

K]Y'a Ub'a]h'Y]bYa 'gWk UWXYb K UbXYfdUfhbYf'i a [Y\h

A Ub '_Ubb'a]h'G]WXYf\Y]h'gU[Ybž'XUgg'DYhYf'Y]b'j]Y`
ghÀf_YfYf'i bX'YfZU\fYbYfYf'K UbXYfYf']gh'U`g']WX"'5i Z
7chcdUI]'gdfUb['Yf'Ub'XYf'Gd]hnY'XYf'; fi ddY'j cfUi gž
k À\fYbX']WX'Ua '9bXY'n]hhYfhY'i bX'ghc`dYfhY"'5i Z'A UhUj Ubi\Uh'Yf'a]WX'fi\]['[Y\U`hYbž'U`g']WX'ZUgh']b'HfÀbYb
Ui g[YVfcWXYb'k ÀfY"'5i Z'XYa 'BYj]g'DYU_'\Uh'Yf'HfU]`g
Ui Z[YgdØfhž'ZØf'X]Y']WX'V`]bX'k Uf"'BUhØf`]WX']gh'Yf'b]WXh'XYf
9fghYž'XYf'a]h'Y]bYa 'gWXk UWXYb'DUfhbYf'k UbXYfh"'=b'5'K U`_
]b'h\Y'K ccXg'VYgWXfY]Vh'XYf'5i hcf'6]``'6fmgcbž'k]Y'Yf'Y]bYb
HY]`'XYg'5ddU`UWX]Ub'HfU]`a]h'GhYd\Yb'?Uhnž'gY]bYa
X]W_VÀi WX][Yb': fYi bXž'VYk À`h][hž'XYf'j Ò``]['i bj cfVYfY]hYh
/ Ua d\Y``]d/

A Ub '_Ubb'a]h'G]W\Yf\Y]h'gU[Ybž'XUgg'DYhYf'Y]b'j]Y``ghÀf_YfYf'i bXYfZU\fYbYfYf'K UbXYfYf']gh'U`g']W\"'5i Z'7chcdUl]'gdfUb['Yf'Ub'XYfGd]hnY'XYf'; fi ddY'j cfUi gž'k À\fYbX']W\'Ua '9bXY'n]hhYfhY'i bXghc`dYfhY"'5i Z'A UhUj Ubi '\Uh'Yf'a]W\'fi\]['[Y\U`hYbž'U`g']W\'ZUgh]b'HfÀbYb'Ui g[YVfcW\Yb'k ÀfY"'5i Z'XYa 'BYj]g'DYU_'\Uh'Yf'HfU]`gUi Z[YgdØfhž'ZØf'X]Y']W\'V`]bX'k Uf"

B UhØf`]W\ ']gh'Yf'b]W\ h'XYf'9fghYž'XYf'a]h'Y]bYa 'gW\ k UW\ Yb'DUfhbYf k UbXYfh"'=b'5'K U`_']b'h\Y'K ccXg'VYgW\ fY]Vh'XYf'5i hcf'6]`` 6fmgcbž'k]Y'Yf'Y]bYb'HY]`'XYg'5ddU`UW\]Ub'HfU]`'a]h'GhYd\Yb'? UhnžgY]bYa 'X]W_VÀi W\][Yb': fYi bXž'VYk À`h][hž'XYf'j Ò``][
i bj cfVYfY]hYh'Ui Z'X]Y'VYj cfghY\YbXY'Hcfhi f'Ui ZhUi W\ h"

A UbW\a U`ž'k]Y`]b`6fmgcbg`6i W\ž'_Ubb`XYf`@Y]ghi b[gi bhYfgW\]YX
`i gh]['gY]b"'Bcfa U`Yfk Y]gY`]gh'Yg`bYfj]["'; Y`Y[Ybh`]W\']gh'Yg
VYq]Y[YbX"

9g'[]Vh'YXcW.'8]b[Yž'X]Y'G]Y'hi b'_ÒbbYbž'i a 'X]Y'9fZU\fi b['ZØfG]Y'VY]XY'Ub[YbY\a Yf'fcXYf'ni a]bXYgh'k Yb][Yf'gW\a Yfn\UZhŁ'ni a UW\Yb"': c`[YbXYg'Z] b_h]cb]Yfh'ZØf'DYhYf'i bX'a]W\"

$J Yf^{T}YfYb^{T}G]Y^{T}b]WXh^{T}=XfY^{T}YXi^{T}X^{T}Ui^{T}WX^{T}k^{T}yb$

9gʻ]ghʻ`Y]W\hžʻYa UbXYbʻUbni ZU\fYbžʻXYfʻYgʻb]W\hʻni ʻj Yfgi W\YbgW\Y]bh"'9gʻ[Y\hʻgW\`]Y»`]W\ʻbi fʻY]bYbʻ: i» ʻj cfʻXYbʻUbXYfYbʻʻYgVfUi W\hʻbi fʻX]Yʻa YbhU`Yʻ9bhgW\`cggYb\Y]h"

