

# **GSOE9830**

9 Wcbca ]W8 Y W]g]cb 5 b U mg]g ]b 9 b [ ]b Y Y f]b [

# 7ci fgY'Cj Yfj ]Yk

# GHJZ:7cbHJWh8YHJ]`g

#### 7cbj Ybcfg

BUa Y	9a U]`	5j U]`UV]`] <b>m</b>	@cWJhjcb	D\cbY
8f"'G\]j U'5VXc`]	g"UVXc`]4 i bgk "YXi "Ui	\$\$"!"‱.\$\$"a]XXUm		
		UbX'Vm'Uddc]bha Ybh		

#### @YWhi fYfg

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWJhjcb	D\cbY
; i m5``]bgcb	0	\$\$'!'‱.\$\$'a]XXUm UbX'Vm'Uddc]bhaYbh fkYY_'%)}		f\$&Ł'-',) )%-

#### GWkcc~7cbhJWh~abZcfa Uhlcb

#### @cWUhjcb

I BGK 'A YVX.Ub]WU``UbX'A Ubi ZUWi f]b[ '9b[ ]bYYf]b[

5]bgk cft\ 'Vi ]`X]b[ '>%+ž'@Yj Y`'%

5Vcj Y 7 c ZZYY cb 7 Ua di g

# <ci fg

-.\$\$-).\$\$da ž'A cbXUm-: f]XUml

ł7`cgYX'cb'di V`]W\c`]XUmgž'GW\cc``gW\YXi `YX'Yj Ybhg'UbX'I b]j Yfg]hm'G\i hXck b

#### K YV

GWXcc`cZA YWXUb]WU`UbX'A Ubi ZUWi f]b[ '9b[ ]bYYf]b[

9b[]bYYf]b[ Gh XYbhGi ddcfhGYfj ]Wg

9b[]bYYf]b[ \*\DXi ghf]U\"HfU]b]b[

<u>I\_BGK\_'Gh\_Xm5VfcUX'UbX'9I\_V\\Ub[Y</u>'f\(\bar{I}\)cf b\Vci\_bX'gh\_XYb\text{lgk}

#### I BGK : i hi fY Ghi XYbhq

#### D\cbY

fŽ\*%%Ł-',),)\$\$-BiWYigGhXYbh<iV

 $f\check{\mathbb{Z}}^*\%^*\&\&`-'\ ,\ )\ `+^**\%^-'9b[\ ]bYYf]b[\ `^{\oplus}Xi\ glf]U``HfU]b]b[$ 

# 7ci fgY 8YHJ] g

# 7 fYX]hDc]bhg \*

# Gi a a UfmcZh\Y 7ci fgY

Dfc YWijb]hJuhjcb 'UbX'XYj Y`cda YbhžfYj ]Yk 'cZdfUWJWJ'XYWJg]cb!a U\_]b[ 'dfcV`Ya g'UbX'fY`Yj Ubh hYWkb]ei YgžVYbYZh#Wcgh'UbU`mg]gž'hJa Y'j U`i Y'cZa cbYmžBca ]bU``UbX`YZZYWJj Y']bhYfYghfUhYž'WU`W``Uhjcb ]bj c`j ]b[ 'a i 'hJd`Y']bhYfYghiZcfa i 'UYž']bhYfbU``fUhY'cZfYhi fbž'dUmVUW\_'dYf]cX'a Yh\cXž'Wca dUf]gcbg'cZ U`hYfbUhjj Y']bj Ygha Ybhgž'XYdfYWJUhjcb'a Yh\cXgž']bWca Y'HUI 'Wcbg]XYfUhjcbž']bZUhjcbž'fYd`UWYa Ybh'UbU`mg]gž gYbg]hjj ]hmUbU`mg]gž`]ZY!WhWY'Wcgh]b[ žYWcbca ]WUbU`mg]g'cZdfc'YWg"

# 7 ci fgY 5]a g

H\Y'Wci fgY'Wcbg]ghg'cZhk c'gYWf]cbg.

