

ARTS3060

:]`a ']b 'h\ Y 'A Y X]U '@Ub Xg WUd Y

HYfa "Hk c" ## "&\$&\$

7ci fgY'Cj Yfj]Yk

GHJZZ7cbHJWh8YHJ]`g

7cbj Ybcfg

B Ua Y	9a U]`	5j U]`UV]`]lm	@cWUh]cb	D\cbY
A Y`Ub]Y'F cVgcb	a "fcVgcb4 i bgk "YXi "Ui	K YXbYgXUm	B <i>#</i> 5	7 cbHJWhVm
		‰Ua !‰da		Ya U]`

GWkcc~7cbhJWh~abZcfa Uh]cb

GVXcc``cZhY`5fhg`UbX`AYX]U

Fcca ' %&ž@YjY`' žFcVYfhK YVghYf6i]`X]b[fl %(Ł

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

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

K YVq]hY. k k k "Ufhq"i bak "YXi "Ui #qUa

 $\label{eq:hamiltonian} $$HY'GWKcc``cZhY'5ftg'UbX'AYX]U'kci`X``]_Y'hc'FYgdYWM\cong \cong m5W_bck`YX[Y'h\Y'HfUX]hjcbU``7ighcX]Ubgžh\Y'6YXY[U'`fPYbg]b[hcb'WJadigŁž'; UX][U'`fP]hmUbX'5fh\/'8Yg][b'7UadigYgŁ'UbX'h\Y'B[ibbUkU`dYcd'Y'fbighfU`]Ub'8YZYbW': cf\W'5\WJXYam]b'7UbVYffUŁ'cZh\Y'`UbXg'k\YfY'YUW\'WJadig'cZIBGK']g`c\WJhYX''$

7ci fgY 8YHJ] g

7 fYX]h'Dc]bhg'*

Gi a a UfmcZh\Y 7ci fgY

H\]g`Wci fgY`YI Ua]bYg`h\Y`g\]zh]b[`d`UWY`cZZ]`a`]b`h\Y`a YX]U``UbXgWUdY`VmifUVJb[`h\Y`k Umg`h\UhZ]`a`\Ug fYgdcbXYX`hc`UbX`UfW\]j YX`]hg`]bhYfUWJcbg`k]h\`ch\Yf`a YW\Ub]WU``UbX`Y`YWfcb]Wa YX]U`f]bWi X]b[`fUX]cž HJ ž'h\Y`h`fbhUv`Yž'h\Y`hY`Yd\cbYž'UbX`X][]hU``WUdh fY`UbX`gmbh\Yg]g\!"6mYI Ua]b]b[`h\Y`\]ghcfmcZa YX]U Wcbj Yf[YbW\gž]hh\YfYVmd`UW\g``"bYk `a YX]U`]b`U`VfcUXYf`\]ghcf]WU``ZfUa Yk cf_"'H\Y`Wci fgY YI Ua]bYg`\ck ']bX]j]Xi U``Z]`a gž`[YbfYgž'UbX`Zcfa UhJcbg`cZWJbYa U`\Uj Y`UXXfYggYX`fYg]Xi U`ž'Ya Yf[Ybhž UbX`Xca]bUbha YX]U`h\fci [\`h\Y]f`Zcfa U``UbX`ghm]ghJWY`Ya Ybhgž'h\Ya UhJWWcbWfbgž'UbX`YI\]V]hJcb dfUWJ\Wg"'6mWca dUf]b[`X]ZZYfYbhZcfa g`cZa cj]b[`]a U[Y`a YX]Už'h\Y`Wci fgY`U`gc`YI d`cfYg`\ck 'dfUWJ\Wg cZUfW\]j]b[`a YX]U`hYI hg`UbX`hYW\bc`c[]Yg`h\fci [\`j Uf]ci g`ghcfU[Y`a YX]U`g\UdY`i bXYfghUbX]b[g`cZh]a Y UbX`\]ghcfJWU``W\Ub[Y"

H\Y'Wci fgY']g'ghfi Whi fYX'Ufci bX'h\fYY'_Ymhcd]Wg.

