

# ?fmdhc!FYj c`i h]cb. 'Gc'j YfÀbXYfh'7fmdhc 5``!GhUfg'X]Y'A Ya Y!7c]bg!K Y`h

9bhXYW\_Yb'G]Y'7fmdhc'5``!GhUfg.'8]Y'Ni\_ibZh'XYf'A Ya Y! 7c]bg']a '?fmdhc!A Uf\_h'j YfY]bh'\=bcj Uh]cbž'7ca a i b]hm'i bX \=bj Ygh]h]cbga Ò[`]W\\_Y]hYb"

± XYf Xmb Ua ]gWX Yb K Y`h XYf? fmd hck À\fi b[Yb]gh Y]b bYi Yg?cbnYdh Ui Z[YhUi WXhž XUg X]Y 5fh i bX K Y]gYž k ]Y 5b Y[Yf A Ya Y! 7c]bg VYhf UWXhYbž fYj c`i h]cb]YfYb '\_ObbhY" 7fmd hc 5``!GhUfg fY GH5F GŁ'\Uh 'g]WX ini a 'N]Y `[YgYhnhž Y]bY ii a ZUggYbXY D`UhhZcfa ni 'gWX UZZYbž X]Y 'Yg Yfa O[`]WXhž X]Y 'J cfnØ[Y 'a Y\fYfYf A Ya Y! 7c]bg ']b Y]bYa 'Y]bn][Yb 'Hc\_Yb 'ni 'j YfY]bYb" '8]YgY ']bbcj Uh]j Y < Yf Ub[Y\Ybgk Y]gY '\_ObbhY 'gck c\``ZØf 'bYi Y '±bj YghcfYbž 'U`g 'Ui WX ZØf 'YfZU\fYbY'? fmd hc!HfUXYf j cb '[fc» Ya '±bhYfYggY 'gY]b"

 $8]Y'K Y`h'XYf'A Ya Y!7c]bg'\Uh']b'XYb'`YhnhYb'\\J\fYb'Y]bYb\\ g][b]Z]\_UbhYb'5i ZgW\kib['Yf'YVh''K\A\fib[Yb'k]Y'8c[YWc]b'ibXG\]VU'\\bi'\UVYb'b]W\h'bi f'Y]bY'[fc\\Y': Ub[Ya Y]bXY'[Yk cbbYb\Z\gcbXYfb'Ui W\nU\fY]W\Y'8]g_i gg]cbYb'\ØVYf']\fY'GhUV]`]h\Ah'ibXXUg'DchYbn]U`'Z\Øf'\\bij Ygh]h]cbYb'Ui g[Y`\Ogh'''7fmdhc'5``!GhUfg'bi hnhX]YgYb'HfYbX'[YgW\]W_h'Ui g\Z'ia 'X]Y'Ni [\Ab[`]W\_Y]h'\Z\Øf'\5b`Y[Yfni'Yf\O\Yb'ibX'[`Y]W\nY]h]['X]Y'F]g]_Yb'Xi fW\'X]Y'6\ØbXY'ib['YfgW\]YXYbYf'7c]bg']b'Y]bYa 'DfcXi_h'ni 'a ]b]a ]YfYb''$ 

### HYW bc'c[]gWY; fi bX'U[Yb

XYgʻA Uf\_hYgʻ[ YfYWkhik ]fX"'8]Yʻ9bhk ]W\_`i b[ 'j YfgWka ]`nhiX]Y BcghU`[ ]YʻXYfʻ-\$YfʻxU\fYʻa ]hʻY]bYfʻa cXYfbYbž VYbi hnYfZfYi bX`]WkYbʻD`UhhZcfa žʻX]Yʻgck c\``′Øb[ YfYʻU`gʻUi WkÀ`hYfYʻBi hnYfʻUbqdf]Wkh"

Ni XYa 'ghY\Yb'X]Y'HYW\bc`c[]Yb']a '9]b\_`Ub['a]h'XYa k UW\gYbXYb'6YXUfZ'Ub'@Ògi b[Ybž'X]Y'bUW\\U`h][Y 

