

## DfY]gY ZØf C ghgYY!7Ua d]b[ 'ghY][ Yb. 'K Ug : Ua ]`]Yb 'Yhnh'Yfk UfhYh°

9fZU\fYb`G]Yž'k ]Y`X]Y`ghY][YbXYb`7Ua d]b[dfY]gY`Ub`XYf CghgYY`XYi hgWXY`I f`Ui VYf`VYhfYZZYb`i bX`YbhXYW\_Yb`G]Y`X]Y VYghYb`5b[YVchY"



K c\`YbVYf[Yf'K]Y\_ž'8Yi hgW\`UbX'!'8]Y'CghgYY'V`Y]Vh'Y]b

VY`]YVhYg'FY]gYn]Y`'ZØf'j ]Y`Y'XYi hgW\Y'I f`Ui VYfž']bgVYgcbXYfY']b

XYb'VYj cfghY\YbXYb'Gca a YfZYf]Ybž'X]Y'9bXY'\$\[\delta\]b'a Y\fYfYb
6i bXYg`\AbXYfb'VY[]bbYb"'BcfXf\Y]b!K YghZU`Yb'Zc`[h'a]h'XYa

: Yf]YbghUfh'Ua''%("'\$\[\delta\]''8]YgYg'\$\[\delta\]\f'nY]W\\bYh'g]W\\'YXcW\'Y]b

HfYbX'UV.'I f`Ui V'a]h'XYa''7Ua dYf'k]fX'hYbXYbn]Y```hYi fYf"'@Ui h

Y]bYf'5bU`mgY'XYg'7Ua d]b[!DcfhU`g'D]bWJa d'ghY][Yb'X]Y

, VYfbUW\hi b[gdfY]gY'ZØf'Y]bY'XfY]\_OdZ][Y': Ua]`]Y']b'9i fcdU'i a

fi bX'\*i 'Ui Z'Xi fW\gW\\b]hh`]W\') &'9i fc'dfc'BUW\h'

±b '8 Yi hgWX`UbX``]Y[h'XYf'DfY]g'dfc 'B UWX h'a ]h'Yhk U'(\$ '9i fc 'YXcWX i bhYf'XYa 'Yi fcdÀ]gWXYb '8i fWXgWXb]hh'''GWXk YXYb 'Zc`[h'U`g nk Y]h[Øbgh][ghYg'N]Y``a ]h'('''9i fcž'k À\fYbX': fUb\_fY]WX'VY]')\$

## 7 Ua d]b[d`AhnY Ub XYf CghgYY

: Øf'7Ua d]b[ ZfYi bXY'[ ]Vh'Yg'Ub'XYf'C ghgYY'Y]bY'J ]Y`nU\`
UhhfU\_h]j Yf'D`ÀhnYž'X]Y'gck c\`'ZØf': Ua ]`]Yb'U`g'Ui W\'ZØf'DUUfY
[ YY][ bYh'g]bX"'8Yf'7Ua d]b[ d`Uhn'@]YVYg`Ui VY']b'K c\`YbVYf[ Yf
K ]Y\_'V]YhYh'GhfUbXni [ Ub[ 'a ]h'Y]bYa 'ZUW\Yb'I ZYf'i bX']gh']XYU`
ZØf': Ua ]`]Yb'a ]h'?]bXYfb"'< ]Yf'ghUfhYb'X]Y'DfY]gY'VYfY]hg'VY]'&%
9i fc'dfc'BUW\h"'</pre>

9]b 'k Y]hYfYg'<][\`][\h']gh'XUg'C ghgYYWUa d]b[': Ua ]`]Y'<Y]XY']b K UUVgž'XUg'a ]h'Y]bYa 'K Y``bYggVYfY]W\ž'Y]bYa '< U``YbVUX'i bX Y]bYa '6YUW\!7`i V'[`Àbnh''<]Yf'`]Y[Yb'X]Y', VYfbUW\hi b[g\_cghYb VY]'Yhk U'' \$'9i fc'dfc'BUW\h''K Yf'Yg'fi\][Yf'a U[ $\check{z}$ \_Ubb']a 7Ua d]b[dUf\_'5i [ghZY`XY'Ub'XYf'D``ObYf'GYYbd`UhhY'ZØf'UV'&+'9i fc dfc'BUW\h'ØVYfbUW\hYbž'k c'Y]b'\* \$\$'A YhYf'`Ub[Yf'GUbXghfUbX gck]Y'j YfgW\]YXYbY': fY]nY]hUb[YVchY'ni f'JYfZØ[i b['ghY\Yb''