fl&:\]ghcfmcZZcfa g`cZa YX]U`Wcbj Yf[YbWlž fl&:fYg]Xi U``UbX`cVgc`YhY`a YX]Už fl Ea YX]U'hja Yg`UbX`\]ghcf]c[fUd\m'

7 ci fgY @YUfb]b[Ci hWca Yg

 $\%'' <]ghcf]WU``m'WcbhYl hi U`]gY'U'fUb[Y'cZaYX]U'Zcfag'UbX'hYW\\bc`c[]Yg$

&"FYWc[b]gY'h\Y'\]ghcf]WU`Zcfa Uh]cb'cZmcif'cVYWhg'cZghiXm

- '" I bXYfgHJbX:gca Y:cZh\Y:dc]bhg:cZ]bhYfgYWhjcb:VYhk YYb:XYVUhYg:]b::]`a 'H\YcfmžA YX]U'H\Ycfmž UbX:7f]h]WU`:H\Ycfm
- ("8YjY`cd`U`Wf]hJWJ``Uf[iaYbh]b`fY`Uh]cb`hc`XYVUhYg`YId`cfYX`]b`h\Y`WcifgY
-) " 7 cbXi WhUbX XYd`cmfYgYUfWX]b :]`a 'H\Ycfm
- *" 7 cbhYl hi U`]gY`mci f`ck b`Wf]h]WU``dcg]h]cb`]b`U`XYVUhY`UbX`fYWc[b]gY`]hg`fY`Uh]cb`hc`ch\Yf`Wf]h]WU` dcg]h]cbg`UbX`Uf[i a Ybhg
- +"8Yg][b'UbXibXYftU_Y'U'fYgYUfWX'dfcYWh
- , "K f]hY`U`WYUfžghfi Whi fYXžYggUm`]bZcfa YX`VmXYVUhYg`]b`:]`a `H\Ycfm

HYUWX]b[GhfUhY[]Yg

5ddfcUWXYg hc "YUfb]b['UbX hYUWX]b[']b h\]g Wci fgY UbX hYUWX]b['ghfUhY[]Yg

H\]g`Wci fgY`]g`Hui [\hih\fci [\k\YY_`m`YWi fYgz'gWfYYb]b[gz'UbX'hi hcf]U`g''H\Y`YWi fYg`UfY`ghfi Wi fYX Ufci bX'h\Y'hcd]WZcf'h\Uhk\YY_'UbX'dcg]h]cb'h\Y'hcd]W]b`fY`Uh]cb'hc Vch\'h\Y'ZJY`X`]hgY`ZUbX`]b`fY`Uh]cb'hc dfYj]ci g`k cf_'Wcj YfYX`]b`h\Y'Wci fgY''H\Y'gWfYYb]b[g`UfY'i gYX'hc'Yl d`cfY'h\Uhhcd]WUbX#cf'hc'`cc_'Uh\ck 'U'Z]`a 'cf'Z]`a a U_Yf'dcgYg'dUfh]W``Uf']ggi Yg'UbX'ei Ygh]cbg'cZfY`Yj UbW'''H\Y'hi hcf]U`g'UfY ghi XYbh%Z/ _%(('YX`X]gWi gg]cbg']b`k\]W\'h\Y'WUgg'k]```k cf_'h\fci [\'h\Y'XYVUhYg'h\Uh'Y'VY]b[UXXfYggYXžfU]gY`ei Ygh]cbg'UVci hh\Y`a UhYf]U``VY]b['Yl d`cfYXžUbX'VY[]b'hc'hU_Y'h\YgY`XYVUhYg']b'bYk X]fYWf]cbg'''Hc'Ybgi fY'h\Uhh hcf]U`g'fi b'YZYWfj Y`m]Yž'h\Uh]ggi Yg'Wb'VY'Yl d`cfYX`UbX'XYVUhYX¾33]h]g la dcfhUbhh\Uhmci 'Xc'h\Y'fYUX]b[g'Zcf'h\Uhk YY_'TW&dWWUgg'UbX'bchY'Xck b'UbmdfcV`Ya g'cf'ei Ygh]cbg k]h\'h\Y'a UhYf]U``gc'h\Uhh\YmWbb'VY'fU]gYX']b'X]gW gg]cb''