♣jj Ygh]h]cbga Ò[`]W\\_Y]hYb'V]YhYb'''Y]b'k]W\h][Yf'5gdY\_h'ZØf 
5b`Y[Yfž'X]Y'gck c\`'\_i fn!'U`g'Ui W\'`Ub[Zf]gh][Y'; Yk]bbY 
UbghfYVYb"

### A Uf\_Yh]b[ i bX 7ca a i b]hm!6]`Xi b[

9]b 'k Y]hYfYf'nYbhfU`Yf'6YghUbXhY]``XYg'7fmd hc'5``!GhUfg!Dfc'Y\_hg ]gh'X]Y'GW\UZI b['Y]bYf'Yb[U[]YfhYb'7ca a i b]hm'''6Y]'?fmd hc! Dfc'Y\_hYb'g]bX'U\_h]j Y'Bi hnYf'YbhgW\Y]XYbX'ZØf'XYb': cfhgW\f]hh'' <]Yf'\_ca a h'XYf'9]bgUhn'[Yn]Y`hYf'A Uf\_Yh]b[ghfUhY[]Yb']bg'Gd]Y`ž k Y`W\Y'X]Y'G]W\hVUf\_Y]h'XYg'Hc\_Ybg']b'Y]bYa 'ØVYfZØ``hYb'A Uf\_h Yf\O\Yb'gc``Yb'''8Yf'9fZc`['\A\b`]W\Yf'Dfc'Y\_hYž'k]Y'ni a '6Y]gd]Y`G\]VU' $\Rightarrow$ i ž'j YfXYi h`]W\hž'k]Y'k]W\h]['Y]bY'hfYi Y'; YZc`[gW\UZh']gh''

8 i fW. Dfca ch]cbg'i bX'j ]fU'Y'? Ua dU[bYb'k YfXYb'6Ybi hnYf a ch]j ]Yfhž'HY]''XYg'K UW\\\ghi a g'ni 'k YfXYbž'k Ug'\\Ub[Zf]gh]['ni f GhUV]']h\(\alpha\) i bX'ni a '9fZc\['XYg'Hc\_Ybg'ZØ\fh"'8]YgY'GhfUhY[]Y \_\ObbhY'g]W\'U\'g'YggYbh]Y\''']b'Y]bYa 'gc["' A Ya Y!7c]bg !A Uf\_h\\YfUi gghY``Ybž'XYf'VY\_Ubbh'XUZØf']gh\(\alpha\)j cb'HfYbXg'i bX'7ca a i b]hml@Y]XYbgW\\UZhYb'[Y`Y]hYh'ni 'gY]b"

# : ]bUbn]Y``Y'9`Ya YbhY'i bX 9]bgh]Y[ ga Ò[ `]WX\_Y]hYb

8]Y Z]bUbn]Y``Y Ghfi \_hi fij cb'7fmdhc'5``!GhUfg']gh'\_`Uf'[YfY[Y`h.'9]b: ØbZhY``XYf'[YgUa hYb'Hc\_Yb!A Yb[Y']gh'ZØf'XYb'JcfjYf\_Ui ZfYgYfj]Yfhž'i a 'ZfØ\nY]h][Yg'\DhYfYggY'i bX'<mdY'ni 'ZÒfXYfb" Ni gÀhn`]W\k]fX'Y]b'GhU\_]b[!AcXY```]ad`YaYbh]Yfhž'XUg'BYi!'i bX6YghUbXg]bjYghcfYb'5bfY]nY'V]YhYhž'Ui Z'XYf'D`UhhZcfa'U\_h]j'ni V`Y]VYb"'8]YgY'5bfY]nY'gc``Yb'Ui W\XXUni 'VY]hfU[Ybž'X]Y'Hc\_Yb!