- GYWIcb %fK YY\_g %) LB Yh7 Ug\: `ck 'UbX'9 Wcbca ]W=bX]WUrcfg •
- 'GYW1cb'&'fK YY\_g'\*!\\$\text{F} \]q\_'5bU\ma\]q

H\Y`Wci fgY`k]```ZcW g`cb`dfcj]X]b[`Wca dfY\Ybg]j Y`Wcj YfU[Y`cZh\Y`WcbWfdhg`cZYWcbca]WXYW]g]cb
UbU`mg]g`]b`Yb[]bYYf]b[`UbX`k]``U`gc`UXXfYgg`dfUW]WU``WcbWffbg`cZYb[]bYYf]b[`YWcbca]WUbU`mg]g"`H\Y
cVYW]j Y`cZh\Y`Wci fgY`]g`hc`dfcj]XY`Yb[]bYYfg`UbX`a UbU[Yfg`k]h\`h\Y`\_bck``YX[Y`cZdf]bW]d`YgžVUg]W
WcbWfdg`UbX`a Yh\cXc`c[mcZYWcbca]WXYW]g]cb`UbU`mg]g"`H\]g`k]```Ugg]ghighi XYbhg`]b`XYj Y`cd]b[
dfcZ]W]YbWnk]h\`h\Y`a Yh\cXg`UbX`k]h\`h\Y`dfcWfggYg`Zcf`a U\_]b[`fUh]cbU``XYW]g]cbg`h\YmUfY``]\_Y`mhc
YbWci bhYf`]b`dfcZYgg]cbU``dfUW]WY"

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

5 ZYfgi WWgqZ ``mWa d`YNb['h\]g'Wa fqYžmci 'g\ci `X'VY'UV`Y'hc.

@YUfb]b[ 'Ci hWca Y	95 GHJ[Y %7ca dYHYbW]Yg
%"5dd`mih\Y`_bck`YX[Y`cZgmghYaUh]WYjU`iUh]cb`cZh\Y`Wcghg`UbXVYbYZ]hg`cZdfcdcgYX`hYW\b]WU``UbX`Vig]bYgg`dfc^YWhUbX`jYbhifYg	D9%"&ž'D9%"' ž'D9&"(
&"I bXYfgHJbX'WcghWcbWYdhgž'WJg\'Zck gž'h\Y]f'Ygh]a Uh]cb'UbX ]bhYfYghZcfa i `UY"'5`gcž'hc'i bXYfgHJbX'j Uf]ci g'XYdfYW]Uh]cb a Yh\cXg'UbX'`YUfb'UVci hh\Y'YZZYWhcZ]bWca Y'HJI 'cb'YWcbca m ghi X]Yg	D9%'&ž'D9%'' ž'D9' "(
' "'6Y'ZJa]']Uf'k]h\'j Uf]ci g'a Yh\cXg'Zcf'YWcbca mghi X]Yg'UbX Wca dUf]b['U'hYfbUh]j Y']bj Ygha Ybhg	D9&"' ž'D9&"( ž'D9' "(
("'I bXYfglUbX'h\Y'fc`Y'cZdfcVUV]`]lmiUbU`mg]g']b'XYW]g]cb'a U_]b[ UbX'XYW]g]cb'lfYY'UbU`mg]g	D9%"%ž"D9%"&ž"D9%" ž"D9&"(ž D9' "(
) "'J U`i Y`]bZcfa Uh]cb'UbX'UbU`mgY'U'dcfhZc`]c'cZ]bj Ygha Ybhg	D9&"%ŽD9&"&ŽD9&"' ŽD9' "%Ž D9' "*
*"'7 Uffmici hiA cbhY '7 Ufic 'g]a i `Uh]cbg	D9&"%ŽD9&"&ŽD9&"' ŽD9&"(

