

HUMS1006

DfYgYbhUhjcb UbX 7 ca a i b]WUhjcb G_]~g

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

7ci fgY'Cj Yfj]Yk

GHJZZ7cbHJWh8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]hm	@cWUhjcb	D\cbY
6fmcb] ⁻ HfYn]gY	V"lfYn]gY4 i bgk "YXi "Ui			

GWXcc~7cbhJWh~abZcfa Uhlcb

GWXcc`cZh\Y'5fhg'UbX'AYX]U

Fcca " %&ž@YjY`" žFcVYfhK YVghYf'6i]X]b['f) %(Ł

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

9a U]`. 'gUa 4 i bgk "YXi "Ui

K YVg]hY. k k k "Ufhg"i bgk "YXi "Ui #gUa

 $\label{eq:hamiltonian} $$HY'GW.cc``cZh,Y'5ftg'UbX'AYX]U'k ci`X``]_Y'tc'FYgdYWM\cong \cong m5W_bck``YX[Y'th,Y'HfUX]tjcbU``7i gtcX]Ubg\cong hY'6YXY[U'``fPYbg]b[tcb'WJa di g\cong \cong \cong \cong mUbX'5fti/'8Yg][b'7Ua di gYg\cong \cong \con$

7ci fgY 8YW] g

7 fYX]hDc]bhg * *

Gi a a UfmcZh\Y'7ci fgY

:]bX'mci f'j c]WY'UbX'gdYU_'k]h\'WcbZJXYbWY'''HY```U'ghcfmž'd]hW\'U'WcbWYdhž'Yb[U[Y'Ub'Ui X]YbWY'UbX'g\UfY]XYUg''' +b'h\]g'Wci fgYž'mci 'k]```YUfb'\ck 'hc'a U_Y'mci f'a Uf_']b'h\Y'k cf'X'''\Mci 'k]```XYj Y`cd'g_]``g']b dfYgYbhYh]cb'UbX'Wca a i b]\Wh]cb'i gYX'Vm]bZi YbhJU```YUXYfgž'Wca dY``]b['ghcfmhY``Yfg'UbX'YZY\Wh]j Y dfYgYbhYfg'''\Mci 'k]```ghi XmghcfmhY``]b['Vm`YUX]b['U\Wcfgž'a chjj Uh]cbU``gdYY\W.Yg'\Vmdck YfZi `\Waa a i b]\Whcfgž'UbX'di \Y']\WgdYU_]b[']b'dfcZYgg]cbU``dfU\Wj\\"'DfU\Wj\\"'\k cf_g\cdg'k]``']bhfcXi \W'\mci 'hc hY\\\b]ei Yg'cZUi X]Yb\W'\Uk UfYbYggž'd\mg]\\U'\dfYgYb\W'\UbX'j c\\U'\dfcYY\Job"'6m\Zc``ck]b['YI Ua d`Yg'UbX fY\YUfg]b[']b'\WJggž'mci 'k]```XYj Y`cd'h\Y'\CbZ]XYb\W'\hc'dfYgYbhmci f']XYUg']b'Ub'Ui h\YbhJ\Wj c]\\W'\UbX \Wca a i b]\\Uh\Y'\mci f'a YggU[Y'k]h\'\wUf]\mubX'\\cby b]\\Wfcb''

7ci fgY @YUfb]b[Ci hWca Yg

- %" XYgWf]VY`UbX`Yj U`i UhY`\ck `dfYgYbhYfg`Wca a i b]\WhY`]b`U`fUb[Y`cZ[YbfYg`UbX`WcbhYl hg &" UbU`mY`UbX`Udd`mdfYgYbhUh]cb`hY\W.b]ei Yg`]b'j c\W``dfcY\W]cbž'd\mg]\WJ``dfYgYb\W`ž'Ui X]Yb\W
- Uk UfYbYggž'UbX`WYUf`Wca a i b]WUh]cb ' " d`Ubž'fY\YUfgY`UbX`XY`]j Yf`Ub`Yb[U[]b[`dfYgYbhUh]cb`Zcf`Ub`Ui X]YbWY
- ("fYgdcbX'Wcbglfi WfjY'mhc'dfYgYbHJhcbg'[]jYb'Vmch\Yfg

