GdUWY '7cUgh': UWYg'9bj]fcba YbhU`GhfU]b Ug'* * ž\$\$\$ BYk 'FYg]XYbhg'5ff]j Y



6fYj UfX:7ci bhmž: `cf]XUžI G5:1:5g:6fYj UfX:7ci bhmidfYdUfYg Zcf:U'dcdi `Uh]cb:gi f[Y'cZ'cj Yf'** ž\$\$\$ fYg]XYbhg:]b:h\Y'bYI h XYWUXYŽVU`UbW]b['[fck h\'k]h\'Ybj]fcba YbhU`'dfYgYfj Uh]cb fYa U]bg:U'dfYgg]b['W\U``Yb[Y"'5\W\cfX]b['hc::`cf]XU'HcXUmž'h\Y fUd]X']bZi I 'cZ'dYcd`Y'k]``ghfU]b'di V`]WgYfj]\W'g'UbX'di h Y\\c[]\W\U``UfYUg'`]_Y'h\Y'\DX]Ub'F]j Yf'@U[ccb'UbX'Gh"'\&\bg'F]j Yf Uh'f]g_"

HfUZZ]W]g'U'g][b]Z]WUbh'WcbWYfbž'k]h\'cihXUhYX']bZfUghfiWhifYZUW]b['h\Y'UXXYX'VifXYb'cZ']bWfYUgYX'fYg]XYbhg'k\]'Y'\UnUfXcig WcbX]h]cbg'Zcf'dYXYghf]Ubg'dYfg]gh''6fYjUfX'7cibhm'fUb_YX'Bc"'%%Uacb['h\Y'XYUX`]Ygh'aYhfc'UfYUg'Zcf'dYXYghf]Ubg'Zfca'&\$%, 'hc&&&&Z'Ug'bchYX'Vm'GaUfh'; fckh\'5aYf]WU"'9ggYbh]U`'fcUX

 $\label{thm:condition} $$ dfc \Upsilon Whg`UfY`df]cf]h]nYX`Vm`h\ Y`GdUWY`7cUgh`HfUbgdcfhUh]cb $$ D`Ubb]b[`Cf[Ub]nUh]cbž`]bWi X]b[`h\ Y`k]XYb]b[`cZ`GhUhY`FcUX`) &, $$ UbX`9``]g`FcUX`UbX`h\ Y`fYd`UWYa Ybh`cZ`h\ Y`GhUhY`FcUX`($% Vf]X[Y"`<ck Yj Yfž`a Ubm`cZ`h\ YgY`dfc \Upsilon Whg`fYa U]b`i bZi bXYXž bYWYgg]hUh]b[`fci [\`m`` &"*)`V]``]cb`Zfca`&$' $`hc`&$) $ž`k]h\`cb`m %+ı `W' ffYbh`m`gYW' fYX"$$$

9bj]fcba YbhU`'=b]h]Uh]j Yg'UbX'7\U``Yb[Yg

H\Y'Ybj]fcba YbhU`'W\U``Yb[Yg'UfY'bi a Yfci g"'7`]a UhY'W\Ub[Y\Ug']bhYbg]Z]YX'k UhYf'ei U`]hm']ggi Yg'UbX'Xfci [\hg']b'`cWU```U_Yg UbX'f]j Yfgž'k \]`Y'6fYj UfX'7ci bhm'[fUdd`Yg'k]h\'gYk U[Y'cj YfZ'ck dfcV`Ya gž'fUb_]b['gYWcbX']b'h\Y'ghUhY'k]h\'''a]``]cb'[U``cbg gd]``YX'Zfca '&\$%+'hc'&\$%, "'I h]`]h]Yg'UfY'a U_]b['ghf]XYg'hc i d[fUXY'gYk Yf'd`Ubhg'UbX'hfUbg]h]cb'\ca Yg'Zfca 'gYdh]WgmghYa g hc'U'WYbhfU`'gYk Yf'gmghYa "'9ZZcfhg'UfY'i bXYfk Um'hc'YI dUbX k UghYk UhYf'hfYUha Ybh'WUdUW]hm'Uh'h\Y'A Yff]hh'=g`UbX'Gm_Yg'7fYY_ d`Ubh'Vm'' \$\$z\$\$\$'[U``cbg'dYf'XUm'Vm'&\$&+z'Ug'fYdcfhYX'Vm': `cf]XU HcXUm'

A cfYcj Yfž'h\Y'GUj Y'Ci f' =b X]Ub'F]j Yf'@U[ccb'Dfc[fUa'U]a g hc'Wca VUh'bi hf]Ybh'dc'`i h]cb'UZZYWh]b['h\Y'`U[ccb'': i bXYX'Vm'U\U'Z\W'bh'gU'Yg'hUl'Uddfcj YX'Vm'Wci bhm'j chYfg']b'&\$%* ž'h\Y dfc[fUa']g'dfc'YWhYX'hc'[YbYfUhY'i d'hc''), *'a]``]cb'cj Yf'h\Y bYI h'XYWUXYž'hUf[Yh]b['Ub'Ubbi U`'fYXi Wh]cb'cZ'%"'' a]``]cb'dci bXg cZ'b]hfc[Yb'UbX'%\$* ž\$\$\$'dci bXg'cZ'd\cgd\cfi g"'H\]g']b]h]Uh]j Y\][\`][\hg'Wc``UVcfUh]cb'Ua cb['cf[Ub]nUh]cbg'gi W\'Ug'h\Y BUh]cbU`'9ghi Ufm'Dfc[fUa'UbX'h\Y'Gh''' \&\bg'F]j Yf'K UhYf AUbU[Ya Ybh'8]ghf]Whž']``i ghfUh]b['U'ZcW'gYX'YZZcfh'hc']a dfcj Yghcfa kUhYf'a UbU[Ya Ybh'"