5g k Y```Ug h\Y`YggYbh]U``fYUX]b['Zcf'h\Y`Wci fgYžghi XYbhg`g\ci `X`U`gc'i bXYfhU_Y`h\Y]f`ck b`]bXYdYbXYbh

fygYUfVX.'Ufci bX'hcd]Vg'UbX'Z]`a 'dfUWf)W'g'Wcj YfYX']b'h\Y'Wci fgY"'H\]g'fygYUfWX 'k]``'Vy'dUff]W``Ufm j U`i UV`Y'Zcf'h\Y'fygYUfWX'YggUmfh\Y'a U'cf'd]YW'cZUggYgga Ybhz'UbX'k]``'U`gc'YbUV`Y'ghi XYbhg'hc'Vf]b[ch\Yf'ei Ygh]cbg'UbX'WcbW'fbg']bhc'X]gW gg]cb']b'gYa]bUfg"'H\Y'hYUWX]b['ghfUhY[]Yg'i gYX']b'h\]g'Wci fgY UfY'U]a YX'Uha YYh]b['h\Y'Wci fgY'U]a g'UbX'ci hWca Yg"'@YWfi fYg'dfcj]XY']bZcfa Uh]cbž'WcbhYl hz'UbX X]gW gg]cb'Uvci hXYVUhYg'UbX'WcbW'dhg'h\UhiUfY'VY]b['UXXfYggYX/gYa]bUfg'UfY'cf]YbhYX'hck UfXg XYj Y`cd]b['mci f'UbU'mf]WU`g_]``g'UbX'UV]`]mhc'XYj Y`cd'Ub'Uf[i a Ybhz'Vi hih\YmUfY'U`gc'U]a YX'Uh XYj Y`cd]b['ghi XYbhgfig_]``g']b'[fci d'XYVUhY'UbX'Wf]hJWU`X]gW gg]cb'''±b¾Z/ _%((/WUgg'Yl YfW]gYg'UfY'U]a YX UhXYj Y`cd]b['g_]``g']b'Zj`a 'UbU`mg]g'UbX'Wf]hJWU``fYUX]b["'H\YmU]a 'hc'Ugg]ghghi XYbhgfiUV]`]hmhc'Udd`m WcbWdhg'hc'bYk 'a UhYf]U'`UbX']a dfcj Y'mci f'i bXYfghUbX]b['cZh\YcfYh]WU``WcbWdhg'UbX'hYfa g"'H\Ya] l' cZ`YWfi fYgzgYa]bUfgzgWfYYb]b[g'UbX']bXYdYbXYbhYUfb]b['YbUV'Y'ghi XYbhg'hc'Wf]hJWU``mYl d`cfY'UbX'XYVUhY WcbWdhg'Ug'k Y``Ug'VY[]b'hc'Udd`mh\Ya'hc'h\Yfgfck b'UfYUg'cZ]bhYfYgh''

5ggYgga Ybh

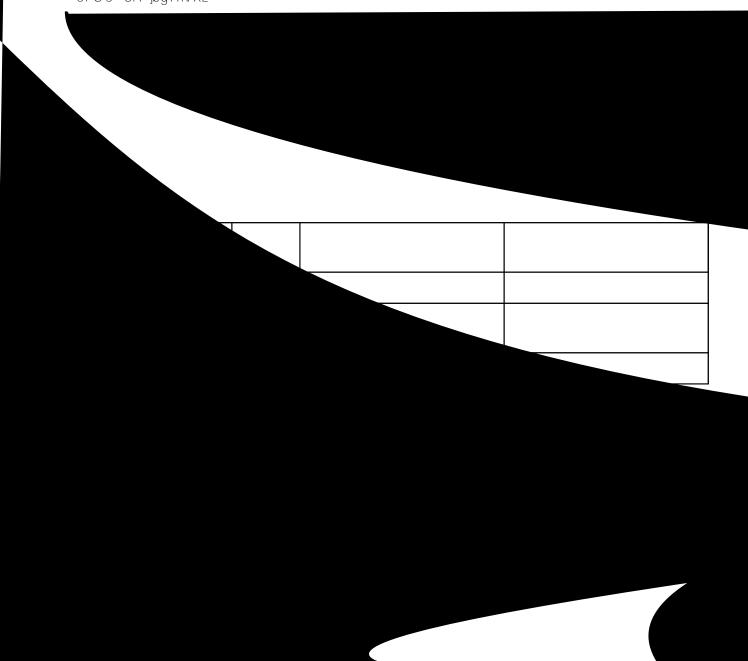
$h\Y\gci\ f\W'\ hmd\Yg\``]gh\YX\'i\ b\XYf\ h\Y\'7\\]WU[\ c\ 'hU\V''$