HYUWX]b[GhfUhY[]Yg

H\Y``YWi fYg`gi fj Ymh\Y`[YbfYg`UbX`WcbhYl hg`cZcfU``Wca a i b]\Wlf]cbž'di V`]\WgdYU_]b['UbX`WfYUh]j Y dfYgYbhUh]cb']b' dfcZ\gg]cbU``dfU\Wf\W'`UbX`gc\\]U```]Z\"'H\YmU`gc'\UXXfYgg`_Ym\\cb\W'dhgž]ggi Yg`\UbX\UddfcU\W\Yg`]b'\WfYUh]b['Y\ZY\\Mj Y'dfYgYbhUh]cbg\"+\b'h\]g'h\U\W\Yf! 'YX`ghf\Uh\[n\vec{x}`YUfb]b['k]```VY`Yl Ua d`Y!\Xf]j Ybž'dfcj]\X]b['U'a cXY``\Zcf`\ck 'ghi XYbhg`\Wb`XYj Y`cd'dfYgYbhUh]cb'g_]``g'\mghi Xm]b['[fYUh df\gYbhUh]cbg'[]j Yb'\m]bZi YbhJ\U``YUXYfgž'hU`Ybh\X`dYf\Zcfa Yfgž'UbX`\calla aY``]b['ghcfmh\``Yfg"

H\Y'hi hcf]U'g'dfcj]XY'Ub']bhYfUWf] Y'`YUfb]b['Ybj]fcba YbhZcf'ghi XYbhg'hc 'XYj Y`cd'dfYgYbhUh]cb'g_]``g h\fci [\'dfUWf]WD'`Yl YfW]gYg'UbX']a a YX]UhY 'ZYYXVUW_"'DfUWf]WD``UWf]]h]Yg'hUi [\hi]b'U'k cf_g\cd! a cXY']bhfcXi WY'ghi XYbhg'hc 'hYW\b]ei Yg'cZUi X]YbWY'Uk UfYbYggž'd\mg]WD``dfYgYbWY'UbX'j cWU'`dfc YWf]cb" 6mZc``ck]b['Yl Ua d'Yg'UbX'fY\YUfg]b[']b'WUggž'ghi XYbhg'k]```XYj Y`cd'h\Y'WcbZ]XYbWY'hc'dfYgYbhh\Y]f'ck b ghcf]Yg']b'UbX'UbX'Wca a i b]WUhY a YggU[Yg'k]h\ WUf]hmUbX'Wcbj]Wf]cb"'H\]g'U'dfUWf]WY! VUgYX'ghfUhY[mZcf'`YUfb]b[!VmXc]b["'H\Y'hi hcf]U'g'U'gc'dfcj]XY'h\Y'WcbhYl hZcf'h\Y'Z]fghUggYgga YbhihUg_. \\
\ddyUgg'UbX'cb']bY'Yl YfW]gYgž'&'l '' a]bi hY'dfYgYbhUh]cbgz'cbY'fYWcfXYX'fUi X]c'cf'j]XYcłz'cbY'`]j Y"
Ghi XYbhg'fY!dYfZcfa 'U'[fYUhgdYYW\'fYWcfXYX'VmUb'UWhcfz'dc`]h]W]Ub'cf'`YUXYf"'\d'UbX'Ya UcXmhYW\b]ei Yg"

H\Y`cb`]bY`WcbhYbh]g`Zcf`dYfgcbU`]gYXz̃gY`ZX]fYWYX``YUfb]b["`Ghi XYbhg`UfY`cZYfYX`U`a Ybi `cZcb`]bY WcbhYbhZca `k\]W\Th\YmW\ccgY`U'dYfgcbU`]gYX`gYei YbW`fY`Yj Ubhhc`h\Y]f`ck b`dfcZygg]cbU``WcbhYl h`UbX]bX]j`]Xi U```YUfb]b['bYYXg"'Ghi XYbhg`k]``Wca d`YhY`UʻgYhbi a VYf`cZa cXi `Yg`Zfca 'h\Y`a Ybi "`H\Y`a Ybi 'k]``]bWi XY`WcbhYbhUbX``YUfb]b['UWhj]hJYg`]b`h\fYY`ghfYUa g. `fl\ZdfYgYbhUh]cb`[YbfYg`fXfUa UhJWa cbc`c[i Ygž [fYUhgdYYW\YgžghcfmhY``]b[žghUbX! i d`Wca YXmzdc`]hJWD``gdYYW\YgžY`Yj Uhcf`d]hW\Ygž_YmbchYdfygYbhUh]cbgžWifYa cb]U``gdYYW\Yg`UbX`gc`cb\Zf\ZdfYgYbhUh]cb hYW\b]ei Y`fcfU``f\Yhcf]Wzj cWD``dfcYWhJcbz`UWhJb['hYW\b]ei Yz`Ui X]YbWY`UXXfYggz*gdYU_]b['hc`WWa YfUz`]ghYb]b[`UbX`Ug_]b['ei YghJcbgz*]a dfcj]gUhJcb`UbX`gc`cb\Zf\LYI UbX`fI EYI Ua d`Yg`cZdfYgYbhUhJcbgz*Vch\

