



# **LING5001**

GYWcbX~@Ub[iU[Y~5Wei]g]h]cb

HYfa 'C bY''##'&\$%-

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

## GHJZZ7cbHJWh8YHJ]`g`

'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
>Ua Yg <sup>·</sup> @YY	0	9	&&* A cfj Yb 6fck b 6i ]X]b[	-',)!%*,%

## 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

Gi VYWh5fYU."@b[i]gh]Wg

H\]g`Wci fgY`ZcW gYg`cb`UWei ]g]h]cb`h\UhiU\_Yg`d`UWY`]b`]bglfi WYX`gYh]b[g`UbX`Wcbg]XYfg`Vch\`W\]X`UbX UXi`hgYWcbX``Ub[i U[Y`UWei ]g]h]cb''`Mci `k]``YI d`cfY`fYgYUfW\`UbX`Udd`mh\Ycf]Yg`cZgYWcbX``Ub[i U[Y UWei ]g]h]cb'hc`]bglfi WYX`WcbhYI hg''`Mci `k]``YI d`cfY`U'j Uf]YhmcZh\Ycf]Yg`UbX`a Ubmj Uf]UV`Ygžgi W\`Ug ]bX]j ]Xi U``X]ZZYfYbWYgžh\Uhi]bZi YbW']bglfi WYX`gYWcbX``Ub[i U[Y`UWei ]g]h]cb`Vch\`Ug`U'dfcWYgg`UbX`Ug`U dfcXi Wf\Vci `k]``YI Ua ]bY`bchcb`mh\Y`gYWcbX``Ub[i U[Y`UWei ]g]h]cb`cZ9b[`]g\`Vi hcZch\Yf``Ub[i U[Y`Ug kY``'Nci `k]``Wca Y`hc`i bXYfgHUbX`h\Y`ZUWcfg`h\Uhi]bZi YbW'h\Y`fci hY`UbX`fUhY`cZUWei ]g]h]cb`Ug`kY```Ug h\cgY`h\UhiUZYWhU`YUfbYffji`i `h]a UhY`UhhU]ba Ybh'

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

%" 9 I d`U]b`h\Y`j Uf]ci g`dfcWfggYg`UbX`dfcXi Wfg`cZ]bglfi WfYX`gYVcbX``Ub[i U[Y`UWei]g]h]cb" &" A U\_Y`i gY`cZUddfcdf]UhY`hYfa ]bc`c[ mhc`X]gWigg`\_YmWcbWfdhg`]b`]bglfi WfYX`gYVcbX``Ub[i U[Y UWei]q]h]cb"

" #bh/fdfYhfYgYUfVX ZjbX]b[g:UbX:Udd`mh\Ya hc]bghfi WhjcbU`WcbhYl hg"

("5ggYgg;h\Y'a Yf]hg;cZj Uf]ci g;UddfcUW\Yg;hc;fYgYUfW\]b[;]bghfi WYX;gYWcbX;``Ub[i U[Y;UWei ]g]h]cb"

#### HYUWX]b[ GhfUhY[]Yg

 $GYWcbX``Ub[iU[Y`UWei]g]h]cb`]g`U`_YmUfYU`cZ5dd`]YX`@]b[i]gh]Wg''`H\]g`WcifgY`ZcW'gYg`cb`UWei]g]h]cb`h\UhHU_Yg`d`UWY`]b`]bghfiWhYX`gYhf]b[g`UbX`Wcbg]XYfg`Vch\`W\]X`UbX`UXi`hgYWcbX``Ub[iU[Y`UWei]g]h]cb''``$ 

H\Y`Wci fgY`Zcfa Uhi]g`h\UhcZU`gYa ]bUf`]b`k\]W\`dfYdUfUhjcb`df]cf`hc`UhhYbX]b[`WUgg`]g`YggYbhJU`hc a YUb]b[Z\``mX]gW gg]b[`Wci fgY`WcbhYbh'`Ghi XYbhg`UfY`Ugg][bYX`kYY\_`mfYUX]b[g`h\UhZcfa `h\Y`VUg]g`cZ\WUgg`X]gW gg]cb"`H\Y`hYghg`gYfj Y`hc`\Uj Y`ghi XYbhg`gmbh\Yg]nY`UbX`Yj U`i UhY`Wci fgY`WcbhYbh'`H\Y`dfYgYbhUhjcb`g]a i `UhYg`U`dfcZYgg]cbU``WcbZYfYbW'`dfYgYbhUhjcb"`H\Y`Z]bU``YggUmU``ck g`ghi XYbhg`hc YI d`cfY`Ub`]ggi Y`cZdYfgcbU``]bhYfYgh'`

