: i bXg: `ck]b[. A Uf[UhY'GYb]cf'7YbhYf 6ccghg'GYfj]WYg'Zcf'@cWU`'GYb]cfg

91 d`cfY 6fck UfX 7ci bhm/ _ \$' - /g`fYWbh`XYj Y`cda Ybhgž]bWi X]b['gYb]cf`gYfj]WYg Zi bX]b[žW]hm`Wca a]gg]cb a YYh]b[gžUbX i dWca]b['Wca a i b]hm`dfc YWhg"



7cWcbi h·7fYY_ž: `cf]XUžI G5 !! ± UrfYWbhra YYh]b[žid`Ubg k YfY gYhr]b a ch]cb Zcfrh\ Y Bcfh\ k Ygh: cWU`Dc]bhrGYb]cfr7YbhYf UbXrh\ Y 7]hmr7ca a]gg]cb 8]ghf]WhžrfYj YU`]b['XYj Y`cda Ybhg'U]a YX UhrYb\ UbW]b['Wca a i b]hmrgi ddcfhrZcfrgYb]cfg" GWXYXi `YX 'Zcfr≯bY %(ži&\$&) žih\ YgY a YYh]b[gidfca]gY hc 'VY'd]j chU`]b 'UXj UbW]b[`cWU`]b]h]Uh]j Yg"

 $H\Y'7]hm'cZ'AUf[UhY']g'[YUf]b['id'Zcf'U'bYk'WcbhfUWh'k]h\'h\Y 5fYUk]XY'7cibW]``cb'5[]b['h\Uh'k]```[fUbh'@cWU``GYfj]WY'Dfcj]XYff@GDŁZibX]b['YZZYWh]jY'Zfca'$\in\m'\%\%\$\&\$\\) z'h\fci[\'\$\bY''\$\z'\&\\\"H\]g'ZibX]b[']g'WfiW]U``Zcf'h\Y'cdYfUh]cbg'cZ'h\Y'Bcfh\kYgh':cWU`Dc]bh'GYb]cf'7YbhYfz'`cWUhYX']b'7cWcbih'7fYY_'UbX'VcfXYfYX'Vm5h\Ubh]W6ci`YjUfX'UbX'@mcbg'FcUXz'k\]W\'U]ag'hc']adfcjY'h\Y$

ei U`]hm'cZ``]ZY'Zcf'UXi `hg'U[YX'*\$'UbX'c`XYf'h\fci[\'j Uf]cig fYWfYUh]cbU``UbX'YXi WUh]cbU``dfc[fUag"

Giddcfh'Zcf'GYb]cf'GYfj]WYg

H\Y'Bcfh\k Ygh': cWU``Dc]bh'GYb]cf'7YbhYf'XcYg'a cfY'h\Ub''A gh dfcj]XY'U'd`UW'Zcf'gYb]cfg'hc'[Uh\Yf/']h'UWh]j Y`m'Yb\UbW'g'h\Y]f `]j Yg'h\fci [\'YggYbh]U`'gYfj]W'g"'CZZYfYX'dfc[fUa g']bWi XY'5Xi `h 8 Um'7 UfYž'A YU`g'cb'K\YY`gž'\YU`h\'gWfYYb]b[ž'Wci bgY`]b[ž'UbX hfUbgdcfhUh]cb'hc'YggYbh]U`'`cWUh]cbg'`]_Y'VUb_g'UbX'[fcWfm ghcfYg"'5g'XYhU]`YX'Vm'CdYb7ci bgY`]b[ž'h\Y'W'bhYf'U]a g'hc UXXfYgg'h\Y'X]j YfgY'bYYXg'cZ'h\Y'gYb]cf'Wca a i b]hmž'dfcj]X]b[ci h`Yhg'h\Uh'YbWci fU[Y'gcW]U`']bhYfUWh]cb'UbX'\YU`h\

H\]gigi ddcfhi]giZUW]`]hUhYXih\fci [\iZ] bX]b[iZfca ih\YiC`XYf
5a Yf]WUbgi5WhicZi%-*) žiUgik Y```UgiWcbhf]Vi h]cbgiZfca ih\Y
Wca a i b]hmžigi W\iUgih\cgYiZfca ih\YiGYb]cfgi: ci bXUh]cbicZiBK
6fck UfXži=bWiH\YiWcbh]bi YXij]UV]`]hmicZih\YgYidfc[fUa giXYdYbXg\YUj]`micbi`cWU``UbXighUhYiZi bX]b[žik\]W\žiVUgYXicbifYdcfhgiZfca
GYb]cfi7YbhYfgžiZUWYgii bWYfhU]bhmiUgiYa Yf[YbWmiZi bXgiZfca
h\YidUbXYa]Wk]bXiXckb"