: cfa Uhhjb['WjhJhjcbg']b'h\Y'V]V`]c[fUd\m $\,$

- FYZYfYbWYg'aighVY``]ghYX'U'd\UVYh]WU``m'
- $\bullet \ \ F\ YZYfYbWYg`]b`th`Y`fYZYfYbWY\#/]V`]c[\ fUd\ m`]ghg\ ci\ `X`VY`]bXYbtYX`cb`th`Y`gYWcbX``]bY`f]b`WUgYg k \ YfY`fYZYfYbWY`]g'tk c`cf`a cfY``]bYgŁ"$
- H\Y'Y'Ya Ybhgž'cf'gYWhobgž'cZh\Y'Whuhjcb'UfY'gYdUfUhYX'Vm'Z\```ghcdgž'bch'Wca a Ug"
- Di V`]g\]b['XYHJ]`g'Zcf'Vcc_g'UfY'bchYbWcgYX']b'VfUW_Yhg"

Di bWhi Uh]cb.

- $\bullet : \mathsf{cchbchYg'UbX'fYZYfYbWYg'g\backslash ci`X'U'k\ Umg'YbX'k\]h\ `U'Z\ ```ghcd'fYI\ WYdh']b'h\ Y'WUgY'cZk\ \backslash YfY'U'I\ F@cf'8C = UfY']bgYfhYXŁ''$



dUfU[fUd\"

.

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

 $\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& G\cfh7c``UVcfUhjj Y`F YgYUfVX '9I YfWjgY

GhUfhXUhY. Bch5dd`]WUV`Y

@Yb[h\.'%)!&\$'a]bihYg'Ž'%)\$'kcfXg

8YHJ]`g.

%) !&\$ a]bi h/ `Wc``UVcfUhjj Y'dcXWUghfYWcfX]b[`d`i g'%) \$!k cfX`]bX]j]Xi U``fYZYWhjcbg"': YYXVUW_. `G\cfh k f]hh/b`UbX#cf'j YfVU``Wca a Ybhgžd`i g'bi a Yf]\\\\\'`[fUXY"''

.

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

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

5ggYgga Ybh' @cb[YfFYgYUfWX 9lYfW]gY

GHJfh'XUhY.

@Yb[h\. &) \$\$ k cfXg

8YW]`g.

&) \$\$`k cfXg": YYXVUW_.; fUX]b[`g\YYh]bX]WUh]b[`dYfZcfa UbWY`U[U]bghWf]hYf]U`UbX`gi a a Uh]j Y`Yj U`i Uh]j Y dUfU[fUd\"```

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

 $\label{thm:limit} \begin{tabular}{ll} Hi & fb & fb & gYh &$

5 https://bxubww.Fyei]fyaybhg

Ghi XYbhg`UfY`ghfcb[`mYbWcifU[YX`hc`UhhYbX`U```WUggYg`UbX`fYj]Yk ```YWhifY`hY`wcfX]b[g'' All for the following of the follo