# HYUWX]b[ 'GhfUhY[]Yg'

 $FYUX]b[g`UbX``YWi fYg`k]```VY`i gYX`hc`]blfcXi WY`UbX`YI d`U]b`h\Y`h\YcfYh]WU``Zci bXUh]cbg`cZj Uf]ci g\\YWcbca ]WUbU`mg]g`df]bW]d`Yg''`DfcV`Ya 'gc`j ]b[ `YI YfW]gYg`k]```VY`i gYX`hc 'Udd`mUbX`fY]bZcfWY`h\Y i bXYfgHUbX]b[ `cZh\Y`WcbWYdhg`UbX`\ck 'h\YmWUb`VY`Udd`]YX`hc 'gc`j Y`dfcV`Ya g`YbWci bhYfYX`]b`h\Y`fYU` k cfX"`Ghi XYbhg`UfY`YI dYWhYX`hc`Wca d`YhY`h\Y`Ugg][ bYX`fYUX]b[ g`df]cf`hc``YWi fYg`gc`h\Uhih\Ym`WUb$ 

# 5ggYgga Ybh

# 5ggYgga YbhHUg\_g

5ggYgga Ybh'hUg_	K Y][\h	8i Y'8UHY	Gh XYbh@YUfb]b[ Ci hWca Ygʻ5ggYggYX
A cXi `Y%!7`Ugg'HYgh	&\$I	Bch5dd`]WUV`Y	%ž'&ž''
A cXi `Y`% 7`Ugg`HYgh	' \$1	Bch5dd`]WUV`Y	%ž <sup>.</sup> &ž <sup>.</sup> '
A cXi `Y`&!`: ]bU``YbX!cZhYfa Yl Ua ]bUh]cb`	) \$1	Bch5dd`]WUV`Y	(ž)ž*

# 5ggYgga Ybh'8YHJ]`g

5ggYgga Ybh% 'A cXi `Y%17`Ugg HYgh

GhUfhiXUhY. "\$&#%\$#&\$&\$ "\$-.\$\$ "5A

@Yb[ h\. "%"\ci f

8YHJ]`g.

H\Y'YI Ua ']bWi XYg'`YWi fY'a UhYf]U``Zfca 'k YY\_'%'UbX'&'UbX'k ]``\UddYb'Xi f]b[ 'h\Y'k YY\_'' 'WUgg"'

5ggYgga Ybh'& 'A cXi 'Y'%7'Ugg'HYgh

GhUfh'XUhY. '%\* #%\$#&\$&\$ '\$-.\$\$ '5A

@Yb[h\. '&'\ci fg

8YW]`q.

 $HYYIUa k ] ``VuddYb Xi f]b[ hYk YY_') WUgg"'$ 

5ggYgga Ybh' . A cXi `Y`&! : ]bU``YbX!cZhYfa `Yl Ua ]bUh]cb

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\. '&'\cif

8 YW] g.

 $H\Y'Z bu``YIUa]bUh]cb`Zcf`h\Y`WcifgY`]g`U'kf]hhYb`YbX!cZhYfa`YIUa]bUh]cb`cZhkc`\cifg`XifUh]cb`UbX`k]``]bWiXY`aUhYf]U``WcjYfYX`]b`AcXi`Y`&"`$ 

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

# FYgci fWyg

# DfYgWf]VYX F Ygci fWYg

@YWhifYcih]bYgžWcifgYbchYg'UbX'YIYfW]gYg'k]``VY'dfcj]XYX'cb'AccX`Y"

? aaVW, \hdg.##a ccX`Y"hY`h"i bgk "YXi "Ui #c[]b#bXYI "d\d

# FYWca a YbXYX FYgci fW/g

•

HYI h6cc\_'%

K "; "'Gi``]j Ubž'9"A "'K ]\(\w\_q\)z'7"D"'?cY``]b[\\\z'\)b[\\\]bYYf]b[\'9\\c\)bca m'\\\\z'\)DfYbf]\(\w\)''<U``

₺h/fbUh/cbU`ž¨%+h\ '9X"ž'&\$% "

H\]g"hYI hVcc\_\_']g"Uj U]`UV`Y "Zcf"di fVXUgY "Uhih\Y"I BGK "Vcc\_\_'g\cd"

HYI h'6cc\_'&'fcdhcbU'Ł

"8 YW]g]cb '5 bU'mg]g 'Zcf' DYlfc 'Yi a '91 d'cfUl]cb" Z'DUi `BYk YbXcfd'UbX'>c\b'GWXi m\Yfz'D`Ubb]b[ 'DfYgg'&\$\$\$