YZZYWIj Y 'UbX' fi/ UXfi' fY'Yj Ubhihc'h, Y' dfc Zygg]cbU` 'WcbhYl hg' UbX' X]gW]d`]bY 'c Zh, Y' ghi XYbhg" 'H\Y'cb`]bY 'YUfb]b['ZYYXg']bhc'h, Y' gYWcbX' UggYgga YbhihUg_. 'Ub' UbU'mi]WU` fYdcfhcb' U'WJgY' ghi Xmž'%) \$\$'k cfXg" Ghi XYbhg'k f]hY' U'fYdcfhiUbU`mn]b['WcbhYl hz' [YbfY' UbX'hYW, b]ei Yg']b' U'dfYgYbhUh]cb' WkcgYb' Zfca 'U'`]ghic Z`]j Y'UbX'fYWcfXYX'Yl Ua d`Yg"'H\Y'fYdcfhdfcj]XYg'Ub'cddcfhi b]lmiZcf'ghi XYbhg'hc'Yj U'i UhY'\ck'dfYgYbhYfg Wca a i b]WUhY' UbX'hc'UbU'mnY'h, Y]f'hYW, b]ei Y"

H\Y`Z\bU``UggYgga YbhitUg_`]g`U`ghi XYbhi`YX``YUfb]b[``ghfUhY[mi'`9UW\`ghi XYbhdfYdUfYg`Ub`cf][`]bU` dfYgYbhUhjcb`]b`U`gdYWjZ\W[YbfYž`XfUk]b[``cb`WcbhYbhih\Uh]g`fY`Yj Ubhirc`h\Ya "`H\YmXY`]j Yf`h\Y dfYgYbhUhjcb`Y]h\Yf``]j Y`]b`WUggž`cf`Ug`U`fYWcfX]b[``gi]hUV`Y`Zcf`cb`]bY`X]ghbf*]]cb` XY` b`hfUhYb[``gW\b]e

5ggYgga Ybh

Ghi XYbhg D`YUgY BchY

5```a Uf_g'UfY'dfcj]g]cbU``i bhj``h\Ym\Uj Y'VYYb'Zcfa U``mWcbZ]fa YX'Vmih\Y': UW\`hm5WUXYa]WE i U`]hm 7 ca a]hhYY'Uhih\Y'WcbWi g]cb'cZYUW\`hYfa "'A Uf_g'a UmVY'gi V'YWhc'W\Ub[Y'Zcfj Uf]ci g'fYUgcbg]bWi X]b[''h\Y'Udd`]WUh]cb'cZ`UhY'dYbU`h]Ygž'a cXYfUh]cb'UbX'h\Y'Udd`]WUh]cb'cZUWUXYa]Wa]gWcbXi Wh dYbU`h]Yg"

Gh XYbhgʻUfYʻfYei]fYXʻhcʻa U_YʻUʻ[Ybi]bY`UhhYa dh'UhYUWXʻUggYgga YbhhUg_`]bʻcfXYfʻhcʻVYʻY``][V`YʻhcʻdUgh h\]gʻWci fgY"

5ggYgga Ybh HUg_g

5ggYgga Ybh'hUg_	K Y][\h	8iY'8UhY	Gh XYbh@YUfb]b[Ci hWca Ygʻ5ggYggYX
DfYgYblUljcb	(\$1	Bch5dd`]WUV`Y	&ž [.] ' ž [.] (
5bU`mhjWU``FYdcfhi`	' \$ı	&"%8i Y`A cbXUm&%>i bYž) da /&"&`8i Y`A cbXUm>i `m % ž`) da /&"' `8i Y`: f]XUm 5i [i gh* ž'a]Xb][\h	% ` &
±b!WUgg*UbX*C b*]bY 91 YfWjgYg*	' \$I	DfYgYbhYX`]b`WUgg`]b`K YY_g '`UbX`)"`%"%8i Y`Hi YgXUm %) /&"&'8i Y`cb`Hi YgXUm >i bY`&-	%ž [*] &

5ggYgga Ybh'8YhJ]`g

5ggYgga Ybh% DfYgYbhJh]cb

GhUfh'XUhY. '&+#\$+#&\$&%'%\$.\$\$'5A

@Yb[h\. ** a]bg

8YHJ]`g.

