

8f]b[YbXYf'5ddY``ni f'K UZZYbfi \Y']a ; UnU!?cbZ`]_h. 'NY]h'`Ài Zh'UV

I G!5i » Yba]b]ghYf'6`]b_Yb'XfÀb[h'Ui Z'gW\bY``Y'K UZZYbfi \Y]a '; UnU!?cbZ]_hž'k À\fYbX'X]Y'; Yk U`h'UbXUi Yfh'i bX ; Y]gY`b']b'; YZU\f'g]bX"

8]Y'G]hi Uh]cb']a 'BU\Yb'CghYb'V'Y]Vh'Ub[YgdUbbh'i bX VYgcf[b]gYffY[YbXž'k À\fYbX'XYf'?cbZ]_h'nk]gW\Yb'=gfUY'i bX'XYf <Ua Ug']b'; UnU'k Y]hYf\]b'Ub': U\fh'Ui Zb]a a h''=ba]hhYb'X]YgYf 9g_U`Uh]cb'k YbXYh'g]W\'5bhcbm'6`]b_Ybž'XYf'I G!5i »Yba]b]ghYfž Ub'X]Y']bhYfbUh]cbU`Y'; Ya Y]bgW\UZh'i bX'ZcfXYfh'Xf]b[YbX'Y]bY K UZZYbfi \Y''GY]bY'5ddY``Y'g]bX'j cf'XYa '<]bhYf[fi bX'XYg ni bY\a YbXYb'6`i hj Yf[]Y»Ybg'i bX'XYf'XfUa Uh]gW\Yb'@U[Y'XYf ; Y]qY`b'j cb'<Ua Ug'ni 'j YfghY\Yb''

6Yf]WX hY b 'ni Zc`[Y']gh'X]Y'A Ò[`]WX_Y]hž'j]Y`Y'XYf'j Yfa]gghY b ; Y]gY`b'`YVYbX'ni 'fYhhYbž'ghUf_'[Ygi b_Yb"'8]Y'J Yf\UbX`i b[Yb\UVYb'g]WX'U`g'gWXk]Yf]['Yfk]YgYbž'i bX'nU\`fY]WXY': U_hcfYb a UWXYb'X]Y'FØW__Y\f'XYf'; Y]gY`b']a a Yf'i bk U\fgWXY]b`]WXYf" 6`]b_Yb'Ài » YfhY'g]WX'ØVYf'X]Y'8f]b[`]WX_Y]hž'X]Y'\i a Ub]hÀfY'?f]gY]b'XYf'FY[]cb'ni 'VYYbXYbž'i bX'VYhcbhYž'XUgg'YXY'A]bi hY'nÀ\`h"

8]YFc``YXYfJYfa]hh`Yf

JYfa]hh`Yf`Ui g`j YfgWX]YXYbYb`@ÀbXYfb`\UVYb`g]W\`]bhYbg]j
VYa Ø\hž: f]YXYb`i bX`GhUV]`]hÀh`]b`X]Y`FY[]cb`ni `Vf]b[Yb"'=\bYb
]gh`VYk i gghž`XUgg`X]Y`NY]h`XfÀb[h`i bX`gW\bY``Y`@Ògi b[Yb`[YZfU[h
g]bX"'=b`; YgdfÀW\Yb`a]h`j YfgWX]YXYbYb`5_hYi fYb`j Yfgi W\Yb`g]Yž
Y]bYb`8]U`c[`ni `ZÒfXYfb`i bX`X]Y`K c[Yb`ni `[`ÀhhYbž`X]Y`Xi fW\`XYb
UbXUi YfbXYb`?cbZ]_h`\cWX[YgWX`U[Yb`k i fXYb"

5bhcbm'6`]b_Ybg''Øb[ghY'FY]gY']b'X]Y'FY[]cb']gh'Y]b'XYi h`]W\Yg NY]W\Yb'X]YgYg'6Ya Ø\Ybg"'9f'\Uh'ZØ\fYbXY'Dc`]h]_Yf']b'HY`'5j]jž?U]fc'i bX'UbXYfYb'GhÀXhYb'[YhfcZZYbž'i a 'ØVYf'X]Y'9g_U`Uh]cb'XYf; Yk U`h'ni 'X]g_i h]YfYb"'8]YgY'?ccdYfUh]cbgj Yfgi W\Y'nk]gW\Yb XYb'@ÀbXYfb'g]bX'j cb'YbhgW\Y]XYbXYf'6YXYi hi b[ž'i a 'XUg'@Y]X XYf'N]j]`VYj Ò`_Yfi b['ni '`]bXYfb'i bX'a Ò[`]W\Y'a]`]hÀf]gW\Y FYU_h]cbYb'Y]bni XÀa a Yb"

