

JYf_Y\fgWXUcg'Ui Z'5(.'GWXk Yfj Yf`YhnhYf @_k!: U\fYf'bUWX'I bZU``

5a '%+"\$*"&\$&) '_Ua 'Yg'Ui Z'XYf'5('VY]'8fYgXYb'ni 'Y]bYa gWk YfYb'@_k !I bZU``ž'XYf'_]`ca YhYf`Ub[Y'GhUi g']b'F]Wk hi b[7\Ya b]hn'j Yfi fgUWk hY"



7\Ya b]hnž'8Yi hgW\`UbX'!'9]b'gW\k YfYf'I bZU```Ui Z'XYf
5i hcVU\b'5('VY]'8fYgXYb'\Uh'\Yi hY'ni 'a Ugg]j Yb

JYf_Y\fgVY\]bXYfi b[Yb'[YZØ\fh"A cf[Ybž'[Y[Yb'*.' \$'I \fž'_Ua
Yg']a '6Ui ghY``YbVYfY]W\'nk]gW\Yb'8fYgXYb!K Ygh'i bX'K]`gXfi ZZ
ni 'Y]bYf'?c``]g]cbž'VY]'XYf'Y]b'@_k'Ui Z'Y]bYb'j cfUi gZU\fYbXYb
@Ughk U[Yb'Ui ZZ \f"'8Yf'' -!'À\f][Y': U\fYf'XYg'Ui ZZU\fYbXYb
: U\fnYi [g'k i fXY'gW\k Yf'j Yf`Yhnhž'gcXUgg'X]Y': Yi Yfk Y\f'ni f
FYhhi b['a]h'\mXfUi `]gW\Ya '; YfÀh'UbfØW_Yb'a i gghY"'9]b
FYhhi b[g\i VgW\fUi VYf'k i fXY'YVYbZU``g'ni a 'I bZU``cfh'[YgW\]W_hž
i a 'fUgW\'a YX]n]b]gW\Y'<]`ZY'`Y]ghYb'ni '_ObbYbž'VYf]W\hYh'6]`X''

8 i fWX 'XYb '5 i ZdfU``'_Ua 'Yg'ni f'_ca d`YhhYb 'GdYffi b['XYf'5(']b F]WXhi b['7\Ya b]hnž'k Ug'Y]bYb'_]`ca YhYf`Ub[Yb 'GhUi 'ni f': c`[Y

\UhhY"8YfFØW_ghUi YffY]W\hY Y]bY @Ab[Y j cb @VYf &'?]ca YhYfbžV]g ni f 5VZU\fh < Y``YfUi "5i W Ui Z'XYf 5%+]b

F]W\hi b[8fYgXYb _Ua Yg ni DfcV`Ya YbžXU Hi bbY` [YgdYffh k i fXYb i bX XYf J Yf_Y\f V]g ni a 5bgW i gg 8fYgXYb!GØXj cfghUXh UV[Y`Y]hYh k i fXY "Gc YbhghUbX Y]b GhUi V]g D]fbUžk A\fYbX X]Y

GhfU» Yb fi bX i a 8fYgXYb i bX X]Y I a `Y]hi b[gghfYW_Yb ghUf_
ØVYf`UghYh k UfYbžk]Y A 8F VYf]W\hYh"

JYf_Y\fgW\UcgibX`FYhhib[gaU»bU\aYb

8]Y'I bZU``Ui ZbU\a Y'[YghU`hYhY'g]W\'_ca d`]n]Yfhž'XU'GW\YfVYb'i bX
Ui g[YhfYhYbYf'?fUZhghcZZ'YbhZYfbh'k YfXYb'a i gghYbž'k Ug
ni gÀhn`]W\Y'NY]h']b'5bgdfi W\'bU\a "'=b'XYf'YfghYb'NY]h'bUW\'XYa
JcfZU```k Uf'X]Y'JYf_Y\fgg]hi Uh]cb'[fUj]YfYbXž']bgVYgcbXYfY']a
a cf[YbX`]W\Yb'6Yfi Zgj Yf_Y\f"'5i Z'XYf'6%+' 'nk]gW\Yb
<Yfnc[gk U`XY'i bX'; fi a VUW\'gck]Y'Ui Z'XYf'GhUUhgghfU»Y'' *
nk]gW\Yb'K]`gXfi ZZi bX'?YggY`XcfZ'_Ua 'Yg'ni 'GhUi 'i bX'Ghcd!UbX!
; c!JYf_Y\f']b'VY]XYb'F]W\hi b[Yb"'5i W\'X]Y'5(']b'F]W\hi b[
7\Ya b]hn'k Uf'VYhfcZZYbž'a]h'GhUi 'UV'<Yfa gXcfZ'ØVYf'Y]bY
GhfYW_Y'j cb'&*'?]`ca YhYfbž'hfchn'XYf'gW\bY``Yb': fY][UVY'Y]bYf
Gdi f"

±g[YgUa h'a i gghYb'X]Y'9]bgUhn_fàZhY'i bX'FYhhi b[ghYUa g'gW\bY``
\UbXY`bži a 'X]Y'G]W\Yf\Y]h'U``Yf'6YhY]`][hYb'ni '[Yk À\f`Y]ghYb"
K Yf'g]W\']b'Y]bYf'gc`W\Yb'BchZU``g]hi Uh]cb'VYZ]bXYhž'gc``hY']a a Yf
X]Y'[fi bX`Y[YbXYb'GW\f]hhY'ni f'9fghYb'<]`ZY'VYUW\hYb.'GW\Ui Ybž
8Yb_Ybž'<UbXY`b"'8Ug'VYXYi hYhž'X]Y'G]hi Uh]cb'gW\bY```ni
VYi fhY]`Ybž'Y][YbY'F]g]_Yb'UVni k À[Yb'i bX']a 'BchZU``'i a [Y\YbX
X]Y'FYhhi b[gbi a a Yfb'ni 'U`Ufa]YfYbž'k]Y'Ui Z'XYf'K YVgY]hY'XYg'
H7G'VYgW\f]YVYb"</pre>

: Un]h'i bX'5i gV`]W_

8]Y'j c``ghÀbX][Y'FÀi a i b['XYf'I bZU``ghY``Y'i bX'X]Y'FØW__Y\f'ni a bcfa U`Yb'JYf_Y\fgZi gg'k YfXYb'j cfUi gg]W\h`]W\'V]g'ni a 'gdÀhYb BUW\a]hhU[']b'5bgdfi W\'bY\a Yb"'K]f'\cZZYb'Ui Z'VU`X][Y 6YggYfi b['XYf'@U[Y'ZØf'U``Yž'X]Y'j cb'XYa 'JYf_Y\fg_c``Udg VYhfcZZYb'g]bX"'8]Y'9fY][b]ggY'\Yi hY'i bhYfghfY]W\Yb'Y]ba U``a Y\fž

 $\label{lem:conditional} $$ [Yg']ghz']b'JYf_Y\fgi bZA``Yb'VYgcbbYb'i bX'gWbY```ni \UbXY`b''$

6`Y]VYb`G]Y`]bZcfa~]Yfh`i~bX`j~cfg]WXh][~Ui~Z`XYb`GhfU»Yb°

8 YhU]`g	
Cfh	7\Yab]hnž'8YihgWX`UbX
EiY``Yb	• k k k "a Xf"XY
	• k k k "V]`X"XY
	• k k k "hWg"VX

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