K ]fhgW\UZh`]W\\_Y]h'i bX'XUg'9b[U[Ya Ybh']bbYf\U`V'XYf7ca a i b]hm'ni 'ghÀf\_Yb"

: Øf'9]bghY][Yf']b'X]Y'K Y`h'XYf'\Dj Ygh]h]cbYb']gh'XYf'Ni [Ub['ni 7fmdhc'5``!GhUfg'g]a dY`'[YghU`hYh''5b`Y[Yf'a ØggYb'`YX][`]W\'Y]bY X][]hU`Y'K U``Yh'YfghY``Ybž'9h\YfYi a 'cXYf'Y]bY'UbXYfY'U\_nYdh]YfhY ?fmdhck À\fi b['\_Ui ZYb'i bX'X]YgY'XUbb'a ]h'XYf'D`UhhZcfa j YfV]bXYbž'i a '`GH5FG'ni 'Yfk YfVYb''8]YgY'Y]bZUW\Y Ni [Àb[`]W\\_Y]h']gh'VYgcbXYfg'k ]W\h][ž'i a 'bYi Y'\Dj YghcfYb'ZØf XYb'?fmdhca Uf\_h'ni '[Yk]bbYb'i bX']\bYb'XUg'bchk YbX][Y JYfhfUi Yb']b']\fY'5b`U[YghfUhY[]Yb'ni '[YVYb''

# A Uf\_hYbhk ]W\_`i b[ 'i bX 'ni \_ØbZh][ Y DYfgdY\_h]j Yb

 $7 \, fmd \, hc \, ^{5} ``! \, GhUfg'j \, YfY]b \, h'X]Y \, 'J \, cfn \emptyset[ \, Y \, 'YhUV \, ]YfhYf'A \, Ya \, Y! \, ^{2}bg'i \, b X \, ghY \, ``h'Y]b \, Y \, 'hY \, W \, bc \, `c[ ]gW \, Y \, '6 \, Ug]g' \, VY \, fY]hz' \, X]Y \, 'Z0f' \, X]Y \, 'Ni \, _i \, b \, Zh \, [ \, Yf \emptyset \, ghY \, h']gh'' \, K \, \, A \, \, fY \, b \, X' \, X]Y \, '=bj \, Ygh]h]c \, b' \, ]b' \, bYi \, Y \, '? \, fmd \, hc \, k \, \, A \, \, fi \, b[ \, Yb \, c \, Zh'a \, ]h'I \, b[ \, Yk \, ]gg \, Y]hY \, b''j \, YfVi \, b \, XY \, b'']ghz' \, V]YhY \, h'X]YgYg' \, Dfc \, Y_h \, ]bhYfYggUbhY \, '5 \, bgAhnYz'i \, a \, 'g]W \, ']a \, 'i \, a \, _Aa \, d \, ZhYb''? \, fmd \, hc \, !A \, Uf_h'ni \, dcg]h]cb]YfYb''' \, K \, ]Y'[ \, i \, h'Yg'[ \, Y \, `]b[ \, hz'X]Y \, '7 \, ca \, a \, i \, b]hm'U_h]j \, 'ni \, a \, ch]j \, ]YfYb'' \, b \, X'Ub''g]W \, 'ni \, 'V]b \, XYbz'' \, JfX \, 'Yb \, hgW \, Y]XYb \, X' \, Z0f' \, XYb \, `Ub[ \, Zf]gh][ \, Yb'' \, 9fZc \, `[ \, 'XYg'' \, GH5F \, G!\, Hc \, _Ybg''gY]b'' \,$ 

