

$B\ Y\ k\ 'V]_Y\ 'd\ U\ h\ 'hc\ '`c\ c\ d\ .\ 'g\ U\ Z\ Y\ 'W\ c\ b\ b\ Y\ W\ h]\ c\ b$ $Z\ c\ f\ '@]Y\ g_U\ i\ 'W]\ h]\ n\ Y\ b\ g\ '$

@]Yg_Ui 'fYWY]j YX'U'gYW' fY'V]_Y'dUh\ 'hc'`ccd']b'&\$&) ž]a dfcj Yg'UWWyg]V]`]hm'UbX'dfca chYg'gi ghU]bUV`Y'a cV]`]hm'



GWX`Y]ZYž'8Yi hgWX`UbX`!`H\Y`a i b]W]dU`]hmcZ'@]Yg_Ui `WUb`VY\Uddm`U`bYk`V]_Y`dUh\`]g`VY]b[`Vi]`h'h\Uh`WfYUhYg`U`gYW' fY\WcbbYWh]cb`UZhYf``ccd"`H\]g`]g`dUfh]W'`Uf`m`]a dcfhUbh`VYWUi gY@]Yg_Ui ž'Ug`h\Y`ZUfYgh`dUfh`cZ'GdfYa VYf[ž']g`UVci h'' ('__]`ca YhYfgZfca ``ccd"`G]Y[Y`]hgY`Z']g`U`ga U```cUg]g`h\Uh`\Ug`]bZfUghfi Whi fYgi W\`Ug`gW\cc`gž'a YX]WU``dfUWh]WYg`UbX`[Ughfcbca mž'k\]W\`UfY`cZ[fYUh']a dcfhUbW'Zcf'h\Y`@]Yg_Ui Yf"'6i h`gc`ZUf'h\Y`UWWYgg]V]`]hm\Ug`VYYb`fYghf]WhYX"`H\Y`dfYj]ci g`m`i gYX``cWU``WcbbYWh]b[`fcUXXcYg`bch`cZZYf`U`gUZYhm`ghf]d`Zcf`dYXYghf]Ubg`UbX`WhW`]ghgž'k\]W\\Ug`U`[fYUh`XYU``cZ`gYW`f]hm`cb`h\]g`k Um`hc`gW\cc`"`H\Y`UWW]XYbhdchYbh]U``k Ug`h\YfYZcfY`WYfhU]b`m`[]j Yb`]b`j]Yk `cZ'h\Y`XU]`mqhi XYbhacj Ya Ybhg"

"H\Ub_g'hc'U''c]bh'dfc'YWh'VYhk YYb'h\Y'W]hm'cZ'GdfYa VYf['UbX'h\Y'a i b]W]dU']hm'cZ'GW\'Y]ZYž'h\]g'[fUj]hm']g'bck 'VY]b['fYa YX]YX"'H\Y bYk 'WhWY'dUh\'VY[]bg'Uh'h\Y'j]'`U[Y'Wca a i b]hm'WYbhYf']b @]Yg_Ui 'UbX'k]bXg'i d'hc'h\Y'gW\cc'`Wca d`YI']b'`ccdž'k\YfY']h Z]bU``m'Zck g']bhc'h\Y'@]Yg_Ui Yf'K Y["'H\]g']g'bch'cb`m'U'dfcZ]h'Zcf ghi XYbhg/'5Xi `hg'U`gc'[Yh'U'gUZY'k Um'hc'UW\]Yj Y'h\Y'Ua Yb]h]Yg'cZ h\Y'bY][\Vcf]b['Wca a i b]hm'k]h\ci h'U'WUf"'