# 5 h Yb X Ub WY F Yei ] f Ya Yb hg

5 hh/bXUbW/cZgYa]bUfg']g'aUbXUhcfm]b'h\]g'WcifgY"'IbYIW'gYX'UVgYbW/Zfca'acfY'h\Ub'&\$i 'cZgYa]bUfg'k]``fYgi 'h]b'h\Y'UkUfX'U'ZJ]`'[fUXY"

 $\pm 0.9 Ya ]bUfg`mci `k ]```UWMj Y`mYb[U[Y`k ]h\ `WcfY`Wci fgY`WcbhYbhžYbUV`]b[`mci `hc`UhHU]b`7 @C`%''`$ 

# 7ci fgY GWX YXi `Y

### J ]Yk 'WUgg'h]a YhUV'Y

## H]a YtUV`Y

8UhY	HmdY	7 cbhYbh
K YY_'%'%': YVfi Ufm!'&( : YVfi Ufm	GYa ]bUf	%∵±blfcXi Wjcb
		C j Yfj ]Yk
		&"``7\UdhYf`%"`@Ub[iU[Y`@YUfb]b[`]b`9Uf`m 7\]`X\ccX
		' "'F YgYUfW\'fYUX]b[ '%
		("5 W¶j ]fm
		8 UHJ 5 bU mg]g
K YY_'&.'&) ': YVfi Ufm!'' A UfWX	GYa ]bUf	8 lgW gglcb
A UTVX		%".7\UdhYf:%"'@Ub[iU[Y'@YUfb]b[']b'9Ufm 7\]`X\ccX
		&"`F YgYUfWX`fYUX]b[ `%
		C j Yfj ]Yk
		' "`7\UdhYf`&"`GYWcbX`@Ub[iU[Y`@YUfb]b[
		(""F YgYUfW\"fYUX]b[ "&
		5 Wjj]hm
		) "``8UHJ`5bU`mg]g

K_YY_" ."( "A_UfWX"!"%\$ A_UfWX	GYa ]bUf	8 ]gW gg]cb
A UIVW		%"``7\UdhYf`&"`GYWcbX`@Ub[iU[Y`@YUfb]b[
		&" F YgYUfW\ fYUX]b[ '&
		C j Yfj ]Yk
		' "``7 \UdhYf`("`9  d`U]b]b[ 'GYWbX'@Ub[ i U[ Y @YUfb]b[
		("'F YgYUfW\'fYUX]b[''
		5 W1jj ]tm
		) "`8 UHJ`UbU`mg]g
K YY_'(.'%%'A UfWX'!'%+ A UfWX	GYa ]bUf	8 ]gW gg]cb
A OTT		%"``7\UdhYf"(""9 d`U]b]b["GYWbX"@Ub[iU[Y @YUfb]b[
		&"'F YgYUfV%'fYUX]b[''
		C j Yfj ]Yk
		' "`7\UdhYf`) `CVgYfj ]b[ `@YUfb]b[ `UbX`HYUW\]b[ `]b h\Y`GYWbX`@Ub[ i U[ Y`7`Uggfcca
		("'F YgYUfW\'fYUX]b['(
		5 W1ji ]hm
		' "``8 UHJ`UbU`mg]g
		5ggYgga Ybh'Ugg][ bYX'Zcf'k YY_')
K YY_').'% 'A UfVX'!'&( A UfVX	5ggYgga Ybh	Bc'ZUWY'hc'ZUWY'\ci fg"'H\Y'UggYgga Ybh]g'Xi Y K YXbYgXUmH\Y'&\$h\'cZA UfW\'Vm).\$\$'d"a "'7cj Yfg 7\UdhYfg'%z&'UbX'('UbX'F YgYUfW\'F YUX]b[g'%''"
K YY_'*. '&) 'A UfWX '! '' %	GYa ]bUf	8 ]gW gg]cb
A UfVX		%"``7\UdhYf")