## 8YfKY[ ]bX]Y?fmdhc!Ni\_ibZh

8]Y'9bhk]W\_i b['j cb'7fmdhc'5``!GhUfg'gd]Y[Y`h'Y]bYb
VYXYi hYbXYb'GW\f]hh']b'XYf'9j c`i h]cb'XYg'?fmdhca Uf\_hYg'k]XYf"
8]Y'?ca V]bUh]cb'Ui g']bbcj Uh]j Yf'HYW\bc`c[]YžY]bYf'ghUf\_Yb
7ca a i b]hmi bX'Xi fW\XUW\hYb':]bUbnghfUhY[]Yb'\_ObbhY'X]YgYf
D`UhhZcfa '\Y`ZYbž'g]W\'U`g'Yfbghni bY\a YbXYf'5\_hYi f']b'Y]bYf
A Yhn[YfY]'j cb'A O[`]W\\_Y]hYb'ni 'YhUV`]YfYb'''+b'Y]bYf'NY]hž']b'XYf
X][]hU`Y'K A\fi b[Yb'ni bY\a YbX'Ub'6YXYi hi b['[Yk]bbYbž'V`Y]Vh
UVni k UfhYbž'k]Y'gW\bY``'g]W\'7fmdhc'5``!GhUfg']a 'K YhhVYk YfV
VY\Ui dhYb'\_Ubb''

#### 8 | Y F c ` Y | cb A Ya Y!7c | bg | b XYf

## ?fmdhck]fhgWXUZh

A Ya Y!7c]bg`\UVYb`g]W\`]b`XYb``YhnhYb`&J\fYb`ni `Y]bYa
VYa Yf\_Ybgk YfhYb`HY]``XYf`?fmdhck]fhgW\UZh`Ybhk]W\_Y`h"\8]YgY
X][]hU`Yb`K À\fi b[Yb`g]bX`cZh`b]W\h`bi f`:]bUbn]bghfi a YbhYž
gcbXYfb`Ui W\`?i`hi fd\Àbca YbYž`X]Y`Xi fW\`Cb`]bY!
; Ya Y]bgW\UZhYb`i bX`gcn]U`Y`A YX]Yb`Ub`Dcdi`Uf]hÀh`[Yk]bbYb"
8c[YWc]bž`i fgdfØb[`]W\`U`g`GdU» dfcY\_h`[YghUfhYhž`\Uh`g]W\`V]g
&\$&%`ni Y]bYf`XYf`VY\_UbbhYghYb`?fmdhckÀ\fi b[Yb`Ybhk]W\_Y`hž
X]Y`a ]h`Y]bYf`A Uf\_h\_Ud]hU`]g]Yfi b['j cb`ØVYf`, \$`A]``]UfXYb`I G8
Y]b`Yfbqhni bY\a YbXYf`5\_hYi f`]a `?fmdhca Uf\_h`k i fXY"

8]Y '5bY][ bi b[ 'Y]bYf'VfY]hYb'Bi hnYfVUg]g'Xi fW. 'A Ya Y!7c]bg'\Uh XUni '[ YZØ\fhž'XUgg'g]Y'b]W\h'bi f'U`g'GdY\_i `Uh]cbgcV'Y\_hYž gcbXYfb'Ui W\'U`g'A]hhY`'ni f': ÒfXYfi b[ 'j cb'gcn]U`Yb'i bX d\]`Ubh\fcd]gW\Yb'Dfc'Y\_hYb'X]YbYb'''8]Yg'nY][ h'g]W\VY]gd]Y`gk Y]gY']b'XYf'I bhYfghØhni b[ 'j YfgW\]YXYbYf K c\`hÀh][ \_Y]hgcf[ Ub]gUh]cbYb'Xi fW\'8c[ YWc]b'i bX'UbXYfY À\b`]W\Y'K À\fi b[ Yb'''8]YgY'\_i `hi fY``Y'8]a Ybg]cb'ÒZZbYh'bYi Y A Ò[ `]W\\_Y]hYb'ZØf'Dfc'Y\_hY'k]Y'7fmdhc'5``!GhUfgž'X]Y']b'Y]bYf VYghY\YbXYb'7ca a i b]hm'j cb'I bhYfghØhnYfb'i bX'Dfca chcfYb Ui ZVUi Yb'\_ÒbbYb"

