

DU_]ghUb i b X '7 \]b U. 'B Yi Y 'D Ufhb Y fg W \ UZh]a 'G W \ UhhY b 'X Y g ']b X]g W Y b '? c b Z \]_hg °

DU_]ghUb 'VYhcbh'X]Y 'ghfUhY[]gWXY 'DUfhbYfgWX UZh'a]h'7\]bU

Ua]X 'GdUbbi b[Yb'a]h'\(\D X \)Yb\(\ZY \)bUWXXYa 'Y]b

K UZZYbgh]\(\Cappa \D X \) Yf_\(\O B X Y \)h' k i fXY"



DU\U`[Ua ž=bX]Yb'! DU_]ghUb]FY[]Yfi b[gj YfhfYhYf`\UVYb'g]W\
YfbYi h'ni 'Y]bYf'Yb[Yb'DUfhbYfgW\UZh'a]h'7\]bU'VY_Ubbhž

k À\fYbX'g]Y'Ui Z'X]Y'Øb[ghYb'GdUbbi b[Yb'a]h'=bX]Yb'fYU[]YfYb"
5a '&\$"A U]'&\$&) 'VYgi W\hY'XYf'ghY``j YfhfYhYbXY

A]b]ghYfdfÀg]XYbh'i bX'5i » Yba]b]ghYf'DU_]ghUbgž'=g\Ue'8 Ufž

DY_]b["8]Yg'k Uf'XYf'YfghY'\cW\fUb[][Y'6Ygi W\Y]bYg

dU_]ghUb]gw\Yb'GhUUhgw\YZg'gY]h'XYa '9ffY]W\Yb'Y]bYg

K UZZYbgh]``ghUbXg'nk]gw\Yb'XYb'VY]XYb'@\AbXYfb"'K \A\fYbX'gY]bYg

5i ZYbh\U`hg'hfUZ'8 Uf'a]h'XYa 'W\]bYg]gw\Yb'5i » Yba]b]ghYf'K Ub[
Mj'ni gUa a Ybž'i a 'ØVYf'X]Y'?cbZ]_hY'a]h'=bX]Yb'gck]Y'X]Y

5bYf_Ybbi b['XYg'K UZZYbgh]``ghUbXg'ni 'gdfYW\Yb''K Ub['M]

VYnY]W\BYhY'XYb'K UZZYbgh]``ghUbX'U`g'J cfhY]``ZØf'VY]XY'BUh]cbYb

i bX'ZÒfXYfhY'XYb'fY[]cbU`Yb': f]YXYbž'k]Y'5``>\UnyYfU'VYf]W\hYh''

8Yf'K UZZYbgh]``ghUbXžXYf'Øb[ghia [YgYhnhik i fXYžZc`[hY'Ui ZY]bY'D\UgY']bhYbg]j Yf'a]`]hÀf]gWXYf'5i gY]bUbXYfgYhni b[Ybžk À\fYbX'XYf'DU_]ghUb'VY\Ui dhYhYž'a Y\fYfY']bX]gWXY?
?Ua dZZi [nYi [Y'a]h'WX]bYg]gWXYb'FU_YhYb'i bX
@ Zhj YfhY]X][i b[ggmghYa Yb'UV[YgWXcggYb'ni '\UVYb"'+bX]Yb'\Uh
X]YgY'6Y\Ui dhi b[Yb'V]g\Yf'k YXYf'VYghÀh][h'bcWX'XYa Ybh]Yfh''
<]bhYf[fi bX'XYg'?cbZ]_hg'g]bX'X]Y'Ub[YgdUbbhY'6Yn]Y\i b[
nk]gWXYb'XYb'VY]XYb'Bi_`YUfa ÀWXhYbžX]Y']\fYb'I fgdfi b[']b'XYf
HY]`i b['6f]h]gWX!+bX]Ybg']a '5i [i gh'%-(+'\UVYbž'VY]'XYf'X]Y
VY]XYb'@ÀbXYf'U`g'i bUV\Àb[][Y'GhUUhYb'YbhghUbXYb''8Yf'?cbZ]_h
i a 'XUg'a i g`]a]gWX'[YdfÀ[hY'?UgWXa]f'V`Y]Vh'Y]b'nYbhfU`Yf
GhfY]hdi b_h''