7ci fgY GWX YXi `Y

<u>J]Yk 'WUgg'hja YHUV'Y</u>

H]a YHJV`Y

8UhY	Hmd Y	7 cbhYbh
K YY_'%'%'>i bY'!') '>i bY	@YWi fY	DUfh%=blfcXi Wcfm`YWi fY.K \Uh]g'U'a YX]i a 3 K \Uh]g'Ub'UfhZcfa 3'=g'Z]`a 'lfi `mUb'UfhZcfa 3'K \Uh]g'h\Y'fY`Uh]cbg\]d'VYlk YYb'Z]`a 'UbX'&\$h\'Wbh fm a YX]U3'
		DUfh'&:]`a 'UbX'F UX]c.'k]fY`Ygg'hYW\bc`c[mcb'h\YV]['gWfYYb"'H\]g'k YY_'k Y'k cbXYf'UVci hih\Y'a U'cff]j U``a YX]i a 'lc']`a 'VYZcfY'K K = fUX]c"'K \UhX]X']h a YUb'ZcfYj Yfm\ca Y'lc'\Uj Y'U'`][\hgdYYX'\cc_!i d lc'bYk 'bUh]cbU`'bYlk cf_g'cZWca a i b]WUh]cb'UbX UXj Yfh]g]b[3' <ck 'fygdcbx'lc'h\]g'h\fyuhb="" 'h\y'x]gya="" 'x'bchwca="" 'x]x']`a="" \yff="" \yfy.'cb'yj=""]h\'gi="" a="" bck="" c]wy'k="" cbh\g'cf="" dyhy'k="" fz']b="" g'dfcxi="" h\yuhfyg'ubx'g\ck]b['z]`a="" myufg'yuf']yfz'wci="" td="" u'cf<="" ug'`]h\fu``m="" uzgh]``z]i="" vcx]yx'j="" w\]bghu="" wyx'a="" yfmcz]wy''7]bya="" yfmduf'ci="" yfmk="" yfmwcfbyfz']b'yj="" yj="" yx`m`cwuh'x']b'`uf[y=""></ck>

>i bY		VY[Ub Ug U fig] Yb Hia YX]i a žk \]W a YUbg H\Uh a i g]Wk Ug d `UmY X ``]j Y fUh\Yf H\Ub]a df]b HY X cb H\Y Z] a ghf]d" 6i h]b h\Y ``UhY '% &\$gž Ub Ui X]c hfUw_k Ug UXXYX hc h\Y YX[Y cZh\Y Z] a ghf]d hc U ``ck Zcf gmb W fcbci g gci b X fY dfc Xi Wf]cb Zcf h\Y a cj]b[]a U[Y" 6i h]b [U]b]b[U j c] W z Z] a U `gc fficc_U \]hfi]b hY fa g cZh\Y g`ck]b[Xck b cZ W]bYa Uhc[fUd\]W YI dfYgg]cb hc U ``ck Zcf X]U `c[i Y" G]b W h\Uh XUhY z Z] a `\Ug VYYb \Ui bhY X Vm]hg ck b gci b X hYUw_Ub X h\Y j Yfm]XYU cZgci b X fY Wcf X]b[Ub X fY dfc Xi Wf]cb" K]h\ h\Y fY YUgY cZY Yghfca U[bYh]WhUdY a UW\]b Yg UZhYf K K =z h\Uh XYVhhc fY Wcf XYX gci b X VY WUa Y cV Y Wf] Y `m Wcff Y `UhY X k]h\ U f]j U `a Y X]i a ":] a fig dfY c WW dUh]cb k]h\ Ui X]c h\UdY]g U hcd]WU``hc]hgY Z'
	GWfYYb]b[GYa]bUf	4 Wolf Wolfs`Eag`VEfgV[a'fGlf]W_`UbXžI?ž&\$\&\ 8]qWigg]cb'cZ4 Wolf Wolfs`Eag`VEfgV[a UbX'WUgg
		fYUX]b[g"