G@EI > [ToSok i WTe [fWUS` TWSUUWeeW Sf \hdg. #k k k "`]VfUfm'i bgk "YXi "Ui #

# 7 ci fgY 9j U'i Uhcb UbX 8 Yj Y'cda Ybh

: YYXVUW\_cb^h\Y`Wci fgY^]g^[ Uh\YfYX^dYf]cX]WU^mi g]b[ 'j Uf]ci g^a YUbgz^]bWi X]b[ 'h\Y`I BGK a m9I dYf]YbW'dfcW'ggz^]bZcfa U`X]gW gg]cb^]b^h\Y`Z]bU^WUgg^Zcf^h\Y`Wci fgYzUbX^h\Y`GW\cc^\*g Gh XYbh#GhUZZa YYh]b[ g"'Mci f^ZYYXVUW\_]g^hU\_Yb^gYf]ci g`mzUbX^Wcbh]bi U``]a dfcj Ya Ybhg^UfY^a UXY^hc^h\Y Wci fqY^VUqYXz^]b^dUfhz^cb^gi W\ZYYXVUW\_"

±0 'h\]g'Wci fgY'fYW'bh]a dfcj Ya Ybhg'fYgi `h]b[ 'Zfca 'dfYj ]ci g'mYUfg' 'ZYYXVUW\_']bWi XY'a cfY'fYU'!`]ZY Yl Ua d`Yg'UbX'WJgY'ghi X]Ygž'Ug'k Y```Ug'dfcV'Ya g'gc'j YX']b'XYa cbghfUh]cb'UbX'dfcj ]XYX'cb'A ccX'Y"'5```cZ h\YgY'gi [ [ Ygh]cbg'UfY']bWcfdcfUhYX']bhc'h\Y'Wci fgY'gm`UVi g"

# Gi Va ]gg]cb cZ5ggYgga YbhHUg\_g

# 5ggYgga Ybhgi Va ]gg]cb UbX a Uf\_]b[ Wf]hYf]U

G\ci`X'h\Y'WcifgY'\UjY'Ubmbcb!Y`YWfcb]WUggYgga Ybh'gi Va ]gg]cbž'h\YgY'g\ci`X'\UjY'U'ghUbXUfX GW\cc`'WcjYf'g\YYh'

5```gi Va ]gg]cbg`UfY`YI dYWYX`lc`VY`bYUh`UbX`WYUf`mgYhci h'`Mci f`fYgi `hg`UfY`h\Y`d]bbUWY`cZU```mci f`\UfX k cf\_'UbX`g\ci `X`VY`lfYUh'X`k ]h\`Xi Y`fYgdYWf'`DfYgYbh]b[ `fYgi `hg`WYUf`m[ ]j Yg`h\Y`a Uf\_Yf`h\Y`VYghW\UbW' cZi bXYfgHUbX]b[ `mci f`a Yh\cX/Yj Yb`]Zh\Y`bi a Yf]WU``fYgi `hg`UfY`]bWcffYWf

A Uf\_]b[ '[ i ]XY`]bYg`Zcf`Ugg][ ba Ybhgi Va ]gg]cbg`k ]```VY`dfcj ]XYX`Uhh\Y`gUa Y`h]a Y`Ug`Ugg][ ba YbhXYhU]`g hc`Ugg]ghk ]h\`a YYh]b[ 'UggYggUV`Y`fYei ]fYa Ybhg"`Gi Va ]gg]cbg`k ]```VY`a Uf\_YX`UVWcfX]b[ 'hc`h\Y`a Uf\_]b[ [ i ]XY`]bYg`dfcj ]XYX"

#### @UhY 'dc`]Wh

 $\label{thm:condition} $$HY^UHY'dYbU'mm]g'Udd']YX'dYf'WUYbXUf'XUmf]bWi X]b['k YY_YbXg'UbX'di V']W\c`]XUmgŁ'h\Uh'h\Y UggYgga Ybh']g'cj YfXi Y'''H\YfY']g'bc'dfc!fUhU'cZh\Y''UhY'dYbU'mmZcf'gi Va ]gg]cbg'a UXY'dUfhk Umh\fci [\'UXUm'$ 