1		h\Y`GYWcbX`@Ub[i U[Y`7`Uggfcca
		&"``F YgYUfVX`fYUX]b[ '(
		Cj Yfj ]Yk
		' "``7\UdhYf`*"'G]I 'dfcdcgU`g`Zcf'gYWcbX``Ub[i U[Y hYUW.]b[
		("'F YgYUfW\'fYUX]b[')
		5 Wj ]hm
		8 UHJ UbU mg]g
		5ggYgga Ybh
		CfU``dfYgYbfUf]cb"`5gg][b`f\Y`fcd]WcZf\Y dfYgYbfUf]cb"`8iY`KYY_`+"
K YY_`+.`%'5df]``!`+'5df]`	GYa ]bUf	8 i Y"'C fu`'DfYgYbhuhjcb"'A i ghVY'i d`cUXYX'hc A ccX`Y'df]cf'hc'&\$\$'d"a "'cb'5df]''' ž'&\$% "
		8 ]gW gg]gcb
		%"``7\UdhYf`*"`G]I`dfcdcgU`g`Zcf`gYWcbX``Ub[iU[Y hYUWX]b[
		&"'F YgYUfW\'fYUX]b[')
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		, 335

		5ggYgga Ybh'
K YY_', .', '5df]`'!'%( '5df]`		5gg][ b HYgh&" 8 i Y '%\$ '5df]" B c 'ZJVW 'hc 'ZJVW '\ci fg" '5ggYgga Ybh'fHYgh'&L ']g 'Xi Y
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K YY_''%) '5df]`'!'&% 5df]`		
Surj		

# FYgci fWyg

#### DfYgWf]VYX F Ygci fWYg

- 6cc\_'-'<ck'@Ub[iU[Yg'5fY'@YUfbYXž'(h\'9X]h]cb"
- F YgYUfW\ 'fYUX]b[g"\'Mci 'k]\``fYWY]j Y\'U\'V]V\]c[fUd\mcZh\Y\'fYUX]b[g"\H\YmUfY\'cifbU\`Uff]WYg Uj\U]\'UV\Y\cb\]bY\h\fci[\\I\BGK\@]VfUfm"

### FYWca a YbXYX FYgci fWYg

BchUj U]`UV`Y

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

A m91 dYf]YbW'fYgdcbgYg'UfY'h\Y'df]a Ufmgci fW'cZghi XYbhZYXVUW\_'hc'h\Y'Wci fgY'Wcbj Ybcf"'\\$Zcfa U'gi fj Ymg'a UmU`gc'VY'i gYX"'F YgdcbgYg']b'h\Y'dUgh\Uj Y``YX'hc'W\Ub[Yg']b'Wci fgY'a UhYf]U`gž']bWUgg UW¶j ]h]Ygž'UbX'UggYgga Ybhg"

#### 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'''#c'ici
UfY'i bUV'Y 'rc'gi Va ]hmci f'Ugg][ ba YbhXi Y'rc'U'ZJi 'hk ]h\'Hi fb]r]b'mci 'a Um'Udd'mZcf'Ub'YI hYbg]cbž'Vi hmci
a i ghfYhJ]b'mci f'r]WYhbi a VYf'Zfca '9I hYfbU''Gi ddcfhfU'cb[ 'k ]h\'Ubmch\Yf'fY'Yj UbhXcW a Ybfgt'rc
]bWi XY'Ug'Yj ]XYbWY 'rc'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'r]W\_Yhbi a VYfž'Vi h]Zmci 'hY'Yd\cbY'mci 'k ]'''bYYX'rc'gdYW]ZJWJ''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"'=hWJb'hU\_Y`a Ubm Zcfa gžZfca `XY`]VYfUhY`W\YUh]b[ 'hc`UWW]XYbhU`mWcdm]b[ 'Zfca `U`gci fWY'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`hYl h'cf']XYU'k]h\ci h'UW\_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'dfcYWgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfX]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`
ghfi Whi fY 'UbX#cf'dfc[ fYgg]cb'cZ]XYUg'cZh\Y'cf][ ]bU`ž'UbX']bZcfa Uh]cb'k ]h\ci h\UW\_bck `YX[ Ya Ybh''H\]g'U`gc
Udd`]Yg']b'dfYgYbhUh]cbg'k \YfY 'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k ]h\ci h\UhYX]hUbX'hc
d]YW]b[ 'hc[ Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk 'k \c`Yž'k ]h\ci h\Uddfcdf]UhY'fYZYfYbW]b[ "

7 c``i g]cb.'k cf\_jb['k]h\ch\Yfg'Vi hdUgg]b['cZZh\Y'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'Ubch\Yf'ghi XYbhVYZcfY'h\Y'Xi Y'XUhYžcf'Zcf'h\Y'di fdcgY'cZh\Ya d`U[]Uf]g]b['UhiUbmh]a Yž'dUm]b['Ubch\Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa ]WhUg\_ž'ghYU']b['cf'UWei]f]b[ Ubch\Yf'dYfgcb'g'UWUXYa ]Wk cf\_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d'YhY'Ubch\Yf'dYfgcb'g'k cf\_'cf'gYY\_]b[ dUma YbhZcf'Wca d'Yh]b['UWUXYa ]Wk cf\_"