* a]bi h/ fl \$\$ k cfX Yei]j UYbhŁdfYgYbhUh]cbžY]h\Yf^]j Y cf^fYwcfXYX"

Hi fb]hjb gYhjb[. H\]g]g bchU Hi fb]hjb Ugg][ba Ybh

5ggYgga Ybh& 5bU`mhJWU`FYdcfh

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\. '' 'l ') \$\$ 'k cfX 'Ugg][bYa Ybhg 'Xi Y 'K YY_g '(ž - 'UbX '%\$"

8YHJ]`g.

'I') \$\$ "k cfX "UbU"mh]WU" fYdcfhg i d'cUXYX ij]U"Hi fb]h]b"

 $\label{thm:limit} \begin{tabular}{ll} Hi & fb \end{tabular} $$ Hi & fb \end{tabular} $$ h' \end{tabular} $$ Hi & fb \end{tabular} $$ h' \end{tab$

5ggYgga Ybh' . =b!WUgg UbX Cb`]bY 9l YfWJgYg

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\.^&!' a]bg^YUW\^dfYgYbfUf]cb^!^&^dfYgYbfUf]cbg^hcfU^

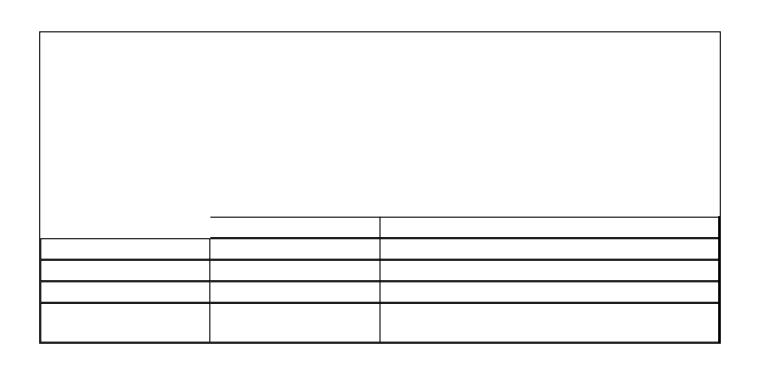
8 YHJ] g.

&`I`&!'`a]bi`hY`]b!WUgg`dfYgYbHJhjcbg`ZJWj`]hUhYX`Vmcb`]bY`acXi`Yg": YYXVUW_`j`]U`@AG.`fi`Vf]W]bX]WJhjb[``Yj`Y``cZ`dYfZcfaUbWY`U[U]bghYUW\`UggYggaYbh'Wf]hYf]Už`kf]hhYb ZcfaUhj`yY`ZYYXVUW_ž`UbX`dYfWYbhJ[Y`[fUXY"

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

D`YUgY`gYY`h\Y`Wci fgY`A ccX`Y`Zcf`a cfY`]bZcfa Uh]cb"

Hi fb]hjb gYhjb[. H\]g]g bchU Hi fb]hjb Ugg][ba Ybh



FYgci fWyg

DfYgWf]VYX F Ygci fWYg

 $\label{thm:composition} $$HY'A ccX'Y'[U`Yfmdfcj]XYg'Ub'Yl HYbg]j Y'fYgci fWY'cZj]XYcgž'HYWXb]ei Y'fY\YUfgU`'k cf_g\cdg'UbX dfUWf)WU`Yl YfW]gYg''$

FYWca a YbXYX FYgci fWfg

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

±JZcfa U``ZYYXVUW_`]g`[Uh\YfYX`cb`h\]g`Wci fgYždUffjW``Uf`mh\fci [\`h\Y`gWJZc`XYX UW\]Yj Ya Ybhg`ghi XYbhg`Yl dfYgg`]b`h\Y]f`UggYgga YbhiHug_g"'±b`&\$&\$`h\]g`Wci fgY`k Ug`fi b`YbhjfY`mcb`]bYž]b &\$&%k Y`k]```VY`Vf]X[]b['ci f`fYW\bhiX]gWcj Yf]Yg`k]h\`cb`]bY`dfYgYbhUhjcb`Zcfa Uhg`k]h\`hfUX]hjcbU` dfYgYbhUhjcb`Zcfa Uhg"

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

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

⊋mci YbWci bhYf'U'dfcV`Ya 'k \Yb'UhYa dhJb['hc'gi Va]hmci f'Ugg][ba Ybhh\fci [\'Hi fb]hJbž'd`YUgY hY`Yd\cbY'9| hYfbU`'Gi ddcfhcb'-',) '' ' ' %cf'Ya U]`'h\Ya 'cb'Y! hYfbU`hYhgi 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'mYUfŁ'''⊋mci UfY'i bUV'Y'hc'gi Va]hmci f'Ugg][ba YbhXi Y'hc'U'ZJi `hk]h\'Hi fb]hJb'mci 'a UmUdd`mZcf'Ub'Y! hYbg]cbž'Vi hmci a i ghfYhJ]b'mci f'hJW_Yhbi a VYf'Zfca '9! hYfbU`'Gi ddcfhfU`cb['k]h\'Ubmch\Yf'fY`Yj UbhXcW a YbhgŁ'hc