K cf\_'gi Va ]hh'X`'UZh'f'h\Y`'XYUX`]bY`Zcf`'UVgc`i h'Y`ZJ]`'`]g'bchUVWVdh'X`'UbX`U'a Uf\_'cZnYfc`k]```VY`'Uk UfXYX Zcf`h\Uh'UggYgga Ybh']h'a "

: cf`gca Y`UggYgga Ybh`]hYa gž`U``UhY`dYbU`hma UmbchVY`Uddfcdf]UhY"`H\YgY`UfY`WYUf`m`]bX]\WUhYX`]b`h\Y Wci fgY`ci h`]bYž`UbX`gi W\`UggYgga Ybhg`fYWY]j Y`U`a Uf\_`cZnYfc`]ZbchWca d`YhYX`Vmh\Y`gdY\\JZ]YX`XUhY" 9I Ua d`Yq`]bWi XY.

%" K YY\_`mcb`]bY`hYghg`cf``UVcfUhcfmk cf\_`k cfh\`U`ga U```dfcdcfh]cb`cZh\Y`gi VYWha Uf\_žcf &" C b`]bY`ei ]nnYg`k \YfY`Ubgk Yfg`UfY`fY`YUgYX`hc`gh XYbhg`cb`Wca d`Yh]cbžcf

- ' "DfcZYgg]cbU``UggYgga Ybh'hUg\_gž'k\YfY`h\Y`]bhYbh]cb`]g`hc`WfYUhY`Ub`Ui h\Ybh]WUggYgga Ybh'h\Uh\Ug`Ub`UVgc`i hY`gi Va ]gg]cb`XUhYžcf
- ("DUgg# U]`UggYgga YbhHJg\_g"

# 91 Ua ]bUh]cbg

Mci 'a i gh'VY'Uj U]`UV`Y'Zcf'U```ei ]nnYgž'hYghg'UbX`YI Ua ]bUh]cbg": cf'Wci fgYg'h\Uh\Uj Y'Z]bU``YI Ua ]bUh]cbgž h\YgY'UfY'\Y`X'Xi f]b[ 'h\Y'I b]j Yfg]hmYI Ua ]bUh]cb'dYf]cXg.': YVfi UfmZcf'Gi a a Yf'HYfa ž'A UmZcf'H%ž 5i [ i gh'Zcf'H&ž'UbX`Bcj Ya VYf#8 YWYa VYf'Zcf'H' "

D`YUgY'j ]g]ha m BGK 'Zcf'Dfcj ]g]cbU``91 Ua ]bUh]cb'h]a YhUV`Y'di V`]g\'XUhYg": cf'Z fh\Yf']bZcfa Uh]cb'cb Yl Ua gž'd`YUgY'gYY'h\Y'<u>91 Ua g</u>'k YVdU[Y"

# GdYW/U`7cbg]XYfUhcb

⊋mci `\Uj Y`YI dYf]YbW/X`Ub`]``bYgg`cf`a ]gUXj Ybh fY`VYmcbX`mci f`Wcblfc``h\Uhk ]```]bhYfZYfY`k ]h\`mci f

I BGK 'bck '\Ug'U': ]hhc'G]h#Gi Va ]hfi 'Y

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

 $\label{lem:bound} I \ B G K \ ``Ug`Ub`cb[c]b[`Wcaa]ha Ybhhc`ZcghYf]b[`U`W`h fY`cZ`YUfb]b[`]bZcfa YX`VmUWJXYa]W]bhY[f]hm'`5``I B G K ``gh XYbhg`\Uj Y`U`fYgdcbg]V]`]hmhc`UX\YfY`hc`h\]g`df]bW]d`Y`cZUWJXYa]W]bhY[f]hm'`D`U[]Uf]ga$ 

# 5 WUXYa ]W = b Zcfa Uh cb

# 7 fYX]hdc]bhg

7 ci fgY'WfYX]hi]g'WU'W'`UhYX']b'I b]hg!C Zi 7 fYX]hifl C 7 L"'H\Y'bcfa U``k cf\_`cUX'YI dYWfUh]cb'Zcf'cbY'I C 7 ]g'UddfcI ]a UhY`m'&) '\ci fg'dYf'hYfa "'H\]g']bWi XYg'WUgg'WcbhUWh'\ci fgž'df]j UhY'ghi Xmž'ch\Yf'`YUfb]b[ UWfj] ]h]Ygž'dfYdUfUh]cb'UbX'h]a Y'gdYbh'cb'U``'UggYggUV`Y'k cf\_"