: i bX]b['8Yj Y`cda Ybhg'cb'h\Y'<cf]ncb

5h'h\Y'7]hm'7ca a]gg]cb'a YYh]b[ž'j Uf]ci g'WcbgYbh'U[YbXU']hYa g k YfY'X]gW ggYXž']bWi X]b['h\Y'Uddfcj U`'Zcf'di fW\Ug]b['Df]a Yl dfcXi Whg'UbX'hYUa 'VYbW\Yg'Zcf'Wca a i b]hm'dUf_gž'U``'k \]`Y _YYd]b['Wca a i b]hm'Z]hbYgg']b'a]bX": i fh\Yfa cfYž'U'`YhhYf'cZ gi ddcfh'YUfa Uf_]b['`' '*-ž**&'Zfca 'h\Y': YXYfU`':]gWU`'MYUf'&\$&(9Xk UfX'6mfbY'A Ya cf]U`'\Rightarrow gh]WY'5gg]ghUbWY'; fUbh'Zcf'6fck UfX 7ci bhm'U`gc'i bXYfgWcfYX'h\Y'W]hmg'Wca a]ha Ybh'hc'Wca a i b]hm Yb\UbWYa Ybh"

5XXfYgg]b['h\Y'bYYXg'cZ'h\Y'A Uf[UhY'Dc`]WY'8YdUfha Ybhž'h\Y a YYh]b['U`gc'XY`j YX']bhc'Ub'cfX]bUbWY'h\Uh'dfcdcgYg YghUV`]g\]b['U'Wca a]hhYY'hc'fYZ]bY'h\Y'dc`]WY'dfca ch]cbU`dfcWYgg"'K]h\'U'ZcW'g'cb'gY`YWh]b['h\Y'a cgh'ei U`]Z]YX'WUbX]XUhYg

 $\label{thm:condition} $$ VUgYX`cb`h\Y]f`eiU`]Z]WUh]cbg`UbX`WUdUV]`]h]Ygž`h\]g`]b]h]Uh]jY $$ V][\N`][\hg`h\Y`W]hmg`U]a`hc`ZcghYf`dfcZYgg]cbU``[fck h\`k]h\]b``UkYbZcfWYaYbh''$

H\Y'6fcUXYf'7cbhYlh

 $H \ Y \ ``Ub Xg W U d Y \ `Zc f 'Z \ b X] b [\ `g Y b] c f `g Y f j] W \ g `] g ``W \ Ub [\] b [\ "`5 W W c f X] b [h c `G Y b] c f `7 Y b h Y f g z 'k \] `Y `Z \ b X] b [\ `\ Ug `b ca \] b U ``m'] b W f Y Ug Y X `g] b W & $$) z `] h `\ Ug `b c h _ Y d h `d U W `k \] h \ `h \ Y `g k Y ``] b [\ `d c d i \ `Uh] c b `c Z `c `X Y f U X i `hg `] b `h \ Y `I \ "G "`8 Y g d] h Y `g ca Y `i d h] W _ g `] b `Z Y X Y f U ``Ub X `g h U h Y Z \ b X] b [\ `U] a Y X `Uh `U] X] b [\ `g Y b] c f `W b h Y f g z `Uf Y Ug ``] _ Y `: `c f] X U `\ Uj Y g Y Y b `g] [b] Z] W Ub h `] a d f c j Y a Y b h g `] b `Z b X] b [\ `Zc f `Y `X Y f `W Uf Y d f c [f Ua g `] b `f Y W b h `m Y Uf g "`H \] g `\ Ug `V Y Y b `W f i W] U ``Zc f `h \ Y `g i W W g g c Z `W b h Y f g ``] _ Y `h \ Y `B c f h \ k Y g h : c W U ``D c] b h "$

5g'k Y'`cc_'U\YUXž'h\Y'\c`]gh]WUddfcUW\'cZ'Wca V]b]b['fYWfYUh]cbž\YU`h\ž'UbX'Wca a i b]hm'gi ddcfh'fYa U]bg'YggYbh]U`"'9bgi f]b['h\Uh Zi bX]b['Wcbh]bi Yg'hc'Z'ck']bhc'h\YgY'dfc[fUa g']g'bch''i gh'UVci h dfcj]X]b['UWh]j]h]Yg/']h']g'UVci h'i d\c`X]b['h\Y'X][b]hm'UbXYb\UbW]b['h\Y'ei U`]hm'cZ'`]ZY'Zcf'gYb]cfg'h\fci [\ci h'ci f'UfYU"

I`h]a UhY`mž'Ug'k Y'Yb[U[Y'k]h\'h\YgY'bYk']b]h]Uh]j Yg'UbX'Zi bX]b[UffUb[Ya Ybhgž']h'VYWca Yg'WYUf'h\Uh'a U]bhU]b]b['UbX'YI dUbX]b[gYfj]WYg'Zcf'ci f'gYb]cfg']g'bch''i gh'U'Wca a i b]hm'fYgdcbg]V]`]hm Vi h'U'a cfU`']a dYfUh]j Y"'H\YfY g'gca Yh\]b['hc'VY'gU]X'Zcf Ybgi f]b['h\Uh'ci f'Y`XYf`m'W]h]nYbg'\Uj Y'h\Y'fYgci fWYg'h\Ym'bYYX hc'`YUX'Zi `Z]``]b['`]j Yg"

8 Y hU]`g	
Cfh	7cWcbi h [.] 7fYY_ž [.] : `cf]XUž [.] I G5
EiY``Yb	a Uf[UhYbYk g"bYh
	kkk "cdYbWcibgY`]b["Wca
	• gYb]cfWVbhYfg"Wca