

## 5i [i ghi gd`Uhn']b'@Y]dn][.'xcVk U`\_'Vf]b[h HfUi a ^cVg'Ua '&(", "'bÀ\Yf°

5a %(", "'ghØfa Yb'ØVYf', \$'I bhYfbY\a Yb'ni a '&Vk U`\_'Ui Z XYb'5i [i ghi gd`Uhn']b'@Y]dn][' 'X]Y'dYfZY\_hY'7\UbWY'ZØf &Vgi WXYbXY°

5a 'GUa ghU[ ž'XYb'&("'5i [ i gh'&\$&( ž'j Yfk UbXY`h'g]W\'XYf
5i [ i ghi gd`Uhn']b'@Y]dn][ ']b'Y]b'di `g]YfYbXYg'NYbhfi a 'ZØf
5fVY]hggi W\YbXY'i bX'I bhYfbY\a Yb"'A]h'a Y\f'U`g', \$
hY]`bY\a YbXYb'6Yhf]YVYb'Ui g'XYf'FY[ ]cb'j Yfgdf]W\h'X]Y'&Vk U`\_
? Uff]YfYa YggY'Y]bY'gdUbbYbXY'; Y`Y[ Yb\Y]h'ZØf'U``Yž'X]Y'Ui Z'XYf
Gi W\Y'bUW\'Y]bYa 'bYi Yb'&V'cXYf'Y]bYf'5i gV]`Xi b[ gghY``Y'g]bX"
8]Yg']gh'X]Y'YfghY'5i Z'U[ Y'X]YgYf'CdYb!5]f'A YggY']b'@Y]dn][ ž'X]Y
i bhYf'XYa 'A chhc' 6i a a Y`b'i bX'6Yk YfVYb 'ghY\h"

8]Y J YfUbghU`hi b[ 'f]WX hY h'g]WX 'Ub 'Y]bY 'VfY]hY 'N]Y`[ fi ddYž XUfi bhYf'GWX Ø`Yfž'Ghi XYbhYbž'K Yf\_ghi XYbhYb'i bX '6Yfi ZghÀh][ Yž X]Y 'bUWX 'bYi Yb' < YfUi gZcfXYfi b[ Yb'gi WX Yb" 8]Y '=XYY '\]bhYf &Vk U`\_']gh'Ygž'X]Y '6Yk YfVi b[ gg]hi Uh]cb'ni 'YbhgdUbbYbž']bXYa X]Y 'HY]`bY\a Yf']b'Y]bYfii b[ Ynk i b[ YbYb'5ha cgd\\AfY'a ]h dchYbn]Y``Yb'5fVY]h[ YVYfb']bg'; YgdfAWX '\_ca a Yb'\_\ObbYb" =bcj Uh]cb'i bX'DYfgOb`]WX\_Y]h'ghY\Yb'\]Yf']a 'J cfXYf[ fi bX"

# I b\_ca d`]n]YfhY 6Y[Y[bi b[Yb i bX nU\`fY]WX Y 5b[YVchY

9]b'<Ui dhi bhYfgWX]YX'ni f'\Yf\_Òa a `]WXYb'&Va YggY']gh'X]Y; YghU`hi b['XYg'?cbhU\_hYg.'K À\fYbX'XYf'&Vk U`\_'A YggY'XØfZYb X]Y'6Ygi WXYf'X]fY\_h'?cbhU\_h'ni 'XYb'I bhYfbY\a Yb'Ui ZbY\a Yb'' 8]Yg'VYXYi hYhž'XUgg'6Yk YfVi b[gi bhYf`U[Yb'Y]b[YgYhnhž'?cbhU\_hXUhYb'Ui g[YhUi gWXh'i bX'gc[Uf'6Yk YfVi b[ga UddYb'j cf

Cfh'ØVYfdfØZh'k YfXYb'\_ÒbbYb"'Ni gÀhn`]W\'k ]fX'Y]b'VYgcbXYfYg 5b[YVch'ZØf'6Yk YfVi b[gZchcg'dfÀgYbh]Yfhž'gcXUgg'X]Y'6Ygi W\Yf [`Y]W\']\f'YfghYg'dfcZYgg]cbY``Yg'6]`X'ZØf'X]Y'6Yk YfVi b['Yf\U`hYb\_ObbYb"