A cghWci fgYk cf\_'Wci fgYg'Uhl BGK 'UfY'\*'I C 7 'UbX']bj c'j Y'Ub'Ygh]a UhYX'%) \$'\ci fg'hc'Wca d'YhY'''9UW\ Wci fgY']bWi XYg'U'dfYgWf]VYX'bi a VYf'cZ\ci fg'dYf'k YY\_'fl\#\ E'cZgW\YXi 'YX'ZUWY!hc!ZUWY'UbX#cf'cb`]bY WcbhUWi'5bmUXX]h]cbU`'hja Y'VYmcbX'h\Y'dfYgWf]VYX'WcbhUWi\ci fg'g\ci 'X'VY'gdYbh]b'a U\_]b[ 'gi fY'h\Uh mci 'i bXYfghUbX'h\Y''YWi fY'a UhYf]U'ž'Wca d'Yh]b[ 'h\Y'gYhUgg][ ba Ybhgž'Z fh\Yf'fYUX]b[ ž'UbX'fYj ]g]b[ 'Zcf UbmYl Ua ]bUh]cbg"

# Cb!WUa di g WUgg UHYbXUbW

Di V`]WX]gHJbW]b[ `WcbX]h]cbg'a i gh'VY`Zc``ck YX`Zcf'U```H' `ZJ\WY!hc!ZJ\WY`WUggYg":Hc`Ybgi fY`h\]gž'cb`m ghi XYbhg`Ybfc``YX`]b`h\cgY`WUggYg'k ]```VY`U``ck YX`]b`h\Y`fcca "`7`Ugg`fcghYfg`k ]```VY`UhtUW\YX`hc WcffYgdcbX]b[ `fcca g`UbX`W]fW``UhYX`Ua cb[ ``UV`XYa cbghfUhcfg"'Bc'cj Yf!Ybfc`a Ybh]g`U``ck YX`]b`ZJ\WY!hc! ZJ\WY`WUgg"'Ghi XYbhg`Ybfc``YX`]b`cb`]bY`WUggYg`WJb`gk Ud`h\Y]f`Ybfc`a YbhZca 'cb`]bY`hc'ch\Yf`UXX]h]cbU`ž' Vi h``]a ]hYXž'bi a VYf`cZcb!WJa di g`WUggYg`VmGi bXUmž'K YY\_`%"D`YUgY`fYZYf`hc`mci f`Wci fgYfg`A ]\WcgcZh HYUa g`UbX`A ccX`Y`g]hYg`Zcf'a cfY`]bZcfa Uh]cb`UVci h`WUgg`UhhYbXUbWY`Zcf']b!dYfgcb`UbX`cb`]bY`WUgg gY\W]cbg#J\W]j ]h]Yg"

Mci f`\YU`h\`UbX`h\Y`\YU`h\`cZh\cgY`]b`mci f`WUgg`]g`Wf]h]WU``mi]a dcfhUbh''Mci 'a i ghighUmUh\ca Y`]Zmci 'UfY q]W\_`cf`\Uj Y`VYYb`UXj ]qYX`hc`qY`Z]qc`UhY`VmBGK\_'\YU`h\`cf`[cj Yfba Ybh'Ui h\cf]h]Yq"'7 i ffYbh'U`Yfhq`UbX`U

