

9| d`cfY`h\Y`fYWYbh`XYjY`cdaYbhg`]b`<]``gVcfci[\`7cibhmž ZcW'g]b[`cb`h\Y`WcbhfcjYfg]U`'/eich/5``][Uhcf 5`WUhfUn/eich/a][fUbh`XYhYbh]cb`WYbhYfž'ghUhY`ViX[Yh W'hgž'UbX`Wcaaib]hm`]adUWhg"



6]['7 md f Y gg 'B Uh]c b U ` 'Df Y g Y fj Y ž : `cf]X U ž I G5 ! 'H\Y 'f Y W bh X]gW gg]cbg gi ffci b X]b[': `cf]XU g 'Wcbhfcj Y fg]U ` a][f Ubh X Y h Y bh]cb 'Z U W]`]hmž Xi V Y X X 5 ``][Uhcf '5 `W Uhf Un ž '\ Uj Y 'gd U f_Y X Wcbg]X Y f U V `Y 'X Y V UhY 'U V ci h 'V ch\ '\ i a Ub 'f][\ hg 'Ub X Y bj]fcba Y bh U ` 'Wcb W f bg " < cgh Y X 'V m; Uf m;] V V cbg 'cb 'A] X D c]b hž 'U X]gW gg]cb 'Z Y Uhi f]b[': `cf] X U F Y d " @]b X g U m 7 f cggž 'Z cfa Y f <]``g V cfci [\ '7 ci b hm 7 ca a]gg]cb Y f A Uf]Y ``U 'Ga]h\ ž 'Ub X '5 b X Y f g 7 f cm Z f ca 'h\ Y : `cf] X U 'K UhW\ '5 W W ci b h U V]`]hm D f c Y Wh 'Y I d `cf Y X 'h\ Y V f c U X Y f ']a d`] W Uh]cbg 'c Z 'h\ Y 'Z U W]`]hmž '] b W i X]b[']hg 'Z b X]b['Ub X 'h\ Y]a d U Wh c Z cb[c]b['gh Uh Y 'V i X [Y h W hg 'cb '`c W U ` W ca a i b]h] Y g '] b H Ua d U '6 Um" '5 g \][\ `][\ h Y X ']b 'K A B: g 'f Y d cf hž 'U 'g Y f] ci g

Wcbj YfgUh]cb'UVci h'h\Y'ghUhY g'df]cf]h]Yg']bhYfgYWh]b['k]h\
Wca a i b]hm'k Y`ZUfY ']g'a cfY'h]a Y`m'h\Ub'Yj Yf'[]j Yb'W' ffYbh
Yj Ybhg"

5``][Uhcf:5`WUhfUnžicdYbYX:Vmih\Y:ghUhY:cZ::`cf]XU']bih\Y
9j Yf[`UXYgž\Ug'VYYb'U'hcd]WcZ'WcbhYbh]cb:g]bWY:]hg']bWYdh]cb"
:`cf]XU'\Ug'U``cWUhYX'`() \$ a]``]cb'hc'YghUV`]g\'UbX'a UbU[Y'h\]g
ZUW]`]hmžifY`m]b['cb'hUldUmYf'a cbYm'XYgd]hY:gca Y'`cWU`
Ui h\cf]h]Yg'UbX'X]ggYbh]b['jc]WYg'fU]g]b['jU`]X'WcbWYfbg'UVci h']hg
]a d`]WUh]cbg'Zcf'ji'bYfUV`Y'Wca a i b]h]Yg"'H\]g'\Ug'Vfci [\h']bhc
ei Ygh]cb'h\Y'Z]bUbW]U``XYW]g]cbg'a UXY'Vm'h\Y'ghUhY'[cj Yfba Ybh
Xi f]b['U'dYf]cX'cZ'g][b]Z]WUbh'Vi X[Yh'W'hg'UZZYWh]b['jUf]ci g
gYWhcfgž'Zfca 'YXi WUh]cb'hc'\ci g]b['UZZcfXUV]`]hm''FYWWbh'Ufh]WYg
\Uj Y'Zi fh\Yf']bX]WUhYX'dchYbh]U``XUb[Yfg'hc'di V`]WfYgci fWYgž
a ca Ybhg'k\Yb'ghUhY'Zi bXg'Wci `X'VY'U'hYfbUh]j Y`m'X]fYWhYX'hc
dfYgg]b['`cWU``bYYXg"

$K \setminus Uh^{\circ}@]Yg^{\circ}6YbYUh \setminus h \setminus Y^{\circ}GifZUWY3$

H\Y'bYYX'Zcf'WUf]Z]WUh]cb'cb'h\Y'ghUhi g'UbX'hfYUha Ybh'cZ'h\YgY
XYhU]bYYg'\Ug'dfca dhYX'Zi fh\Yf'gWfi h]bm"'@Y[U`'YI dYfhg'YI dfYgg
WcbWYfb'UVci h'h\Y'`cb[!hYfa ']a d`]WUh]cbg'Zcf'Vch\'h\cgY
XYhU]bYX'UbX'h\Y'Wca a i b]h]Yg'Zfca 'k\]W\'h\Ym'Wca Y"'K\]`Y'h\Y
[cj Yfba Ybh'WU]a g'h\Y'ZUW]`]hm']g'Ub'YggYbh]U`'ghYd'hck UfXg
a UbU[]b[']``Y[U`']a a][fUh]cbž'Wf]h]Wg'Uf[i Y'h\YfY g'gca Yh\]b['hc
VY'gU]X'Zcf'Wcbg]XYf]b['h\Y'\i a Ub'f][\hg'cZ'h\Y']bX]j]Xi U`g
UZZYWhYX"