]a dfcj Ya Ybh c Z WmW]b[]b Zf Ughfi Whi fY

H\]g]b]h]Uh]j Y Z]hg dY fZY Wh`m]b hc h\ Y 'W' ffY b h`hfY b X `c Z' WhW]b [
Zf]Y b X`]b Y gg]b `GUI c b m" 5 WWc fX]b ['hc h\ Y ``UhY gh X UhU 'Zfca h\ Y
: fYY `GhUhY z' U'hc hU``c Z'' * 'Udd`]WUh]c b g 'Zc f `WhW]b ['Z b X]b ['k]```VY
[fUb hY X]b `& \$& (z'k \]W\]b Wi XY g 'U hc hU``j c`i a Y `c Z' %&", 'a]``]c b
Yi fc g" 'O@Ugi j QfY dc fhg `c b h\ Y `Uddfcj U``V m'h\ Y `GhUhY `C ZZ]WY `Zc f
F c UX `7 c b ghfi Wh]c b `Ub X `HfUb gdc fhz'k \ Y fY V m'h\ Y `Z b Xg `Wc a Y `Zfc a
V c h\ `ghUhY `Z b Xg `Ub X `Zfc a `ZY XY f U``Z]b Ub W]U``U]X g" `H\ Y `fY U`]nY X
dfc `Y Whg `U]a `hc `]a dfc j Y `h\ Y `UhhfUWh]j Y b Y gg `Ub X `gUZY hm`c Z `WhW]b ["
5 a c b [`c h\ Y f `h\]b [gž `%* "*') `_]`c a Y hY fg `UfY `WfY UhY X `b Y k `WhWYY
d Uh\ g `hc `dfc a c hY `gi ghU]b UV`Y `a c V]`]hm`Ub X `W]a UhY `dfc hY Wh]c b `]b
GUI c b m" `H\ Y gY `a Y Ugi fY g `b c h`c b`m`a U_Y `WhW]b [`gUZY fz `Vi h`U`gc
a c fY `Y bj]fc ba Y b hU``m`Zf]Y b X `m"'

 $\label{thm:continuous} $$ 'H\Y'bYk 'WmWY'dUh\']b'@Yg_Ui'k]```UXX]h]cbU``m'id[fUXY'h\Y'hcif]gh'WmWY'dUh\']bZfUghfi WhifY']b'h\Y'fY[]cb"'H\Y'WcbbYWh]cb'hch\Y'dcdi`Uf'WmWY'dUh\g'gi W\'Ug'h\Y': Øfgh!DØW_`Yf'WmWY'dUh\ž'h\Y [Yc`c[m'hcif'UbX'h\Y'Zfc['WmWY'dUh\'a U_Yg'h\Y'UfYU'dUfh]W'`Uf`m UhhfUWh]jY'Zcf'WmW]ghg"'H\]g'Wci`X'\UjY'dcg]h]jY'YZZYWhg'cb'`cWU`hcif]ga "'$

'bUhi fY'UbX'Ybj]fcba YbhU`dfchYWh]cb']b ZcW'g'

'K \Yb'd`Ubb]b['h\Y'WmWY'dUh\ž'bUhi fY'WcbgYfj Uh]cb'k Ug'U`gc
Wcbg]XYfYX"'A YUgi fYg'k YfY'hU_Yb'hc'a U]bhU]b'Ub'YI]gh]b['fck'cZ
hfYYg'UbX'h\Y'V]_Y'dUh\'k]````YUX'dUgh']h"'H\]g'g\ck g'h\Uh
Ybj]fcba YbhU``m'WcbgW]ci g'UWh]cb'UbX'h\Y'YI dUbg]cb'cZ'h\Y

 $k \ YY^*]bZfUghfi \ Whi \ fY'WUb'[\ c'\ UbX']b'\ UbX'!'Ub'UddfcUWX'h\ Uh']g a \ cfY']a \ dcfhUbh'h\ Ub'Yj \ Yf']b'h]a \ Yg'cZ'W]a \ UhY'WX Ub[\ Y'''$

'H\Y'Wcbghfi Wh]cb']g'd`UbbYX'Zcf'&\$&) ž'UbX'h\Y'W]hm'Wci bW]`
XYW]XYX'hc'd`Ub'UbX']a d`Ya Ybh'h\Y'dfYZYffYX'j Uf]Ubh']b'5df]`"
H\Y'Ubh]W]dUh]cb'cZ'h\Y'bYk'V]_Y'dUh\']g'[fYUhž'Vch\'Ua cb['h\Y'YUj Yg'UbX'h\Y'g`cdYgž'UbX'Wci `X'h\YfYZcfY'bch'cb`m']bWfYUgY'h\Y'ei U`]hm'cZ'`]ZY']b'h\Y'fY[]cbž'Vi h'U`gc'fYdfYgYbh'Ub']a dcfhUbh'ghYdhck UfXg'a cfY'gi ghU]bUV`Y'a cV]`]hm''7mW]b[']g']bWfYUg]b[`m'VY]b[Ya d\Ug]nYX'Vm'h\Y'\YUfh'cZ'Ub'Ybj]fcba YbhU``m'Zf]YbX`m'UbXfYgci fWY'!gUj]b['a cV]`]hmž'Ug'@GUI cbmfg'V]_Y'hfUZZ]W'

8 YhU]`g	
Cfh	GWX`Y]ZYž8YihgWX`UbX
EiY``Yb	• k k k "k c W Y b _ i f]Y f "] b Zc
	k k k "`Ugi j "gUW gYb"XY
	k k k "fUXj Yf_Y\f"gUW\gYb"XY

6 Ygi WX Yb 'G]Y i bg 'Ui Z. 'bU[!VfUbXYbVi f["XY