- 5ddfcj YX 7 U W `Uhcfg
- 5WUXYa 1W<cbYghmiUbX'D'U[]Uf]ga

# a dcfhUbh'@]b\_g

- <u>A ccX`Y</u>
- <u>@UV:5\W\Ygg</u>
- < YU`h\ 'UbX'GUZYhm

# 5ddYbX]I . '9b[]bYYfg'5i ghfU`]U'f95Ł'DfcZYgg]cbU` '9b[]bYYf'7ca dYhYbWm GHJbXUfX

Dfc[fUa =bhybXYX=@YUfb]b[ 'Ci hWca Yg	
?bck `YX[Y`UbX'g_]```VUgY	
D9%"%7ca dfY\Ybg]j Yž'h\YcfmVUgYX'i bXYfghUbX]b[ 'cZh\Y'i bXYfd]bb]b[ 'bUhi fU`'UbX d\mg]\WJ`'g\WJYb\Wg'UbX'h\Y'Yb[ ]bYYf]b[ 'Z bXUa YbhJ`g'Udd`]\WJV`Y'hc'h\Y'Yb[ ]bYYf]b[ 'X]g\WJd`]bY	
D9%"&"7cbWYdh U``i bXYfgHJbX]b['cZh\Y'a Uh\Ya Uh]Wgžbi a Yf]WJ``UbU`mg]gžgHJh]gh]Wgž'UbX Wca di hYf`UbX`]bZcfa Uh]cb'gW]YbWYg'k\]W\'i bXYfd]b'h\Y'Yb[]bYYf]b['X]gW]d`]bY	
D9%" '=b!XYdh\'i bXYfghUbX]b['cZgdYW]U`]ghVcX]Yg'cZ_bck `YX[Y'k]h\]b'h\Y'Yb[]bYYf]b[X]gW]d`]bY	
D9%'( '8]gWfba YbhcZ_bck `YX[ Y 'XYj Y`cda YbhUbX'fYgYUfWX 'X]fYWf]cbg'k ]h\]b'h\Y Yb[ ]bYYf]b[ 'X]gW]d`]bY	
D9%) '? bck 'YX[Y'cZYb[]bYYf]b[ 'XYg][b'dfUWjWY'UbX'WcbhYl hi U`'ZJWcfg']a dUWjb[ 'h\Y Yb[]bYYf]b[ 'X]gWjd`]bY	
D9%"* I bXYfgHJbX]b[ 'cZh\Y'gWcdYž'df]bW]d`Ygž'bcfa gž'UWVci bHJV]`]h]Yg'UbX'Vci bXg'cZ gi gHJ]bUV`Y'Yb[ ]bYYf]b[ 'dfUWfJWY']b'h\Y'gdYW]ZJWX]gW]d`]bY	
9b[]bYYf]b['Udd`]WUh]cb'UV]`]hm	
D9&"%5dd`]WUh]cb`cZYgHUV`]g\YX`Yb[]bYYf]b[`a Yh\cXg`hc`Wca d`Yl `Yb[]bYYf]b[`dfcV`Ya gc`j ]b[	
D9&"&": `i YbhiUdd`]WUh]cb'cZYb[]bYYf]b['hYVXb]ei Ygžhcc`g'UbX'fYgci fWYg	
D9&" '5dd`]WUh]cb`cZgmghYa Uh]WYb[]bYYf]b[`gmbh\Yg]g`UbX`XYg][b`dfcWYggYg	
D9&"('5dd`]WUh]cb'cZgmghYa Uh]WUddfcUWXYg'hc'h\Y'WcbXi WhUbX'a UbU[Ya YbhcZYb[]bYYf]b[dfcYWng	
DfcZYgg]cbU`'UbX'dYfgcbU`'Ultf]Vi hYg	
D9' "%'9h\]WU`'WcbXi Wh'UbX'dfcZYgg]cbU`'UWWci bHJV]`]hm	
D9' "&'9ZYWAj Y'cfU`'UbX'k f]MYb'Wcaaib]WUAjcb']b'dfcZYgg]cbU`'UbX'`Um'XcaU]bg	
D9' "' '7 fYUhjj Yž']bbcj Uhjj Y'UbX'dfc!UWhj Y'XYa YUbci f	
D9' "( 'DfcZ/gg]cbU`i gY'UbX'a UbU[ Ya YbhcZ]bZcfa Uh]cb	
D9' ") 'C fXYf'mia UbU[ Ya YbhcZgY`Zi'UbX`dfcZygg]cbU``WcbXi Wh	
D9' "* '9ZZYWNjj Y'NYUa 'a Ya VYfg\]d'UbX'NYUa 'YUXYfg\]d	