# HYW bc`c[]gW Y =bbcj Uh]cb i bX G]W Yf\Y]h ]a ?fmdhc!A Uf\_h

 $8 ]Y ``6`c W\_W. U]b! HY W. bc`c[]Y \check{z} X]Y ``\]bhY f`? fmd hck Å\fi b[Yb `ghY \ h\check{z} \ VhY]bY Y]bXYi h][Y `i bX `g]W. Y fY `HfUbgU\_h]cbg\]ghcf]Y `[YgW. UZZY b\check{z} X]Y `ZØf `5b`Y[Yf'j cb`[fc» Y f`6YXYi hi b[`]gh" `\D`XYb ``YhmhY b`\J\\ fY b g]bX `nU\`fY]W. Y `hY W. bc`c[]gW. Y `\Dbcj Uh]cbYb `Ui Z[YhfYhYb \check{z} X]Y XUfUi Z`UVn]Y `Yb \check{z} X]Y `G]W. Y f\Y]hi bX `9ZZ]n]Ybn `XYg` < UbXY`g`a]h ? fmd hck Å\fi b[Yb `ni 'j YfVYggYfb" `Dfchc_c``Y `k]Y `9h\YfYi a` &"$ ghfYVYb `Y]bY `Yf\O\hY `G_U`]YfVUf_Y]hi bX `9bYf[]YYZZ]n]Ybn `Ub ž'k Ug ZØf `D`UhhZcfa Yb `k]Y `7 fmd hc `5``!GhUfg'j cb `J cfhY]` `gY]b`_Ubb"$ 

8 UfØVYf`\]bUi g`gd]Y`h`X]Y`G]W\Yf\Y]h`]a `?fmdhca Uf\_h`Y]bY YbhgW\Y]XYbXY`Fc``Y"`8]Y`HUhgUW\YžXUgg`7fmdhc`5``!GhUfg`Y]bY 5i X]h]Yfi b[ 'Xi fW. 'Gc']X'DfccZ'Yf\U'hYb'\Uhž']gh'Y]b'dcg]h]j Yf

\[
\Delta X]\_Uhcf'Z\OffdchYbn]Y'\Y'\Delta j YghcfYb'''GYW' f]hm'5i X]hg'g]bX'k ]W\h][ Y

A U\righta bU\a Ybž'i a 'GW\k UW\ghY\`Yb']b'XYf'GcZhk UfY'ni

]XYbh]Z]n]YfYb'i bX'ni 'VY\YVYbž'VYj cf'g]Y'Ui g[ Ybi hnh'k YfXYb

\_\ObbYb'''Gc\W\Y'JYfZU\fYb'g]bX'b\Oh][ ž'i a 'XUg'JYfhfUi Yb'XYf

5b\Y[ Yf'ni 'gh\h\_Yb\z']bgVYgcbXYfY'Ub[ Yg]W\hg'XYf'ghY][ YbXYb

5bnU\`'j cb' < UW\_g'i bX'6Yhf\O[ YfY]Yb']b'XYf'6fUbW\Y''

### A Uf\_hUbU`mgY'i bX'K YhhVYk YfVgi a ZY`X

8 Yf??fmdhca Uf\_hi]ghiÀi » YfghiXmbUa ]gWX ii bXik ]fXighÀbX][ij cbbYi YbiDfc Y\_hYbii bXiHYWXbc`c[]YbiVY`YVh" 8 Ug

K YhhVYk YfVgi a ZY`XiZØfi7fmdhci5``!GhUfgi]ghigY\fi]bhYbg]j žia ]h
j ]Y`YbiVYghY\YbXYbiA Ya Y!7c]bgii bXiUbXYfYbi]bbcj Uh]j Yb

Hc\_YbgžiX]Yii a i=bj YghcfYbi\_cb\_i ff]YfYb"Ni fnY]hi[]VhiYgik Y]h

ØVYfi%\$"\$\$\$j YfgWX]YXYbYi?fmdhck À\fi b[YbiUi ZiXYa iA Uf\_hž
k cVY]ibi fiY]bYi< UbXj c``Y]bYig][b]Z]\_UbhYiA Uf\_hUbhY]`gghY``i b[YffY]WXhi\Uh"