9bj]fcba YbhU`7cbWYfbg UbX @Y[U`5Wh]cb

A YUbk \]`YžYbj]fcba YbhU``[fci dg``]_Y`h\Y`7YbhYf`Zcf`6]c`c[]WU`
8]j Yfg]hm`UbX': f]YbXg`cZ'h\Y`9j Yf[`UXYg`\Uj Y``Ui bW\YX`U`ZYXYfU`
`Uk gi]h`hc`\U`h`h\Y`Wcbghfi Wh]cb`cZ'5``][Uhcf`5`WUhfUn"`5WWcfX]b[`hc
76G`BYk gž'h\Y``Uk gi]h`XYa UbXg`U`Wca dfY\Ybg]j Y
Ybj]fcba YbhU``fYj]Yk ž`Uf[i]b[`h\Uh`h\Y`Wcbghfi Wh]cb`Wci `X
gYj YfY`m`]a dUWh`XY`]WUhY`k Yh`UbX`YWcgmghYa g`\ca Y`hc
YbXUb[YfYX`gdYW]Ygž']bWi X]b[`h\Y`: `cf]XU`dUbh\Yf"`8YhfUWhcfg
ZYUf`h\Uh`df]cf]h]n]b[`h\]g`ZUW]`]hm`g][bU`g`U`hfci V`]b[`hfYbX
k \YfYVm`Ybj]fcba YbhU``dfchYWh]cbg`UfY`gUWf]Z]WYX`]b`ZUj cf`cZ
qhf]b[Ybh`]a a][fUh]cb`dc`]W]Yg"

 $\label{thm:continuous} 5 \cdot gc \cdot cZ \cdot bchY \cdot]g \cdot hV \cdot W \cdot hi \ fU \cdot g][\ b]Z]WUb WY \cdot cZ \cdot hV \cdot Y \cdot `Ub X \cdot k \ YfY \\ 5 \cdot ``][\ Uhcf \cdot 5 \cdot WUhfUn \cdot]g \cdot VY]b[\cdot Vi] \cdot h\check{z} \cdot g]hi \ UhY X \cdot]b \cdot hV \cdot 6][\cdot 7 \ md fY gg \\ B Uh]c b U \cdot DfY gY fj Y \]ghc f]WU \cdot `m U \cdot g]hY \cdot cZ \cdot Ybj]fc ba Yb hU \cdot 'dfc hY ghg \\ U]a YX \cdot Uh \cdot dfYj Yb h]b[\cdot hV \cdot XYj \ UghUh]cb \cdot Ybj]g]cb YX \cdot Vm \cdot U \cdot dfYj]ci g \\ U]fdc fh \cdot dfc \cdot YWh'' \cdot HV \cdot `Ub X g \cdot \]ghc fm² \cdot Wci d \cdot YX \cdot k]hV \cdot]hg \cdot YWc \cdot c[]WU \cdot ZfU[]`]hm² \cdot \ Ug \cdot \][\ b]hY X \cdot UX X]h]cb U \cdot \cdot dfc hY ghg² \cdot]b Wi X]b[\cdot U \cdot a \ cV]`]nUh]cb \\ Zfca \cdot B Uh]j Y \cdot 5a \ Yf]WUb \cdot [fci dg \cdot k \setminus c \cdot j]Yk \cdot hV \cdot `Ub X \cdot Ug \cdot gUWfY X''$

: `cf]XU g'8]j]g]cb'cZ'9a Yf[YbWm'A UbU[Ya Ybh']g'hUg_YX'k]h\
X]gUghYf'dfYdUfYXbYggž'bch'h\Y'cj Yfg][\h'cZ'XYhYbh]cb'WbhYfg"
K]h\'cb[c]b['`Y[U``VUhh`Yg'UbX'Wca a i b]hm'cddcg]h]cbž']h'fYa U]bg
hc'VY'gYYb'\ck'5``][Uhcf'5`WUhfUn'k]```Yj c`j Yž'YgdYW]U``m'Ug'h\Y
I "G"'Gi dfYa Y'7ci fh'\Ug'hYa dcfUf]`m'VUffYX': `cf]XU'Zfca
YbZcfW]b['gYj YfU``bYk ']a a][fUh]cb'`Uk g"

5g'HUa dU'6Um'Wca a i b]h]Yg'[fUdd`Y'k]h\'h\Y'fUa]Z]WUh]cbg'cZh\YgY'XYjY`cdaYbhgž'h\Y']bhYfgYWh]cb'cZ']aa][fUh]cb'dc`]WhžYbj]fcbaYbhU`fYgdcbg]V]`]hmž'UbX'Z]gWU`dfiXYbWY'Wcbh]biYg'hcdfcjc_Y'Wf]h]WU`WcbjYfgUh]cbg'UWfcgg'h\Y'ghUhY''K]h\'X]gW'gg]cbg`]_Y'h\cgY'ZUW]`]hUhYX'Vm'KAB: ž']hg'WYUf'h\Uh'h\Y'jc]W'gUXjcWUh]b['Zcf'U'VU`UbWXX'UddfcUWX'k]``VYWcaY']bWfYUg]b[`mj]hU`'Ug'h\Y'g]hiUh]cb'ibZc`Xg"

8 YhU]`g	
Cfh	6]['7 md fYgg 'B Uh]c b U` 'DfYgYfj Yž': `c f]XUž'l G5

8 Y hU]`g	
EiY``Yb	• k k k "k a b Z"cf[
	h\YWcbjYfgUh]cb"Wca
	• kkk"WWgbYkg"Wca

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