K YY_`(.`&&`>i bY`!`&* >i bY	@YWi fY	:]`a 'UbX'd\chc[fUd\m']bXYI]WU`]mžfYdfcXi Wi]cbž a ch]cb"'5g'kY'U``_bck ž'Zj`a ']g'd\chc[fUd\m&('I dYf'gYWcbX"'H\Y'd\chc[fUa g'h\Uha U_Y'i d'h\Y Zj`a ghf]d'WcbghUbhmfYZYf'h\Y'a YX]i a 'hc']hg d\chc[fUd\]WVUgY/UbX'Zj`a g'_bck 'h\]g'j Yfmk Y``" <ck 'i="" 'x'h\ymk="" 'xc'zj`a="" \mk="" a="" c'i="" cf'x3'k\uhix]zzyfybwy'xcyg']ha="" ci="" cj="" d3'k="" d\chc[fud\g'fa="" g'h\uh="" g'hc'fgyyfh\y'd\chc[fua="" g'u``ck="" h\y'k="" h]cb3<="" k\uh]g'h\y'fy`uh]cbg\]d'vyhk="" td="" u_y'h\ya="" u_y'k\yb="" ubhhc'xc'h\]g3="" x][]hu`'fyj="" yf3'k\uhi\ug'w\ub[yg'g]bwy'h\y="" yyb'd\chc[fud\mubx=""></ck>
	GWfYYb]b[4 'ai ŽGb f5bhcb]cb]žl ? ž% **Ł
	GYa]bUf	8]gW gg]cb'cZ4'ai ŽGb UbX'WUgg'fYUX]b[g"
K YY_`).`&-`>i bY`!'' `>i `n	GWYYb]b[:]a UbX hY Yj]g]cb#]XYc. a UbU[]b['h\Y h\fYUh' H\YfY]g ']hiY ei Ygh]cb h\Uhh\Y a U'cf h\fYUh'c Z]a fig\Y[Ya cbm]b h\Y h\ Ybh]Yh\ 'WYbh fm\Wa Y Zfca 'h\Y gc!\W``YX fvccV h VYfzh\Y figei UfY!YmYX a cbghYffi h\Uhgei UthYX]b Yj YfmVcXmfg`]j]b['fcca g 'UbX VfcUX\Wghk\UhF c\Yfh <i &\l<="" 'ubx'gci="" 'uhhya="" 'uv`y="" 'x]x="" 'zcf'f]j="")="" <ck="" [="" [\yg="" \\jhyzh\yb="" \vyzcfyzg]b\w="" \w``yx="" \wc`ci=""]a=""]b=""]b[=""]fgh]b=""]g]cb=""]gi=""]hhcc="" a="" bxzvi="" c\zh\y="" cbghyf3`="" cz="" dh="" e[="" f8cbybz' ="" fb]\u[="" fz\wds[="" fzhj="" g="" g5z'\%="" gc="" gmb\xfcb]nyx="" gyh':="" gyy="" h\y="" hc="" hk="" j="" td="" u="" u[="" u`="" ufu="" ug="" uvv`yfi—="" v`u\w!ubx!k\]hyzh\yb="" xc="" xca="" y="" y[="" ybhg"="" ybu\wx="" yfvfcux\wghyj="" ygh]\why="" yj="" z]`a="" =""></i>
	GYa]bUf	8]gW gg]cb cZE [`Y[`ı[`fZWDS[`UbX WUgg
I/ \/\/ '* '*' ! \! \0/d+ ' \	C \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	fYUX]b[g"
K YY_'*.'*'>i `m'!'%\$'>i `m	GWYYDJD[GYa]bUf	H[VWaVda_Wf17 fcbYbVYf[ž:7 UbUXUž:%-, ' Ł 8]gW gg]cb cZH[VWaVda_WUbX WUgg fYUX]b[g"
	@YWifY	:]`a `UbX`j]XYc.`±o`h\Y`%, \$gž`U`bYk `h\fYUh Ya Yf[YX"`J]XYc"`H\Y`J < G"`6YmcbX`h\Y`dfcV`Ya g

