

## GdU[\Yhh]']a 'HYgh.'@]X`'ØVYfhfi a dZh 6Uf]``U'i bX'5`X]']a '; YgW\a UW\_ghYgh

9]b GK F A Uf\_hWXYW\_'nY][ h 8]gWci bhYf!GdU[ \Yhh]'j cb @]X` ØVYfnYi [ Yb ]a ; YgWX a UW\_ghYghž'k À\fYbX'UbXYfY'A Uf\_Yb YbhhÀi gWXYb"

A ØbWXYb' '8]Y'Ei U`]hÀh'j cb'@YVYbga ]hhY`b'gd]Y`h'ZØf'j ]Y`Y

J YfVfUi WXYf'Y]bY'YbhgWXY]XYbXY'Fc``Yž'VYgcbXYfg'k Ybb'Yg'i a

X]Y'Ni VYfY]hi b['VY`]YVhYf'; Yf]WXhY'[Y\h''9]b'U\_hi Y``Yf'HYgh'XYg

GK F'A Uf\_hWXYW\_g'k ]fZh'Y]b'bYi Yg'@]WXh'Ui Z'X]Y'DUghU!K Y`hž'k cVY]

X]Y'HYghYf[YVb]ggY'j cb'GdU[\Yhh]'gck c\`'X]Y'Gi WXY'bUWX

YfgWXk]b[`]WXYb'U`g'Ui WX'ei U`]hUh]j '\cWxkYfh][Yb'DfcXi\_hYb

VYhfYZZYb"

#### 9f\_Ybbhb]ggY`Ui g`XYa ; YgWka UW\_ghYgh

#D Y]bYf'fYdfAgYbhUh]j Yb'l bhYfgi Wki b[ 'k i fXYb'GdU[\Yhh]
j YfgWk]YXYbYf'A Uf\_Yb'[YhYghYhž'XUfi bhYf'X]Y'9][Yba Uf\_Yb'j cb
5`X]'i bX'@]X`'gck]Y'fYbca a ]YfhY'DfcXi \_hY'k]Y'6Uf]``U'i bX
8 Y`j YfXY"'8]Y'9f[YVb]ggY'nY][Yb'Y]bY'ØVYffUgWkYbXY'K YbXi b[.
8]Y'GdU[\Yhh]'j cb'@]X`ž'X]Y'a ]h'bi f'\$ž+-'9i fc'ni 'Y]bYa''[Øbgh][Yb
DfY]g'Ub[YVchYb'k YfXYbž'ØVYffUgWkhYb'X]Y'HYghYf'Xi fWk']\fYb
j c``a i bX][Yb'; YgWka UW\_ 'i bX'X]Y'UbgdfYWkYbXY
6]ggZYgh][\_Y]h''=a'; Y[YbgUhn'XUni 'gWkb]hhYb'X]Y'Bi XY`b'j cb'5`X]
Ua 'gWk'YWkhYghYb'UV"

# : UfVY'i bX'CVYfZ'ÀWXY'U`g Ei U`]hÀhga Yf\_a U`Y

9]b 'Y b hg W X Y ] X Y b X Y g '? f]h Y f]i a 'ZØf' X]Y '6 Y k Y fhi b [ 'X Y f' B i X Y `b `k U f ] \ fY ': U f V Y ž' X]Y 'U i Z' X]Y 'E i U `]h À h 'X Y g 'j Y f k Y b X Y h Y b 'K Y]n Y b g

 $\label{thm:condition} $$ \] bk Y]gh" 9I dYfhYb ni Zc`[Y'[]`h.'\\X'\Y``Yf'X]Y'GdU[\Yhh]\Z'XYghc \O\Yf'X]Y'E i U`]h\Ah" 8]Y'9][Yba Uf_Y'j cb'' '; `c\\_Yb'g\\\b]hh'\]Yf\Y] Ua '\YyghYb'U\\Z'\k\A\fYb\X'\X]Y'GdU[\Yhh]'j cb'5`\X]']b'\X]Yg\Ya '5gd\Y_h \]bh\Yf\\Yf\]b[Yb"$ 

