

MDIA5100

±Xi ghfmi±hYfbg\]d

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

7ci fgY'Cj Yfj]Yk

Ghuzz 7 cbhuWh8 Yhu]`g

'7cbj Ybcfg'

BUa Y	9a U]`	5j U]`UV]`]m	@cWJhjcb	D\cbY
9a a Uʻ>UbY	Yaa U"^UbY4 i bgk "YXi "Ui	-	‰) ž@YjY``%ž FcVYfh KYVghYf	

GWkcc~7cbhJWh~abZcfa Uh]cb

Fcca " &ž`Yj Y`" FcVYfhK YVghYf`6i]`X]b[

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

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

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

 $\label{eq:hamiltonian} $$HY'GWCC``cZhY'5ftg'UbX'AYX]U'kci`X``]_Y'tc'FYgdYWM\cong \cong m5W_bck`YX[Y'h\Y'HfUX]tjcbU``7igtcX]Ubg\cong h\Y'6YXY[U'`fPYbg]b[hcb'WJadig\cong ix', UX][U'`fP]hmUbX'5fth/'8Yg][b'7UadigYg\cong iybX't\Y'B[ibbUkU`dYcd'Y'fbigffU`]Ub'8YZYbW': cf\w'5\\\XYami]b'7Ub\YffU\cozh\Y'`UbXg'k\YfY'YUW\w'Uadig'cZl\BGK']g`c\\WJhYX''$

7ci fgY 8YHJ] g

7 fYX]hDc]bhg *

Gi a a UfmcZh\Y 7ci fgY

H\]g`Wci fgY`dfcj]XYg`mci `k]h\`Ub`cddcfhi b]hmhc`i bXYfhU_Y`k cf_!]bhY[fUhYX``YUfb]b[`UbX`[U]b`]bXi ghfm YI dYf]YbW'k]h\`U`\cghcf[Ub]gUh]cb`WcgY`mfY`UhYX`hc`mci f`A UghYfg`dfc[fUa "

 $5\,hh.Y.YbX.cZh.Y.]bhYfbg\]d.mci.k]``dfcj.]XY.U.giaaUhj.Y.fYdcfhcZmci.f.Yl.dYf]YbWfg.UbX.k.cf_.Yl.Uad.Yg.Wcad.YhY.XXi.f]b[.h.Y.]bhYfbg\]d"$

H\Y']bhYfbg\]d'fYei]fYg'U'rcrU'`Wca a]ha YbhcZ%\$\$!%) \$\\ci fg'cZk cf_'k]h\'U'\cghcf[Ub]gUh]cb'UbX'a Um bcfa U`mVY'hU_Yb']b'Z[fghcf'gYWcbX'gYa YghYf''=\hYfbg\]d'cddcfhi b]hYg'UfY'UXj Yff]gYX'j]U'h\Y'GW\cc`'cZ h\Y'5fhg'UbX'A YX]U'=\hYfbg\]d'BYk g'YthYf''5'hYfbUh]j Y`mmci 'a UmUddfcUW\'U'fY'Yj Ubhcf[Ub]gUh]cb'hc Udd`mZcf'Ub']bhYfbg\]d'"Df]cf'hc'gYY_]b['Ub']bhYfbg\]dž'mci 'g\ci 'X'UhhYbX'Ub']bhYfbg\]d']bZcfa Uh]cb gYgg]cb'fi b'Vmh\Y'GW\cc`'cZh\Y'5fhg'UbX'A YX]U"

9bfc`a Ybhi]g`VmiUddfcj U``cZh\Y`GW\cc`ž'WcbX]h]cbU``cb`Uddfcj U``cZUb`]bhYfbg\]d`d`UWYa YbhUbX'a YYh]b[h\Y`Y`][]V]`]hmfYei]fYa Ybhg`UVcj Y"

7 ci fqY @YUfb]b['Ci hMca Yq

HYUWX]b['GhfUhY[]Yg'

H\]g'Wci fgY'\Ug'bc'Zcfa U`'hYUW\]b['Wca dcbYbh'''

FYgci fW/g

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 dh]b['hc'gi Va]hmci f'Ugg][ba Ybhth\fci [\'Hi fb]h]bž'd`YUgY hY`Yd\cbY'9| hYfbU`'Gi ddcfhcb'-',)'''' %cf'Ya U]`th\Ya 'cb'Yl 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'mYUfŁ'''⊋mci

5WUXYa]W = DZcfa Uh]cb

: 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/
- I BGK '<YU`h\ 'UbX'GUZYhm'dc`]W[Yg/
- YI Ua]bUh]cb dfcWYXi fYg/
- gdYWJU``Wcbg]XYfUhJcb`]b`h\Y`Yj YbhcZ]``bYgg'cf'a]gUXj Ybh fY/
- gh XYbhYei]mUbX X]gUV]`]m/
- ÜbX'ch\Yf'YggYbhJU`'UWUXYa]W]bZcfa UhJcbž'gYY

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