Bi f']gh'Yg'b]W\h'ZØf''YXYb'gc'Y]bZUW\"'? ÒfdYf']W\Y':]hbYggž < Ò\YbU___`]a Uh]g]Yfi b[ž'9fZU\fi b['i bX'9]bghY``i b['gd]Y`Yb'Y]bY Fc``Y"'9]bY'a cXYfUhY'K UbXYfi b['ZØf'G]Y'_Ubb'ZØf'Ya UbX UbXYfYb'Ài » Yfgh'gW\k]Yf]['gY]b"'J Yfgi W\Yb'G]Yž'fi \]['i bX'dcg]h]j ni 'V`Y]VYb"'9fa i h][Yb'G]Y'XYb'gW\k UW\Yb'K UbXYfYf'i bX'nY][Yb G]Y'b]W\hž'XUgg'G]Y'[Y`Ub[k Y]`h'cXYf'Àb[gh`]W\'g]bXž'gY`Vgh'k Ybb G]Y'Yg'g]bX"'8 Ug'k]fX'g]Y'bi f'bcW\'k Y]hYf'XYa cfU`]g]YfYb"

K Ybb'g]Y'X]Y'; YXi `X'j Yf`]YfYbž'k YfXYb'G]Y'b]Wkh'XYZYbg]j 'fl Bi bž]Wk'\UVY'G]Y'b]Wkh'[YVYhYb'ni '_ca a Yb 'cXYf' 8]Y'a Y]ghYb'@Yi hY _ObbYb'XUa]h'i a [Y\Yb Ł"'G]Y'_ObbYb'k ØhYbX'gY]bž'k Ybb'g]Y k ØhYbX'gY]b'a ØggYbž'UVYf'Xi 'gc``hYgh'Wcc``V`Y]VYb"

; YVYb G]Y]\bYb FUi a ž UVYf b]W h ni j]Y`

8 Yb_Y`b]W\hz`XUgg`Xi `Ub`]\fYf`GY]hY`V`Y]VYb`a i ggh"`K Ybb`G]Y k Y]hYf`k UbXYfbz`nY][h'X]Ygz`XUgg`G]Y`]a a Yf`bcW\'j cb`XYf 9fZU\fi b['dfcZ]h]YfYb"

'U`h1 <]hnYYfgW\OdZib['j Yfa Y]XYb 25h`Ug'/ '6cchg'?]U'VY]a
K UbXYfb']b'XYf'5hUWUa U!K ØghYž'XYa 'hfcW_YbghYb'Cfh'XYf'9fXY</pre>

B UhØf`]W\ 'gc``hY 'a Ub 'XUfUi Z'UW\ hY b ž'b]W\ h'ni 'k Y]h'UVni gW\ k Y]ZY b" K Ybb 'G]Y 'VY] 'YI hfYa Ya 'K YhhYf'c XYf']b 'XYf' < \dot{O} \ Y'k Ub XYfb ž a ØggYb 'G]Y '\(\delta\) fYb 'DUfhb Yf'a \dot{O} [`]W\ Yfk Y]gY 'Ui Z'Gma dhca Y 'XYf < \dot{O} \ Yb_fUb_\Y]h'c XYf' <]hnYYfgW\ \dot{O} d \dot{Z} b [']a '5i [Y 'VY\U`hYb"

5i » YfXYa ž'k Ybb 'G]Y 'Y]bY 'DUi gY 'a UW. Yb 'i bX 'g]Y 'G]Y 'Y]b\c`Ybž j YfVf]b[Yb 'G]Y 'ZØbZ'A]bi hYb 'a]h']\bYbž'UbghUhh'g]W. 'k]YXYf'Ui Z XYb 'K Y['ni 'a UW. Yb "'G]Y '\UVYb 'j]Y``Y]W. h'[YfUXY 'Y]bY 'DUi gY [Ya UW. hž'UVYf'g]Y '\UVYb 'Yg'b]W. h"

: chcg a UWXYb

K Ybb'G]Y'Y]bY'? Ua YfU'XUVY]'\UVYbž'j YfVf]b[Yb'G]Y'Y]b][Y'NY]hXUa]hž': chcg'ni 'a UW\Yb"'8 Ug'[]Vh'XY]bYa 'DUfhbYf'NY]hž'X]W\Y]bni \c`Yb'cXYf'gc[Uf'j cfUi gni k UbXYfbž'c\bY'g]W\'gW\i`X]['ni Z\\Ybž'XUgg'Yf'X]W\'Ui Z\\A`h"

ŸbXYfY'XYb'D`Ub'b]W\h

'U`h1 9bhgWXY]XYb'G]Y'g]WX'ZØf'Y]bYb'`Ub[gUa Ybž'UVYf'ghYh][Yb
: cfhgWXf]hh'Ybh`Ub['Y]bYf'[i h'[Yd`UbhYb'Fci hY 2 HfUi a nY]h
9bhgWXY]XYb'G]Y'g]WX'ZØf'Y]bYb'`Ub[gUa Ybž'UVYf'ghYh][Yb
: cfhgWXf]hh'Ybh`Ub['Y]bYf'[i h'[Yd`UbhYb'Fci hY

