A cgei]hc '7cbhfc`'GYh'Zcf'GUb]VY`'UbX 7Udh]j U'=g`UbXg'Hcb][\h°

A cgei]hc 'Wcbhfc` 'hfYUha Ybh 'gWXYXi `YX 'Zcf 'GUb]VY` 'UbX gi ffci bX]b[']g`UbXg cb 'i bY '%' !%(ž'U]a]b['hc 'fYXi WY 'dYgh dcdi `Uh]cbg 'UbX '\YU`h\ 'f]g_g"



GUb]VY`ž: `cf]XUžI G5 !!Cb'h\Y'Yj Yb]b['cZ' * bY'%' ž'&\$&) ž
fYg]XYbhg'cZ'GUb]VY`ž'7Udh]j Už'Bcfh\ '7Udh]j Už'6cWU'; fUbXYŽ
7UVVU[Y'?Ymž'UbX'I gYddU'=g`UbX'WUb'YI dYWh'U'Vi nn]b['b][\h' H\Y'@YY'7ci bhm'A cgei]hc'7cbhfc`'8]ghf]Wh'f@7A 78Ł'\Ug
gW\YXi `YX'U'a cgei]hc'hfYUha Ybh'gYgg]cb'i g]b['Ub'I `hfU'@ck
Jc`i a Y'fl @JŁ'fchcf'U]fWfUZh"'H\]g']b]h]Uh]j Y'U]a g'hc'hUW_`Y'h\Y
cb[c]b['a cgei]hc'bi]gUbWY'h\Uh'd`U[i Yg'h\YgY'VYUi h]Zi ``]g`UbXgž
dfcj]X]b['gca Y'fYgd]hY'Zcf'`cWU`g'UbX'j]g]hcfg'U`]_Y"

 $\label{lem:hamman} $$H\Y'Tc``ck]b['a cfb]b['z'dfcj]XYX'h\Y'k YUh\Yf'WccdYfUhYg'': cf h\cgY'XYU`]b['k]h\'\][\a cgei]hc'dcdi`Uh]cbg'Uh'h\Y]f'\ca Ygž @7A 78 YbWcifU[Yg'fYg]XYbhg'hc'gi Va]h'gYfj]WY'fYei Yghg'h\fci [\$

$H \setminus Y \cdot GW \mid Y \mid WY \cdot 6Y \setminus \mid b \mid X \cdot h \setminus Y \cdot GdfUm \mid b \mid$

7cbWfbg'UVci h'dYgh]W]XY'gUZYhm'UfY'Wca a cbž'Vi h'gYj YfU`ghi X]Yg'i bXYfgWcfY'h\Y'a]b]a U`'f]g_g'UggcW]UhYX'k]h\'I @UgdfUm]b["'5WWcfX]b['hc'J 87=ž'bi a Yfci g'dYYf!fYj]Yk YX'Ufh]WYg]bX]WUhY'h\Uh'h\Y'f]g_g'hc'\i a Ubg'UbX'bcb!hUf[Yh']bgYWhg'Zfca]bXi ghf]U`'a cgei]hc'gdfUm'Udd`]WUh]cbg'fYa U]b''ck "'5'&\$\$, 'ghi Xm Vm'8 Uj]g'UbX'DYhYfgcb'Zci bX'h\Uh'Ubm'V]c`c[]WU`'YZZYWhg'cb'bcb! hUf[Yh'Ufh\fcdcXg'Zfca 'h\YgY'Udd`]WUh]cbg'UfY'bchUV`m'ga U``"

: i fh\Yf`fYUggi fUbWY`Wca Yg`Zfca `U`7YbhYfg`Zcf`8]gYUgY`7cbhfc` UbX`DfYj Ybh]cb`ff787Ł'ghi Xm`WcbXi WhYX`]b`&\$\$) ž'k \]WX`a YUgi fYXdYgh]W]XY`WcbWYbhfUh]cbg`]b`i f]bY`VYZcfY`UbX`UZhYf`I @JUdd`]WUh]cb"'=h`WcbWi XYX`h\Uh`gi VghUbh]U``YI dcgi fY`hc`dYgh]W]XYg Zfca `I @J`gdfUm]b[`XcYg`bch`c\W\Yf"-\b`ZU\Wh\z`dUfh]\W]dUbhg`g\ck YX\][\Yf`dYgh]W]XY`a YhUVc`]hY``Yj Y`g`Zfca `\ca Y`Udd`]\WUh]cbg`h\UbZfca `h\Y`a cgei]hc`Wcbhfc``YZZcfhgž`k\]WX`gdYU_g`j c`i a Yg`UVci h h\Y`fY`Uh]j Y`gUZYhm`cZ'cf[Ub]nYX`gdfUm]b[`a Yh\cXg"