8]Y'A YggY'V]YhYh'Ui W\'6YfUhi b['ni 'H\Ya Yb'XYf'K Y]hYfV]`Xi b[i bX'Ei U`]Z]n]Yfi b['Ub"'6YgcbXYfg'k]W\h][']ghž'XUgg'gdYn]Y``Y 5b[YVchY'ZØf'Ui g`ÀbX]gW\Y'5fVY]hggi W\YbXY']b'Ni gUa a YbUfVY]h a ]h'XYf'GhUXh'@Y]dn]['VYfY]h[YghY``h'k YfXYb"'8]Yg'nY][hž'k]Y'X]Y JYfUbghU`hi b['b]W\h'bi f'`c\_U`Y'HU`YbhYž'gcbXYfb'Ui W\]bhYfbUh]cbU`Y'6Yk YfVYf'Ubgdf]W\h'

 $8 ]Y'J]Y`ZU`h`XYf`5i gghY``Yf`]gh'VYa Yf_Ybgk Yfh'''Jcb`YhUV`]YfhYb I bhYfbY\a Yb`ØVYf`]bbcj Uh]j Y`GhUfhi dg`V]g`\]b`ni <br/>
<UbXk Yf_gVYhf]YVYb` 'X]Y`5i gk U\``Ub`&Vg`i bX<br/>
?Uff]YfYa <math>O[`]WX_Y]hYb`XYW_hY]b`VfY]hYg`GdY_hfi a `UV''`K Yf`g]WX XUfUi Z'j cfVYfY]hYhž`_Ubb`Ui WX`X]Y`X][]hU`Y`&Vk U```_cbgi `h]YfYbži a `g]WX`j cfUV`Y]bYb`, VYfV`]W_`ØVYf`X]Y`j YfZØ[VUfYb`GhY``Yb`ni j YfgWXUZZYb''`5a `JYfUbghU`hi b[ghU[`gY`Vgh`k YfXYb`Ui``yfXYa nk Y]`[fc``Y`&Vk U``g`Ui Z[YghY``hž`Ui Z'XYbYb`fi bX`%") $$`U_hi Y``Y &VUb[YVchY`dfÀgYbh]Yfh`k YfXYb''$ 

#### 9]b '9j Ybh'ZØf'U``Y

8]Y'HY]`bU\a Y'Ub'XYf'æVk U`\_'?Uff]YfYa YggY']gh'\_cghYb`cgži bX YXYf']gh'Y]b[Y`UXYbž'g]W\'X]Y'j YfgW\]YXYbYb I bhYfbY\a YbgdfÀgYbhUh]cbYb'Ubni gY\Yb"'A]h'Y]bYa 'Vi bhYb FU\a Ybdfc[fUa a ž'XUg'Ui W\'YW\_YfY'5b[YVchY'j cb': ccXhfi W\_g i a ZUgghž'k]fX'XYf'5i [i ghi gd`Uhn'ni 'Y]bYa 'YVYbX][Yb'Cfh'XYg 5i ghUi gW\g'i bX'XYg'BYhnk Yf\_Ybg"

8]Y 'C f[ Ub]gUhcfYb 'XYg'  $\approx$  Vk U`\_g' VYhcbYbž' XUgg'Yg' XUfi a '[ Y\hž Y]bY'6fØW\_Y'nk ]gW\Yb'5i gV]'Xi b[ ggi W\YbXYb'i bX'XYb' VYghYb 5fVY]h[ YVYfb 'XYf'FY[ ]cb'ni 'gW\`U[ Yb"'  $\Rightarrow$  bg[ YgUa h'j Yfgdf]W\h'X]Y JYfUbghU'hi b[ 'b]W\h'bi f'k Yfhj c``Y'?cbhU\_hYž'gcbXYfb'Ui W\'Y]bY bYi Y'5fhii bX'K Y]gYž'X]Y'  $\approx$  Vgi W\Y'ni 'Yf`YVYb"

### =bhYfYggY Ua 6Yfi ZgY]bgh]Y[ k YW\_Yb

8]Y : Vk U`\_ :? Uff]YfYa YggY : V]YhYh Y]bY : \Yfj cffU[YbXY : D`UhhZcfa žia :]a : X]fY\_hYb : 5i ghUi gWX : a ]h : 5fVY]h[YVYfb : k ]WX h][Y = DZcfa Uh]cbYb : ni : gUa a Y`b : i bX : g]WX : ØVYf : X]Y : bYi YghYb : HfYbXg i bX : 5bZcfXYfi b[Yb : Ui Z'XYa : 5fVY]hga Uf\_h : ni :]bZcfa ]YfYb ": 9g :]gh Y]bY : 7 \ UbWY ž'X]Y : b]WX h : bi f : ZØf : X]Y : HY]`bY\a Yfž : gcbXYfb : Ui WX : ZØf X]Y : I bhYfbY\a Yb : cb : J cfhY]` :]ghž : XU : g]Y : Ui Z'X]YgY : K Y]gY : bYi Y HU`YbhY : YbhXYW\_Yb : \_ObbYb"

