"'H\]g'U'gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfc YWhgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k ]h\ci h'WfYX]h'

⇒ Uddfcdf]UhY 'dUfUd\fUg]b[.'7\Ub[]b['U'ZYk'k cfXg'UbX'd\fUgYg'k\]Y a cghmfYhJ]b]b['h\Y'cf][]bU`gffi WhifY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU`ž'UbX']bZcfa UhJcb'k]h\ci hUW\_bck `YX[Ya Ybh''H\]g'U`gcUdd`]Yg']b'dfYgYbhUhJcbg'k\YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci hWfYX]h'UbX'hc

# 5 WUXYa]W±bZcfaUhjcb

: cf'YggYbhJU`gh XYbh]bZcfa UhJcb'fY`UhJb['hc.

• fYei Yghg Zcf Yl hYbg]cb/