5g·Zcf·h\Y·hmdYg·cZ·dYgh]W]XYgʻi gYXž·h\Y·I "G"·9bj]fcba YbhU`DfchYWh]cb·5[YbWm·fPD5Ł·bchYgʻh\Uh·UXi `h]W]XYgʻgi W\·Ug cf[Ubcd\cgd\UhYgʻfl]_Y·a U`Uh\]cb·UbX·bU`YXŁ·UbX·gmbh\Yh]W dmfYh\fc]Xgʻfl]bWi X]b[ˈdfU``Yh\f]b·UbX·dYfa Yh\f]bŁ·UfY·Wca a cb`m i gYX"'H\YgY'UXi `h]W]XYgʻUfY·hmd]WU``m·Udd`]YX·]b·i `hfU!`ck 'j c`i a Y gdfUmgžii g]b[``Yggʻh\Ub'' `ci bWYgʻcZ·UWh]j Yʻ]b[fYX]Ybh'dYfʻUWfY" H\]gʻUddfcUWX \Y`dgʻhcʻa]b]a]nYʻYl dcgi fYʻf]g_gʻZcfʻVch\`dYcd`Y UbX'h\YʻYbj]fcba Ybh"

$5.7ca \ a \ i \ b]hm < YU`h\ = b]h]Uh]j Y$

9Zzcfhgʻgi WkʻUgʻh\YgYʻUfYʻbchʻa YfY`mʻUVci hʻWca Zcfh/ʻh\YmʻU`gc d`UmʻUʻWfi WjU`ʻfc`Yʻ]bʻdi V`]W\YU`h\"'A cgei]hcʻWcbhfc``]gʻYggYbh]U`hcʻWca VUhʻci hVfYU_gʻcZʻa cgei]hc!VcfbYʻX]gYUgYgʻh\UhʻWUbʻdcgY

g][b]Z]WUbh'\YU`h\`h\fYUhgž']bWi X]b['K Ygh'B]`Y'J]fi g'fK BJŁ"
FYgYUfW\']bX]WUhYg'h\Uh'h\Y'f]g_g'UggcW]UhYX'k]h\'WcbhfUWh]b[
K BJ 'ZUf'YI WYYX'Ubm'dchYbh]U`'\YU`h\'WcbWYfbg'Zfca 'h\Y
]bgYWh]W]XYg'i h]`]nYX']b'a cgei]hc'Wcbhfc`'dfc[fUa g"

5g'k Y'\YUX']bhc'h\Y'gi a a Yf'a cbh\gž'k \Yb'a cgei]hc dcdi `Uh]cbg'hmd]WU``m'gi f[Yž']h g'j]hU`'Zcf'Yj YfmcbY']b'h\YgY Wca a i b]h]Yg'hc'ghUm']bZcfa YX'UbX'dfcUWh]j Y"'DfcdYf'a cgei]hc a UbU[Ya Ybh'bch'cb`m'U``Yj]UhYg'h\Y'bi]gUbW''Vi h'U`gc gUZY[i UfXg'h\Y'\YU`h\'cZ'fYg]XYbhg'UbX'j]g]hcfg"

: cf'a cfY']bZcfa Uh]cb'UVci h'a cgei]hc'Wcbhfc`'UbX'gdYW]Z]W hfYUha Ybh'd`Ubgž'fYg]XYbhg'WUb'j]g]h'h\Y'@7A78'kYVg]hY''Bck g h\Y'h]a Y'hc'dfYdUfY'Zcf'U'a cfY'd`YUgUbh'gi a a Yf'Yl dYf]YbWY'cb ci f'ghi bb]b[']q`UbXq°

8 Y hU]`g	
Cfh	GUb]VY`ž: `cf]XUž'l G5
EiY``Yb	k k k "WUdh]j UgUb]VY`"Wca
	• k k k "j XW]"bYh
	• k k k "YdU"[cj

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