8]Y'JYfUbghU`hi b['k]fX'b]W\h'bi f'XUg'6Yfi Zg`YVYb'j]Y`Yf
A YbgW\Yb'VYY]bZi ggYbž'gcbXYfb'Ui W\'Y]bYb'bYi Yb'HfYbX']b'XYf
5fh'i bX'K Y]gY'fYdfÀgYbh]YfYbž'k]Y'6Yk YfVYf'i bX'5fVY]h[YVYf
a]hY]bUbXYf']bhYfU[]YfYb'\_ObbYb"'8]YgY'Zf]gW\Y
<YfUb[Y\Ybgk Y]gY'\_ObbhY'VU`X'Ui W\']b'UbXYfYb'GhÀXhYb
BUW\U\aib['Z]bXYb'i bX'X]Y'5fh'i bX'K Y]gY'fYj c`i h]cb]YfYbž'k]Y
k]f'ØVYf'&Vgi W\Y'i bX'?Uff]YfYd`Ubi b['XYb\_Yb"

# 8]Y'6YXYi hi b['XYf'?Uff]YfYa YggY'ZØf'X]Y FY[]cb'@Y]dn][

 $8 ]Y \approx Vk U'_? Uff]YfYa YggY `\ Uhrb]W\ hrbi f'6YXYi hi b['ZØf'X]Y Y]bnY`bYb \approx Vgi W\ YbXYb z'gcbXYfb'Ui W\ 'ZØf'X]Y'k ]fhgW\ UZh`]W\ Y 9bhk ]W_`i b['XYf'[YgUa hYb'FY[]cb'@Y]dn]['''\delta 'XYb'`YhnhYb'\d\ Yb\ \Uhrg]W\ '@Y]dn][''U`g'Y]b'XmbUa ]gW\ Yg'K ]fhgW\ UZhg!'i bX ?i `hi fnYbhfi a 'YhUV`]Yfhz'XUg'Y]bY'J]Y`nU\`'j cb'5fVY]hgd`\dhnYb']b i bhYfgW\]YX`]W\ Yb'6fUbW\ Yb'V]YhYh''8]Y'\alpha Vk U`_'A YggY'X]Ybh'U`g D`UhhZcfa z'i a '`c_U`Y'I bhYfbY\a Yb'ni 'df\dgYbh]YfYb'i bX'gca ]h ni f'GhY][Yfi b['XYf'6YgW\\dd Zh][i b[gfUhY']b'XYf'FY[]cb VY]ni hfU[Yb''$ 

8]Y'5fVY]hg`cgYbeichY']b'GUW\gYb'`U[']a '\\J\f'&\\$\'\VY]'Yhk U') \(\frac{z}{k}\) Ug']a '\JYf['\Y]W\'ni 'UbXYfYb'6i bXYg`\AbXYfb'fY`Uh]j 'b]YXf][
]gh"'8]Y'\&Vk U`\_'?Uff]YfYa YggY'i bhYfghØhnh'X]YgYb'HfYbX\(\frac{z}{l}\)bXYa
g]Y'X]fY\_hYb'Ni [Ub['ni 'Y]bYf'J]Y`nU\`'j cb'5fVY]h[YVYfb
Yfa \(\frac{o}{1}\)]W\'\h'i bX'['\Y]W\'\nY]h]['XUni 'VY]hf\(\frac{a}{1}\)f\(\frac{z}{n}\)YVYXUfZ
ni 'XYW\_Yb"