9]bY'A Uf\_hUbU`mgY'nY][hž'XUgg'X]Y'?cbgc`]X]Yfi b[']b'XYf?fmdhck À\fi b[g`UbXgW\UZh'ni b]a a h"'8]Yg'VYXYi hYhž'XUgg
Dfc'Y\_hY'a ]h'Y]bYf'\_`UfYb'J]g]cb'i bX'Y]bYa 'ghUf\_Yb'7ca a i b]hml:c\_i gž'k]Y'7fmdhc'5``!GhUfgž']b'XYf'@U[Y'g]bXž'g]W\'j cb'XYf'A UggYUVni\YVYb"'8]Y'HUhgUW\Yž'XUgg'XUg'Dfc'Y\_h'Y]bY'X]j Yfg]Z]n]YfhYGhfUhY[]Y'j YfZc`[h'i bX'X]Y'JcfhY]`Y'XYg'GhU\_]b[g'bi hnhž'\_ÒbbhY\Y`ZYbž'Y]bY'`cmU`Y'Bi hnYfVUg]g'Ubni gdfYW\Yb'i bX'X]YG]W\hVUf\_Y]h']a 'ØVYfZØ``hYb'A Uf\_h'ni 'Yf\Ò\Yb"

# GhUh]gh]\_Yb'ni f'5\_nYdhUbn'j cb ?fmdhck À\fi b[Yb

GhUh]gh]\_Yb'nY][YbžXUgg'X]Y'5\_nYdhUbn'j cb'?fmdhck À\fi b[Ybk Y`hk Y]h'ni b]a a h"'@Ui h'Y]bYf'l a ZfU[Y'j cb'GhUh]ghU']a '\\\f'&\\$&' [UVYb'Yhk U'\%'\ XYf'9fk UW\gYbYb']b'XYb'l G5'Ubž'VYfY]hg']b ?fmdhck À\fi b[Yb']bj Ygh]Yfh'ni '\UVYb"'8]Yg']gh'Y]b'5bgh]Y[']a JYf[`Y]W\'ni '&\\$&\%\Z'U`g'bi f'+\ XYf'6YZfU[hYb'X]Y'[`Y]W\Y'5bhk cfh [UVYb"'Ni gÀhn`]W\'nY][h'Y]bY'9f\YVi b['j cb'8Y`c]hhYZ'XUgg', '\

XYf'I bhYfbY\a Yb'd`UbYbž'X]Y'J Yfk YbXi b['j cb?fmdhck À\fi b[Yb']b'XYb'bÀW\ghYb'nk Y]'\\fYb'ni 'Yf\Ò\Ybž'k UgUi Z'Y]bY'k UW\gYbXY'5\_nYdhUbn']b'XYf'K ]fhgW\UZh'\]bk Y]gh"

8]Y'Dcdi `Uf]hÀh'j cb'D`UhhZcfa Yb'k]Y'7fmdhc'5``!GhUfg'\_ÒbbhY Xi fW. 'gc`W.Y'HfYbXg'[YZÒfXYfh'k YfXYbž'XU']a a Yf'a Y\f A YbgW.Yb'i bX'I bhYfbY\a Yb'?fmdhck À\fi b[Yb'U`g'HY]`']\fYf Z]bUbn]Y``Yb'GhfUhY[]Y']b'6YhfUW\h'n]Y\Yb"'8]YgY'9bhk]W\_`i b[YbV]YhYb'gck c\``<YfUi gZcfXYfi b[Yb'U`g'Ui W.'A Ò[`]W\\_Y]hYb'ZØf bYi Y'Dfc Y\_hYž'X]Y']a '6YfY]W.'XYf'X][]hU`Yb'K À\fi b[YbYfZc`[fY]W.'gY]b'a ÒW\hYb"

8 YhU]`g

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