±bUddfcdf]UhY`W]hUh]cb.`7]h]b[`gcifWrg`k\]W\`\UjY`bchVYYb`fYUXžk]h\cihUW\_bck`YX[]b[`h\Y`´gYWcbXUfm´gcifWrZfca`k\]W\`\_bck`YX[Y`cZh\Ya`\Ug`VYYb`cVhU]bYX"

8 i d`]\W\n]cb`ffgY`Z\d`U[]\Uf]ga "Ł`gi Va]\n]b[`mci f`ck b`k cf\_z`]b`k \c`Y`cf`]b`dUffz`k \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\nYX`Zcf`Ubch\Yf`UggYgga Ybhcf`\\cf\\text{i fgY`UhI\_BGK\_`cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWnfYZYfYbWlb[ 'dfUWnWyg.

- DUfUd\fUg]b[žgi a a Uf]g]b[žYggUmk f]h]b[ 'UbX h]a Y a UbU[Ya Ybh
- 5ddfcdf]UhY'i gY'cZUbX'Uhtf]Vi h]cb'Zcf'U'fUb[Y'cZa UhYf]U`g']bWi X]b['hYl hž']a U[Ygž'Zcfa i `UY'UbX WbWYdhg"

±0X]j ]Xi U``Ugg]ghUbWr`]g`Uj U]`UV`Y`cb`fYei YghZfca `H\Y`@YUfb]b[ `7 YbhY`f\hd.#k k k "`Wi bgk "YXi "Ui #£" Gh XYbhg`UfY`U`gc`fYa ]bXYX`h\UhWUfYZ ``ha Ybu[ Ya Ybh]g`Ub`]a dcfhUbhdUfhcZgh XmUbX`cbY`cZh\Y ]XYbh]Z]YX`WUi gYg`cZd`U[ ]Uf]ga `]g`dccf`h]a Y`a UbU[ Ya Ybh'`Gh XYbhg`g\ci `X`U``ck `gi Z]W]Ybh'h]a Y`Zcf fYgYUfW\žXfUZh]b[ `UbX`dfcdYf`fYZYfYbW]b[ `cZgci fWfg`]b`dfYdUf]b[ `U``UggYgga Ybh']hYa g"

IBGK @]VfUfmU`gc`\Ugʻh\Y`9@G9`hcc``UjU]`UV`Y`hc`Ugg]ghmci`k]h\`mcif`ghiXmUhIBGK "'9@G9`]gXYg][bYX`hc`]bhfcXiVW`bYk`ghiXYbhg`hc`ghiXm]b[`UhIBGK`Vih]hWUb`U`gc`VY`U`[fYUhfYZfYg\Yf`Xif]b[`mcifqhiXm"

7 ca d'Yhlb[ 'h\Y'9@&9'hi hcf]U`'UbX'ei ]n'k ]`'YbUV'Y'mci 'hc.

 UbU`mgY`hcd]\Mgž'd`Ub`fYgdcbgYg`UbX`cf[Ub]gY`fYgYUf\W\`Zcf'U\WXYa]\Wk f]hjb[`UbX`ch\Yf UggYgga YbhiHUg\_g

- i bXYfglUbX'mci f'f][\hg'UbX'fYgdcbg]V]`]h]Yg'Ug'U'gh XYbhUhi BGK
- VY 'Uk UfY'cZd`U[]Uf]ga ž'Wcdmf][\hzil BGK 'Gh XYbh7cXY'cZ7cbXi WhUbX'5VWWdhUV`Y'I gY'cZ IBGK '=7 H'FYgcifWYg'Dc`]Wm
- VY 'Uk UfY 'cZh\Y 'ghUbXUfXg'cZVY\Uj ]ci f'Yl dYWYX 'cZYj YfmcbY ']b'h\Y 'l BGK 'Wca a i b]hm 'cWUhY 'gYfj ]WYg'UbX']bZcfa Uh]cb'UVci hi BGK 'UbX'l BGK '@]VfUfm

Gca Y'cZh\YgY'UfYUg'k]``VY'ZJa]`]Uf'hc&

] ib g'U'Dc`b

# 5WUXYa]W±bZcfaUhjcb

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

- fYei Yghg Zcf Yl hYbg]cb/`UhY gi Va ]gg]cbg [ i ]XY`]bYg/fYj ]Yk 'cZa Uf\_g/