$<]ghcf]gWXY'; fi bX`U[Y'XYg'?cbZ`]_hg$

 $8] Y'HY]'ib['kifXY'jcb'@cfX'AcibhVUhhYb']b]h]] Yfhžia'X] YhibY\aYbXYb'GdUbbib[Yb'nk]gWXYb'<]bXi'ibX'Aig`]aYb'nia] `XYfb'', VYf') $$: ØfghYbghUUhYb'\UhhYb'X]Y'KU\`ž'g]WXYb'k XXYf'\dange X]Yb'cXYf'DU_]ghUb'UbnigWX`]Y\Yb''?UgWXa]fž'ibhYfXYf'<YffgWXUZh'XYg'\]bXi]gh]gWXYb'?\Ob][g'<Uf]'G]b[\ž'kifXY'bUWXgY]bYf'5_nYdhUbn']b'\dange X]Yb'Y]b'iaghf]hhYbYg'; YV]Yhž'XUg'nia Y\fYfYb'?f]Y[Yb'[YZØ\fh'\Uh''8]Y'j]Yf'?f]Y[Y'nk]gWXYb'\dange X]Yb'\dange bX'DU_]ghUbž'XUfibhYf'XYf'YfghY'?cbZ]_h'ia'?UgWXa]f'%-(+ž'X]Y?f]Y[Y'jcb'%-*)'ibX'%-+%'gck]Y'XYf'?Uf[]'!?f]Y['%---ž'\UVYbX]Y'\dange Yb'XYb'\Y]XYb'@\dange bXYfb'kY]hYf'VY`UghYhžkk]Y'X]Y'\dange f]hUbb]\WU'nigUaaYb'XYb'\YY]XYb'@\dange bXYfb'kY]hYf'\YY`UghYhžkk]Y'X]Y'\dange f]hUbb]\WU'nigUaaYb'XYb'\YY]XYb'@\dange AbXYfb'kY]hYf'\YY`UghYhžkk]Y'X]Y'\dange f]hUbb]\WU'nigUaaYb'XYb'\YY]XYb'@\dange AbXYfb'kY]hYf'\YY`UghYhž$

± XYb ``YhnhYb '* ↓ \fYb `\ Uh'X]Y 'a]`]hÀf]gWX Y '5_h]j]hÀh ']b `XYf `FY[]cb ni [Ybca a Yb "`DU_]ghUb 'g]Y \ h 'g]WX `Ub \ U`hYb XYb '8 fc \ i b [Yb 'Ui g ± X]Yb 'Ui g[YgYhnhž]bgVYgcb XYfY 'b UWX 'XYa 'DU\ U`[Ua !5b[f]ZZ 'Ua &&" '5df]` '&\$&) ž 'VY] 'XYa '&* 'A YbgWX Yb ii a g @YVYb '_Ua Yb ii b X 'XYf ± X]Yb `XUni 'j YfUb `UgghYž XYb '± Xi g!K UggYf!J YfhfU['Ui gni gYhnYb "DU_]ghUb `\ Uh'X]Y 'J cfk ØfZYž XUgg ']g`Ua]gh]gWX Y '; fi ddYb 'Ui g DU_]ghUb 'ZØf 'X]YgYb '5b[f]ZZ j YfUbhk cfh`]WX 'g]b Xž Yb hgWX]Y XYb ni fØW_[Yk]YgYb"

7\]bUg`Fc``Y`]a '?cbZ`]_h

 $\label{thm:continuous} 5bU\text{`mghYb'gY\Yb'8Uf g'6Ygi W.']b'DY_]b['U\text{`g'YbhgW,Y}]XYbX'Ubžia' a '7\]bUg'X]d\text{`ca} Uh]gWXY'I bhYfghØhni b['ni 'g]WXYfbž'k Å\fYbX g]WX'X]Y'I G!DU_]ghUb!6Yn]Y\i b[Yb'ni [i bghYb'\deltaX]Ybg'j YfÅbXYfb'' 8Yf'7\]bU!DU_]ghUb'9Wcbca]W7cff]Xcf'ff7D97\deltaY\gw kYfYg'\deltaZfUghfi_hi fdfc'Y_hž'V'Y]Vh'Y]b':i bXUa Ybh XYf'V]'UhYfU`Yb'6Yn]Y\i b[Yb''\8YbbcW.'[]Vh'Yg < YfUi gZcfXYfi b[Ybž']bgVYgcbXYfY']b'6U`cWX]ghUbž'k c gYdUfUh]gh]gWXY'; fi ddYb'[Yn]Y`h'WX]bYg]gWXY'\deltahYfYggYb Ub[fY]ZYb''\8Uf'j Yfg]WXYfhY'7\]bUž'XUgg'DU_]ghUb'U``Yg'hi b'k YfXYžia'X]Y'G]WXYf\Y]h'WX]bYg]gWXYf'GhUUhgVØf[Yf'i bX'Dfc'Y_hY']a @UbX'ni '[Yk À\f`Y]ghYb''`GY]h'&$&%'[UV'Yg'a]bXYghYbg'&$'HchYi b'hYf'WX]bYg]gWXYb'5fVY]hYfb']b'DU_]ghUb''$

8 Y hU]`g	
J c f ZU``	Gcbgh][Yg
Cfh	DU\U`[Ua žʻ±bX]Yb
EiY``Yb	• k k k "U`^UnYYfU"Wca
	• k k k "Vf]hUbb]WU"Wca
	Ud]"dU[Yd`UWY"XY

6Ygi WXYb G]Y i bg Ui Z b!U["XY