7ca a i b]hmi]bj c`j Ya Ybhi]gʻYggYbh]U``]bʻh\YgYʻYZZcfhg"ʻH\Yʻ7]h]nYb Cj Yfg][\hi7ca a]hhYYʻ]gʻhUg_YXʻk]h\ʻcj YfgYY]b[ʻdfc^YWh h]a Y`]bYgžʻWcghgžʻUbXʻbi hf]YbhifYa cj U``YZZYWh]j YbYggʻk\]`YʻU`gc ghUm]b[ʻYb[U[YX`k]h\`Wca a i b]hmidfcdcgU`g"ʻHcc`gžʻ`]_Yʻh\Yʻ5`[UY 6`cca 'A Udd]b[ʻFYdcfhgʻGhcfm'A UdʻUbXʻh\YʻGYbh]bY``J]Yk YfʻHcc`ž dfcj]XYʻhfUbgdUfYbWmʻUVci hi`U[ccb`\YU`h\ž'XYa cbghfUh]b[ʻh\Y dfc[fUa gʻWca a]ha Ybhihc`_YYd]b[ʻfYg]XYbhgʻ]bZcfa YX"

: i hi fY'Dfc'YWh]cbg'UbX'7ca a i b]hm 9b[U[Ya Ybh

@cc_]b['U\YUXž'h\Y']a d`]WUh]cbg'cZ'W]a UhY'W\Ub[Y'YI hYbX VYmcbX']a a YX]UhY'dc``i h]cb']ggi Yg"'GYU!`Yj Y`'f]gY'Wci `X'YI dcgY cj Yf'%ž* \$\$'Wf]h]WU`']bZfUghfi Whi fY'UggYhg'hc'ZccX]b['Vm'&\$) \$"'5g dfYggi fYg'a ci bh'Zfca 'fYU`'YghUhY']bhYfYghg']bZi YbW]b['[fck h\ XYW]g]cbgž'h\Y'dc`]h]W]nUh]cb'cZ'gi ghU]bUV`Y'XYj Y`cda Ybh'dfYgYbhg\ifX`Yg'Zcf'`cWU`'[cj YfbUbWY"'H\Y'6fYj UfX'7ci bhm'7ca a]gg]cb g\]hgf]WU`'ZUj cf]b['cZ'[fck h\'dc`]W]Yg'Wca d`]WUhYg'YZZcfhg'hca U]bhU]b'U'VU`UbWY'VYhk YYb'XYj Y`cda Ybh'UbX'YWc`c[]WU`]bhY[f]hm"

#b 'hUW_`]b['h\ YgY 'a i `h]ZUWY hY X 'W\ U``Yb[Ygž'[fYYb']b ZfUghfi Whi fY]b]h]Uh]j Yg 'UfY'[U]b]b['hfUWh]cb" '5 'dfc 'Y Wh' Zc Wi g]b['cb 'Yb[U[]b[h\ Y'\]ghcf]WU``m'i b XYfgYfj Y X '6`UW_ 'Wca a i b]hm']b '7 c Wc U'K Ygh']g ZcghYf]b['X]gWi gg]cbg 'Ufci b X 'dchYbh]U`']b hYfj Ybh]cbg 'Zcf' Zcc X]b[Ub X 'dfca ch]b['Wca a i b]hm'fYg]`]Yb WY "'5g'bchY X 'V m: `cf]XU'GYU; fUb hž'h\ Y'cb[c]b['WccfX]b Uh]cb 'k]h\ '`cWU`'Ub X 'ghUhY' d Ufhb Yfg fY ZY Whg'U'Wca a]ha Ybh'hc']b hY[fUh]b['h\ YgY'Y ZZcfhg']b hc'fY[]cb U` `Ub X'dfchY Wh]cb 'ghfUhY[]Yg"

cf'6fYj UfX'7ci bhmž'h\Y'fcUX'U\YUX']g``]hhYfYX'k]h\'W\U``Yb[Ygž Vi h'h\YfY g'gca Yh\]b['hc'VY'gU]X'Zcf'U'Wca a i b]hm'k]``]b['hc UXUdh'UbX'Yb[U[Y"'6U`UbW]b['[fck h\ž'Ybj]fcba YbhU` gi ghU]bUV]`]hmž'UbX'Wca a i b]hm'bYYXg'k]``fYei]fY'X]`][YbWY'UbX WccdYfUh]cb'Ua cb['U``'ghU_Y\c`XYfg"'H\Y'ghU_Yg'UfY'\][\ž'UbX gi WWYgg'k]```XYdYbX'cb'h\Y'Wc``YWh]j Y'k]``hc'dfYgYfj Y'h\Y'bUhi fU` VYUi hm'cZ'h\Y'fY[]cb'k\]`Y'UWWca a cXUh]b['bYk'fYg]XYbhq"

8YhU]`g	
Cfh	6fYj UfX 7ci bhmž: `cf]XUžI G5
EiY``Yb	• kkk"Z`cf]XUhcXUm"Wca
	• k k k "VfYj UfXZ`"[cj
	k k k "Z`gYU[fUbh"cf[

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'a Y]b!k]Yb "bYh