K YY_'+.'% '>i `m!'%+'>i `m	F YUX]h[WJI gYX'Vmh\Y'`]j Y'HY'Yj]g]cb'VfcUXWJghž'h\Y'UV]`]hm hc'hJdY'—'hc'fYk]bXž'ZJgh'Zcfk UfXž'dUi gY'—'Z fh\Yf fYj c'i h]cb]gYX'h\Y'a YX]U'`UbXgWJdY''A cj]Yg'Wci 'X VY'k UhW\YX'UhUbmhja Yž'UhUbmdUW\"'HY'Yj]g]cb bYhk cf_g'Wci 'X'bc'`cb[Yf'Ybgi fY'']j YbYgg'cZh\Y]f VfcUXWJghg''H\Y'fc'Y'cZWJbYa U'k Ug'Z fh\Yf h\fYUhYbYX'UbX'X]a]b]g\YX''' <ck 'x]x'z]`a=""]h]g'u'fyux]b[<="" g'fygdcbx3="" h\yfy'ufy'bc'wuggyg']b'k="" th="" yy_'+=""></ck>
K 11_ 1. 70		k YY_"
K YY_', .'&\$'>i `m!'&('>i `m	ey Whi fy	:]`a 'UbX'h\Y'X][]hU`. 'h\Y'XUk b'cZU'bYk 'YfU"': fca h\Y'% - \$gžh\]b[g'fYU``mVY[Ub'hc'W\Ub[Y'Zcf'h\Y W\bh fmcZ\\bYa U. 'Z]`a 'k Ug'bc'`cb[Yf'h\Y']bYj]hUV'Y cdh]cb'Zcf'V][!g\\YYb'dfc'Y\\M]cb'cZa cj]b[']a U[Ygž Y]h\Yf'Ug'ghcfU[Y'cf'f]b\\YYUg]b[`mz'Ug'd`Um\U_ a YX]i a "'6i hih\Y'f]gY'cZX][]hU`dfc\\Ygg]b[`\UX'U `cb['UbX'ghfUb[Y'dfY!\]ghcfmz'hcc"'7 ca di hYfg'\Uj Y VYYb']b'Zj`a g'Zcf'a UbmXY\\XYgz'UbX'bYj Yf'j Yfm ZUj cfUV`m'5bX'Zfca 'h\Y'a ca Ybhh\YmVY[Ub'hc fk f]hYfk\Uhk Ug'cb'h\Y'g\\YYbz'\ca di hYfg'VY[Ub]bYj]hUV`mhc'[YbYfUhY'Ub]]YhJYg'cZX]gd`U\\a Ybh UbX'gi Vgi a dh]cb"'H\]g'`Y\\f\f fY'`cc_g'Uhgca Y'cZh\Uh\]ghcfmz'UbX'UXXfYggYg'h\Y'VY[]bb]b['cZh\Y'YbX'Zcf Zj`a"
	GWfYYb]b[FZW? Sfdj fK UW.ckg_]gžI G5ž%Ł
	GYa]bUf	8]gWgg]cb'cZFZW?SfdjUbX'WUgg'fYUX]b[g"
K YY_''&+'>i `m'!'' %'>i `m	n@YWhifY	±bX]j]Xi U`a YYh]b[g'k]h\andred SfFcVgcbahc'X]gWagg fYgYUfW\andred JWg"
	GWfYYb]b[E [VWTk E [VWfP YbbYU``nž' G5ž'&\$%&Ł'
	GYa]bUf	:]`a 'UbX'f\Y'X][]fU`ž'df''&. '8]gW gg]cb`cZE [VWTk E [VWUbX'WUgg`fYUX]b[g"
K YY_'%\$." '5i [i gh'!'+ 5i [i gh	@YWh fY	: Ufyk Y``Z`a /\Y``c`WjbYa U``+b`f\]g`ZjbU```YWfi fYžk Y k]```cc_'Uhi\Y'WcbfYa dcfUfm`UbXgWJdYž'UbX UXXfYgg`]h`]b`fYfa g`cZU`gmgfYa]W\m\f]X]micZ dfcUWj\Wgžk \cgY`i bXYf`mjb[``c[]W]g`cZUb]bYj]fUV`Y`ffUbg]fjcb`Zfca 'Ub`UbU`c[i Y`fc`U`X][]U` ZfUa Y`cZfYZYfYbWf"'K \UhXcYg`]ha YUb`Zcf d\cfc[fUd\mfc`\Uj Y`VYYb`gi dd`UbfYX`VmWca di fYff [YbYfUfYX`]a U[Yg3`K\UhXcYg``][\ha YUb`fcXUm3 K\Uh]g`f\Y`WjbYa Ufg`fY`Ufjcbg\]d`fc`fja Yž'UZfYf`f\Y YbX`cZZ`j`a 3`=g`Ufndcgg]V`Y`k]f\ci hUb`UbU`c[i Y
	GWfYYb]b[4 'SU] BS` fZWdff7 cc[`Yfž'l G5ž'&\$% Ł
	GYa]bUf	8]gWigg]cbicZ4/SU] BS`fZWdUbXiWUggifYUX]b[g"