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"'=h\Wb'hU_Y`a Ubm Zcfa qžZfca 'XY`]VYfUhY'W\YUh|b['hc`UWW]XYbhU`mWcdm]b['Zfca 'U'gci fW'k]h\ci h'UW_bck 'YX[Ya Ybh'

 $IBGK''[fcidg'd'U[]Uf]ga'']bhc'h\Y'Zc``ck]b['WUhY[cf]Yg.$

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'] 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'YWgž'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` ghfi Wh fY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU'žUbX']bZcfa Uh]cb'k]h\ci hUW_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 hWfYX]hUbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk 'k \c`Yžk]h\ci hUddfcdf]UhY'fYZYfYbW]b["

7 c``i g]cb. 'k cf_jb['k]h\ 'ch\ Yfg'Vi h'dUgg]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 'XUhYzcf'Zcf'h\ Y' di fdcgY'cZh\ Ya d`U[]Uf]g]b['Uh'Ubmh]a Yz'dUm]b['Ubch\ Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_z'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[ˈgci fW/gˈk \]WX`\Uj Y`bchVYYb`fYUXžk]h\ci hUW_bck`YX[]b[ˈh\Y`″gYWcbXUfm″gci fW/Zfca ik \]WX`_bck`YX[Y`cZh\Ya`\UgʻVYYb`cVhU]bYX"

8 i d`]\WUh]cb`ffgY`Zd`U[]\Uf]ga "Ł`gi Va]\h]b[`mci f`ck b`k cf_ž]b`k \c`Y`cf`]b`dUfhžk \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\hYX`Zcf`Ubch\Yf`UggYgga Ybhcf\Wci fgY`UhI BGK `cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWhfYZYfYbWb[dfUWhWyg.

- DUfUd\fUq]b[žgi a a Uf]q]b[žYggUmk f]h]b['UbX'h]a Y'a UbU[Ya Ybh
- 5ddfcdf]UhY'i gY'cZUbX'Uhff]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 #£" Ghi XYbhg`UfY`U`gc`fYa]bXYX`h\UhWUfYZ ``h]a Y`a UbU[Ya Ybh']g`Ub`]a dcfhUbhdUfhcZghi XmUbX`cbY`cZh\Y]XYbh]Z]YX`WUi gYg`cZd`U[]Uf]ga `]g`dccf`h]a Y`a UbU[Ya Ybh'`Ghi XYbhg`g\ci `X`U``ck `gi Z]W]Ybh'h]a Y`Zcf fYgYUfW\z`XfUZh]b[`UbX`dfcdYf`fYZYfYbW]b[`cZgci fWg`]b`dfYdUf]b[`U```UggYgga Ybh']hYa g"

IBGK @]VfUfmU`gc`\Ugʻh\Y`9@&9`hcc``UjU]`UV`Y`hc`Ugg]ghmci`k]h\`mcif`ghiXmUhIBGK"`9@&9`]g XYg][bYX`hc`]bHfcXiWY`bYk`ghiXYbhg`hc`ghiXm]b[`UhIBGK`Vih]hWUb`U`gc`VY`U`[fYUhfYZfYg\Yf`Xif]b[`mcif

- i bXYfgfUbX mci f'f][\hg'UbX'fYgdcbg]V]`]hJYg'Ug'U'gh XYbhUhl BGK
- VY`Uk UfY`cZd`U[]Uf]ga ž`Wcdmf][\hz'l BGK `Gh XYbh7cXY`cZ7cbXi WhUbX`5VWWdhUV`Y`l gY`cZ I BGK `=\forall H`F Ygci f\W\g`Dc`]\m\m
- 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'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 bXYfgHJbX]b['cZU``h\YfY`UhYX'UgdYWng'cZ9@+69'k]``\Y`d'mci 'a U_Y'h\Y'a cghicZmci f'ghi X]Yg'UhI BGK "'\\hd.##qi VYWfi |XYg"`]VfUfm'i bqk "YXi "Ui #\`]qY#JVci hY`]qY

5WUXYa]W±bZcfaUhjcb

: cf'YggYbhJU`ghi XYbh]bZcfa UhJcb'fY`UhJb['lc.