#### DfcV`Ya Y'VY]'XYf'Ei U`]hÀh

9]b'k Y]hYfYg'U`Ufa ]YfYbXYg'8YhU]`'k i fXY'Xi fWX'X]Y cVYfZÀWX`]WXY'6YhfUWXhi b['Ui Z[YXYW\_h"'6Y]'XYf'A Uf\_Y'8Y`j YfXY k i fXYb'\Y``Y'Gdchg'YbhXYW\_hž'X]Y' VY]a '?cWXYb'Y]b'DfcV`Ya k YfXYb '\_ObbhYbž'XU'g]Y'a O[`]WXYfk Y]gY'X]Y'6fi WX[YZU\f Yf\O\Yb"8Yf'<YfghY``Yf'j Yfg]WXYfhYž'XUgg'X]YgY'A Ab[Y``b]WXh XYa 'GhUbXUfX'XYf'A Uf\_Y'YbhgdfAWXYb'i bX'a O[`]WXYfk Y]gY'Xi fWX HfcW\_bi b[gdfcV`Ya Y'VY]a 'HfUbgdcfh'cXYf'XYf'@U[Yfi b[YbhghUbXYb'gY]b'\_ObbhYb"

### K Ufi a ']gh'XYf'HYgh'k ]WX h][3

8]YFYYJ Ubn'X]YgYf'I bhYfgi Wi b['YfghfYW\_h'g]W 'ØVYf'X]Y'V`c>Y
; YgWla UW\_gVYk Yfhi b['\]bUi g"'8Yf'HYgh'nY][hž'XUgg'\cWk Yfh][Y
@YVYbga]hhY`b]Wkh'nk Ub[g`Ai Z]['\c\Y'DfY]gY'j Yf`Ub[Yb"'\dagge)
NY]hYb'ghY][YbXYf'@YVYbg\U`hi b[g\_cghYb'i bX'k UWkgYbXYa\dagge)hYf'ggY'Ub'[Ygi bXYf'9fbA\fi b[']gh'Yg'ZØf'JYfVfUi WkYf
VYgcbXYfg'k]Wkh]['ni 'k]ggYbž'XUgg'g]Y'[i hY'Ei U`]hAh'ni 'Y]bYa
YfgWkk]b[`]WkYb'DfY]g'Z]bXYb'\_ObbYb"'8Ug'9f[YVb]g'\_ObbhY'j]Y'Y
<Ui g\U`hY'Yfa i h][Ybž']\fY'DUghU!K U\``ni 'ØVYfXYb\_Yb'i bX
[Y[YVYbYbZU``g'bYi Yž'\_cghYb[Øbgh][YfY'Cdh]cbYb
Ui gni dfcV]YfYb"

#### : Un]h'XYf'J YfVfUi WXYf

8]Y 'HYghYf[YVb]ggY 'XYg 'GK F 'A Uf\_hW\YW\_g '`UXYb 'XUni 'Y]bž UbXYfY 'A Uf\_Yb 'ni 'Yf\_i bXYb 'i bX 'Ui Z'E i U`]hÀh 'ni 'UW\hYbž 'UbghUhh g]W\'U``Y]b 'Ui Z'VY\_UbbhY 'B Ua Yb 'ni 'j Yf`UggYb"' \ddot 5bVYhfUW\h'XYf J]Y`gY]h][\_Y]h'j cb 'Bi XY`b']b 'XYf'? ØW\Y']gh'X]Yg'Y]bY 'k Yfhj c``Y 9f\_Ybbhb]g 'ZØf'U``Y'?cW\VY[Y]ghYfhYbž'X]Y']\fY'; Yf]W\hY'Ui Z'XUg bÀW\ghY'@Yj Y``\YVYb'a ÒW\hYbž'c\bY'XUg'6i X[Yh'ni 'gdfYb[Yb"

I a 'X]Y'dYfZY\_hYb'GdU[\Yhh]'6c`c[bYgY'ni ni VYfY]hYbž'`c\bh'Yg g]W\ž'X]Y'9f[YVb]ggY'XYg'HYghg'ni 'VYUW\hYb"'CZh'g]bX'X]Y [Øbgh][YfYb'5b[YVchY'jcb'8]gWcibhYf!AUf\_Yb'jÒ``][UigfY]W\YbXž'ia'YW\hY']hU`]Yb]gW\Y'; Ybigga caYbhY'ni'\_fY]YfYb"

8 Y hU]`c

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'X]Y!bUWX f]WX hYb "b Yh