K Ybb'G]Y']b'Y]bYf'UV[Y'Y[YbYb'; Y[YbX'cXYf']b'[YZÀ\f`]W\Ya; Y`ÀbXY'k UbXYfbž'gc``hYb'G]Y'b]W\h'j Yfgi W\h'gY]bž'Y]bY
5V_Øfni b['ni 'bY\a Yb'cXYf'ni 'gY\f'j cb' → fYa 'D`Ub
UVni k Y]W\Yb''K]f'\UVYb'6Yf]W\hY'j cb'K UbXYfYfb'[Y\Òfhž'X]Y
g]W\'hU[Y`Ub['j Yf`Ui ZYb'\UVYbž'k Y]`'g]Y'Y]bY'i b[Yd`UbhY
5V_Øfni b['[Ybca a Yb'\UVYb"

5VkY]Wkib[Yb'jca 'D`Ub'ZØ\fYb'ni 'i bjcf\YfgY\VUfYb 9fY][b]ggYb"'8Ug'6YghYž'kUg'G]Y'ZØf'=\fYb'K UbXYfdUfhbYf'hi b _`ObbYbž']gh'Y]b'`Ub[gUa Ygž'UVYf'ghYh][Yg'JcfUb_ca a Yb'Ybh`Ub[Y]bYf'[i h'[Yd`UbhYb'Fci hY"

9f`Y]W\hYfb G]Y X]Y @Ugh

K Ybb'≒f'K UbXYfdUfhbYf'a]h'XYa '; Yk]W\h'Ui Z'gY]bYa 'FØW_Ybni '_Àa dZYb'\Uhž'n]Y\Yb'G]Y']b'6YhfUW\hž']\a 'bUW\'A Ò[`]W_Y]hYhk Ug'UVni bY\a Yb"'A UbW\a U`'_ÒbbYb'X]Y'dUUf'?]`c[fUa a a Y\f'XYb'I bhYfgW\]YX'Ui ga UW\Yb"

5 g k] f Ui Z'XYf = g `U XY `Gc `Ub_Ua Yb i bX] W a]h Y]b Ya ghY] `Yb \$!a]b Øh] [Yb `Gd Un] Yf [Ub [`Ui Z'Z Ugh ("\$\$\$ `A YhYfb a]h '%' __[; Yk] W h `Ui Z'XYa `F ØW_Yb _cb Zfcbh] Yfh `k i fXY Z k i gghY] W Z X Ugg] W `XUa]h `b] W h i a [Y\Yb _cbbhY "'; `ØW_`] W Yfk Y]gY `Vch `a]f `Y] b Y]b \Y]a]g W Yf \$\frac{1}{2}\$ b [Y `Ub Z a Y]b Y `HUg W Y `Z Øf `a] W `ni `hf U [Yb " = b X] Yg Yf `G]hi Uh] cb `\Ahh Y `DYh Yf `k Yb] [`Z Øf `a] W `hi b `_ObbYb Z X U `Yf g Y `Vgh `&\$ `_[`hf i [Z `UV Yf i b h Yf `Ub X Yf Yb `I a gh Ab X Yb `f A Uh Uj Ub i `Ł < Uh `Yf `a Y]b ; Yd A W `Yf `Y] W h Yf h Z k Ug `]a a Ybg `[Y\c `Z Yb `\ Uh "

K YfXY'b]Ya U`g'gY`Vghni Zf]YXYb

 $8 \ Ug \ gc \ ``hY \ gY \ Vghj \ YfghÅbX `]WX \ gY]b \ \check{z} \ UVYf \ dUW_Yb \ `G]Y \]a \ a \ Yf \ X]Y \\ nY \ b \ `k \]WX \ h][\ ghYb \ '8 \]b[\ Y \ Y]b \ `i \ bX \ YfnÅ \ `Yb \ `G]Y \ Ui \ ZY]bY \ Ui \ g[\ YhfYhYbY \ K \ UbXYfi \ b[\ [\ Y \ Yb" \]$

a j Yf[Ub[YbYb '划\fighUfVYb 'g]YVYb 'K UbXYfYf 'a]h'<Y `a Ybž BYcdfYbUbnØ[Yb 'i bX '? `YhhYf[i fhYb 'bUW\ 'Y]bYf 'Ghi fnZi h']a 'N]cb! BUh]cbU`dUf_"'K Ybb 'i bj cf\Yf[YgY\YbY '9fY][b]ggY 'gY\f YfZU\fYbY'i bX '[i h'j cfVYfY]hYhY 'K UbXYfYf 'hfYZZYb'_ÒbbYbž_
_ÒbbYb'g]Y 'YXYb 'hfYZZYbž'U`gc'[YVYb'G]Y 'g]WX 'gY`Vgh'X]Y 'VYghY 7\UbWY"

'U`h1 2

@Y]hV]`X.`8fYUagh]aY

6Ygi WXYb G]Y i bg Ui Z Y]bY!fY]gY "XY