FYgci fWyg

DfYgWf]VYX F Ygci fWYg

5 ```gYhfYUX]b[g'UfY']bWi XYX'cb'h\Y'Wci fgY'A ccX`Y'g]hY''

FYWca a YbXYX FYgci fWYg

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

Ghi XYbhiZYYXVUW_ik]``VY`[Uh\YfYX`h\fci[\`h\Y`A m9I dYf]YbWr`gi fj YmžUj U]`UV`Y`hc`ghi XYbhg`hc`Wta d`YhYhck UfXg`h\Y`YbX`cZhYfa "`5```ZYYXVUW_ik]``VY`Wtbg]XYfYX`UbX`hU_Yb`]bhc`UWVti bhiZcf`Z hi fY`]hYfUh]cbg`cZh\Y`Wti fgY"`C dYbž]bZcfa U``W\UbbY`g`cZZYYXVUW_ik]```U`gc`VY`YbWti fU[YX`Xi f]b[``h\Y`Wti fgY'j]U`Ya U]``cf j YfVU``X]gW gg]cb`k]h\`h\Y`Wtbj Ybcf"`

Gi Va]gg]cb cZ5ggYgga YbhHUg_g

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

Image: Ybwei bhyfu'dfcv'ya k \yb'uhhya dhjb['hc'gi va]hmci f'Ugg][ba Ybhh\fci [\ 'Hi fb]h]bž'd'YUgY

Hy'Yd\cby'9| hy'fbu''Gi ddcfhcb'-',) '' ' ' %cf'Ya U]''h\Ya 'cb'Y! hy'fbu'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"'=Z'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 UmUdd'mZcf'Ub'Y! hy'bg]cbž'Vi hmci
a i ghfYhJ]b'mci f'h]W_Yhbi a VYf'Zfca '9! hy'fbU''Gi ddcfhfU'cb['k]h\ 'Ubmch\Yf'fy'Yj UbhXcW a Ybhgt'hc
]bWi XY'Ug'Yj]XYbW' hc'gi ddcfhmci f'Y! hy'bg]cb'Udd']WUh]cb"'=Zmci 'Ya U]''9! hy'fbU''Gi ddcfhmci 'k]'`
Ui hca Uh]WJ'`mfYW']j Y'U'h]W_Yhbi a VYfZ'Vi h]Zmci 'hy'Yd\cby'mci 'k]``bYYX'hc'gdYW]Z]WJ'`mUg_'Zcf'cby''
Hi fb]h]b'U'gc'dfcj]XYg'i dXUhy'g'cb'h\Y]f'gmghYa 'ghUh' g'cb'Hk]hyf''

; YbYfU`mž'UggYgga YbhiHug_g'a i ghVY'gi Va]hhYX'Y`YVWfcb]\WJ``mij]U'Y]h\Yf'Hi fb]h]b'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`hYfbUh]j Y'gi Va]gg]cb'XYHJ]`g"

cfi]bZcfa Uhjcbicbi\ckihcigi Va]hUgg][ba Ybhgicbi]bYij]UiA ccXiY.i\hdg.#gh XYbhi bgk "YXi "Ui #\ck! gi Va]hUgg][ba Ybha ccXiY

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

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i=hWJbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiWXYUh]b[ihciUWW]XYbhU`mWcdm]b[iZfca iUigci fWYik]h\ci hiUW_bck iYX[Ya Ybh'

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

- 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@+G9'k]``\Y`d'mci 'a U_Y'h\Y'a cghcZmci f'gh X]Yg'UhI BGK "'\\hd.#gi VYWn[i]XYg"`]VfUfm"i bgk "YXi "Ui #\`]gY#JVci hY`]gY

5 WUXYa]W + DZcfa Uh]cb

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

- fYei YghgʻZcfʻYl hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk 'cZa Uf_g/
- I BGK < YU`h\ "UbX GUZYmdc`]W]Yg/
- YI Ua]bUh]cb dfcWXi fYg/
- gdYWJU``Wcbg]XYfUhJcb`]b`h\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybhi fY/
- gh XYbhYei]hmUbX X]gUV]]hm/
- UbX'ch\Yf'YggYbhJU`'UWUXYa]W]bZcfa UhJcbž'gYY

\hdg.#k k k "Ufng"i bgk "YXi "Ui #W ffYbhghi XYbhg#UWUXYa]W]bZcfa Uh]cb#dfchcWc`g![i]XY`]bYg#

.

∍a U[Y'7fYX]h

E[Y[I[fZWDS[