## J]Y`ZU`h'i bX'=bbcj Uh]cb'Ui Z'XYf'xcVk U`\_ ? Uff]YfYa YggY

8]Y \*\* Vk U`\_ 'A YggY \YVh'g]W 'Xi fW ']\fY'J]Y `ZU`h'Ub 'Ui gghY``YbXYb I bhYfbY\a Yb '\Yfj cf" \*\* bg[ YgUa h'g]bX 'ØVYf', \$ 'I bhYfbY\a Yb Ub[ Ya Y`XYhž'X]Y'j cb'hfUX]h]cbY``Yb' < UbXk Yf\_gVYfi ZYb'V]g'\]b'ni ]bbcj Uh]j Yb'GhUfhi dg'Ui g'XYf'HYW bc`c[]YVfUbW Y'fY]W Yb"'8]YgY 8]j Yfg]hÀh'gcf[ h'XUZØfž'XUgg'Y]b'VfY]hYg'GdY\_hfi a 'Ub'VYfi Z]W Yb A Ò[`]WX\_Y]hYb'dfÀgYbh]Yfh'k]fXž'k Ug']bgVYgcbXYfY'ZØf'' A b[ Y A YbgW Ybž'X]Y'Ua '5bZUb[']\fYf'?Uff]YfY'ghY\Ybž'j cb'[fc\*Yf 6YXYi hi b[']gh"

± Ni gUa a YbUfVY]ha ]hXYfGhUXh@Y]dn][ 'k YfXYb'ni XYa gdYn]Y``Y'6YfUhi b[ gUb[ YVchY'VYfY]h[ YghY``hžX]Y'Ui g`ÀbX]gWXY 5fVY]hggi WXYbXY'i bhYfghØhnYb"'8]Yg'[ YgWX]Y\h'Xi fWX'[ Yn]Y`hY ± Zcfa Uh]cbYb'ni 'fYWXh`]WXYb'5gdY\_hYb'XYf'5fVY]hgUi ZbU\a Y']b 8Yi hgWX`UbX'gck]Y'Xi fWX'Cf]Ybh]Yfi b[ g\]`ZYb'ni f'±bhY[ fUh]cb']b XYb'5fVY]hga Uf\_h"

#### GhUh]gh]\_Yb ni f ∞ Vk U`\_ ? Uff]YfYa YggY

| ?UhY[cf]Y                        | 5bnU\`        |
|----------------------------------|---------------|
| 5i gghY``YbXY`I bhYfbY\a Yb      | , \$          |
| 5_hi Y``Y`≈VUb[YVchY`Ui ZXYf     | %) \$\$       |
| æVk U``                          |               |
| 9fk UfhYhY 6Ygi WXYf             | 、VYf') \$\$\$ |
| K cf_g\cdg'i bX'6YfUhi b[Yb'j cf | A Y\fYfY      |
| Cfh                              |               |

8 ] YgY ghUh]gh]gWXYb NUXYb j YfXYi h`]WXYb X]Y 6YXYi hi b[XYf J YfUbghU`hi b[gck cX`ZØf5fVY]hggi WXYbXY U`g`Ui WXZØfX]Y

Ui gghY``YbXYb`l bhYfbY\a Yb"'9g'k ]fX`Yfk UfhYhž'XUgg'ØVYf') \$\$\$6Ygi W\Yf'X]Y`A YggY`Ubn]Y\Ybž'i a `bYi Y`VYfi Z`]W\Y`DYfgdY\_h]j Ybni `YbhXYW\_Yb`i bX`XYb`X]fY\_hYb`?cbhU\_h'ni `dchYbn]Y``Yb5fVY]h[YVYfb`\Yfni ghY``Yb"

#### ?cbhU\_hibX5bgdfYWdYfgcb

: Øf'k Y]hYfY' ₺ Zcfa Uh]cbYb'ni f'J YfUbghU`hi b['\_ÒbbYb ₺hYfYgg]YfhY'X]fY\_h'a ]h'DYhYf'6Òhh[Yf']b'?cbhU\_h'hfYhYb"'GY]bY?cbhU\_hXUhYb'g]bX.

- HY`Y Zc b . '\$ %\#') &\$ '- \$ '\* \* \*
- 9!A U]`. ``Y]dn][ 4 ^cVk U`\_"W]hm

8]Y' & Vk U'\_'? Uff]YfYa YggY'j Yfgdf]W\ hz'Y]b'k ]W\ h][ Yf'GW\ f]hh' ZØf j ]Y'Y'F]W\ hi b[']\ fYf'VYfi Z]W\ Yb'Ni \_i bZh'ni 'gY]b'i bX'V]YhYh'Y]bY Y]b`UXYbXY'D`UhhZcfa z'i a 'bYi Y'?cbhU\_hY'ni '\_bØd ZYb'i bX'g]W\ ØVYf'U\_hi Y``Y' & VUb[YVchY'ni ']bZcfa ]YfYb"

8 Y hU]`q

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