Ni gÀhn`]WX ']gh'XYf'?B5I G'7Ua d]b[dUf\_'Ui Z'FØ[Yb'VY]'j]Y`Yb7Ua dYfb'VY`]YVh''8]YgYf'D`Uhnž'X]fY\_h'Ub'XYf'GhY]`\_ØghY'a]hNi [Ub['ni a '%%'\_a '`Ub[Yb'GUbXghfUbX' GWXUUVY ž'V]YhYhacXYfbY'GUb]hÀfUb`U[Yb'i bX'[fc»nØ[][Y'GhY``d`ÀhnY'ZØf'UV'&+9i fc'dfc'BUWXh''5i WX'XYf'BUhi f7Ua d]b[d`Uhn'6YfbghY]bfY]hYf6Ufh\'Y][bYh'g]WX'\Yfj cffU[YbX'ZØf': Ua]`]Yb'i bX'\_cghYh'UV'' \*9i fc'dfc'BUWXh''

## DfY]gØVYfg]W\h'i bX'H]ddg

 $; YbYfY```` UVYb`X]Y`Xi fWXgWXb]hh`]WXYb`, VYfbUWXhi b[g_cghYb`Ui ZYi fcdA]gWXYb`7Ua d]b[d`AhnYb`]b`X]YgYa `$U\f`Y]bYb`5bgh]Y[$ 

 $\label{thm:sigma} YfZU\ fYb" 8 ]Y" DfY ]gY" ]Y[Yb" nk ]gWXYb" %( ž%, "9i fc" i bX" ( $ž($"9i fcž k Ug"Y]bYb" 5 bgh]Y["j cb" ( ž+) "i "]a "J Yf["Y]WX" ni a "J cf"U\f VYXYi hYh"": Øf" 8 Yi hgWX `UbX"k ]fX"Y]b" 8 i fWX gWX b]hhgd fY]g"j cb &, ž, * "9i fc" dfc" B UWX h"[Ya Y`XYhž"a ]h"Y]bYf" DfY]gghY][Yfi b["i a ( ž, + "i ""$ 

I a 'X]Y'?cghYb'ni 'gYb\_Ybž'Ya dZ]Y\`h'A UI ]a ]`]Ub'A Ò\f`Y'j cb' WUa d]b[ "]bZcž'UVgY]hg'j cb'Hci f]ghYb!<chgdchg'ni 'WUa dYb'i bX FUVUhh\_UfhYb'cXYf'JcfhY]`Y'k ]Y'XYb'WUa d]b[ "]bZc': 5B7@ 6'ni bi hnYb"'

 $8 ]Y \cdot VY \cdot ]Y \vee hY ghY b \cdot 6i b XY g \cdot Ab XY f \cdot ZØ f \cdot 7 \ Ua \ d ]b [ \cdot g]b X \cdot k \ Y]hY f \setminus ]b \cdot X]Y \\ b c f X XY i \ hg W XY b \cdot F Y [ ]c b Y b '' < Y ggY b \cdot i b X \cdot H \setminus Øf]b [ Y b \cdot ZØ \setminus f Y b \cdot U \cdot g \cdot X]Y \\ [ Øb gh] [ ghY b \cdot 6i b XY g \cdot Ab XY f \cdot a ]h \cdot DfY]gY b \cdot i a \cdot X]Y \cdot ' \cdot ' V]g \cdot ' + \cdot 9i \ f c \cdot d f c \\ B U W \lambda \lambda Y [ Y Zc \cdot [ h'j c b \cdot B F K \mathring{z} B]Y XY f g U W \lambda g Y b \cdot i b X \cdot G W \cdot Y g k ] [ ! < c \cdot g h Y]b \mathring{z} k c \cdot X]Y \cdot DfY]gY \cdot Y h K U \cdot ' , \cdot 9i \ f c \cdot V Y h f U [ Y b '' ]$ 

A ]h'XYa 'bU\YbXYb': Yf]YbVY[ ]bb']gh'X]Y'C ghgYY'ZØf'j ]Y`Y'Y]b j Yf`cW\_YbXYg'N]Y`ž'Ui W\'k Ybb'X]Y'? cghYb'ghY][ Yb"'9]bY ZfØ\nY]h][ Y'6i W\i b[ 'i bX'X]Y'5i gk U\`'XYg'f]W\h][ Yb 7 Ua d]b[ d`UhnYg'\_ÒbbY'ZØf'Y]bYb'[ Y`i b[ YbYb'I f`Ui V YbhgW\Y]XYbX'gY]b"

8YhU]`g	
Cfh	Kc\`YbVYf[Yf'K]Y_ž'8YihgW\`UbX
EiY``Yb	• k k k "XYfk YghYb"XY
	• k k k "d]bWUa d"XY
	• k k k "WUa d]b[ "]bZc

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