K Ufi a ']gh'X]Y'G]hi Uh]cb'k]WXh][3

8]Y 6YXYi hi b['XYf'@U[Y ']a 'BU\Yb'C ghYb'_Ubb'b]W\h'\cW\'[Ybi [Y]b[YgW\Ahnhik YfXYb"'B]W\h'bi f'X]Y'Ni _i bZh'XYf'; Y]gY`b'ghY\h'Ui ZXYa 'Gd]Y`ž'Ui W\'X]Y'GhUV]`]h\Ah'XYf'[YgUa hYb'FY[]cb']gh']b'; YZU\f"8Yf'?cbZ]_h'\Uh'VYfY]hg'HUi gYbXY'j cb'A YbgW\Yb`YVYb'[YZcfXYfhibX'_\ObbhYž'k Ybb'Yf'b]W\h'Y]b[YX\Aa a h'k]fXž'ni 'Y]bYa 'bcW\[f\Ob\YfYb': `\AW\YbVfUbX'Z\O\fYb"'8]Y'dc`]h]gW\Y'@UbXgW\UZh']a\BU\Yb'CghYb']gh'c\bY\]b'ZfU[]`ž'i bX'X]Y'`Ui ZYbXYb\Si gY]bUbXYfgYhni b[Yb'Z\OfXYfb'YI hfYa]gh]gW\Y'5bg]W\hYb'Ui Z\VY]XYb'GY]hYb"

9]b'k Y]hYfYg'DfcV'Ya ']gh'X]Y'\i a Ub]hÀfY'G]hi Uh]cb']b'; UnU"
6Yf]W\hYb'ni Zc`[Y'g]bX'X]Y'@YVYbgVYX]b[i b[Yb'ZØf'X]Y
N]j]'VYj Ò`_Yfi b['XfUa Uh]gW\'i bX'X]Y'NU\`'XYf'J Yfhf]YVYbYb
ghY][h'_cbh]bi]Yf`]W\"'6`]b_Yb'\Uh'VYfY]hg'Ui Z'X]Y'Bchk YbX][_Y]h
\]b[Yk]YgYbž'XYb'A YbgW\Yb']b'; UnU'\i a Ub]hÀfY'<]`ZY
ni _ca a Yb'ni '`UggYbž'k À\fYbX'['Y]W\nY]h][
G]W\Yf\Y]hga U\s\bU\a Yb'Yf[f]ZZYb'k YfXYb'a ØggYbž'i a 'Y]b
k Y]hYfYg'5i ZZ'Ua a Yb'XYf'; Yk U`h'ni 'j Yf\]bXYfb"

Ni gÀhn`]WX 'ghY``h`XUg`[Ycdc`]h]gWXY`I a ZY`X`<YfUi gZcfXYfi b[YbXUf"J]Y`Y`@ÀbXYf`gWXUi Yb`[YbUi '\]b`i bX`g]bX`VYgcf[h'ØVYf`X]YdchYbn]Y``Yb`5i gk]f_i b[Yb`Ui Z'X]Y`[`cVU`Y`GhUV]`]hÀh"'8Yf`8fi W_Ui Z'X]Y`I G5`i bX`UbXYfY`]bhYfbUh]cbU`Y`5_hYi fY`k ÀWXghžhfUbgdUfYbhY`i bX`YZZY_h]j Y`@Ògi b[Yb`Ubni V]YhYbži a `XYb?cbZ`]_h`ni `VYYbXYb`i bX`: f]YXYb`]b`X]Y`FY[]cb`ni `Vf]b[Yb"

8]Y 'G]hi Uh]cb 'V 'Y]Vh'Ui W\ ']b 'XYb 'A YX]Yb 'Y]b 'nYbhfU`Yg 'H\ Ya U" \approx i fb U`]ghYb 'VYf]W\ hYb 'fY[Y`a À»]['ØVYf'X]Y 'gd Ubbi b[g[Y`UXYbYb

9bhk]W_`i b[Yb ii bX'VY`Yi W\hYb ii bhYfgW\]YX`]W\Y'DYfgdY_h]j Yb
XYf'VYhY]`][hYb 5_hYi fY"'A UbW\a U```Ài Zh'X]Y'6Yf]W\hYfghUhhi b[
; YZU\fž'X]Y'_ca d`Yl Yb Ni gUa a Yb\Ab[Y'ni 'g]a d`]Z]n]YfYbž
k A\fYbX'Yg'g]W\ ii a 'Y]b'j]Y`gW\]W\h][Yg'DfcV`Ya '\UbXY`hž'XUg'h]YZ
]b'XYf'; YgW\]W\hY'i bX'XYb'=XYbh]hAhYb'XYf'A YbgW\Yb'j Yfk i fnY`h
]gh"

8]Y'bÀW\ghYb'GW\f]hhYž'X]Y']bhYfbUh]cbU'Y'5_hYi fY'i bhYfbY\a Ybk YfXYbži a 'Y]bY'K UZZYbfi \Y'ni 'YffY]W\Ybž'g]bX'YbhgW\Y]XYbX"8]Y'K Y'h'V`]W_h'[YgdUbbh'Ui Z'X]Y'9bhk]W_`i b[Ybž'XYbb'k Ug'\]YfdUgg]Yfhž'_ÒbbhY'k Y]hfY]W\YbXY': c`[Yb'\UVYb"'6Y]'XYb'U_hi Y``YbGdUbbi b[Yb'i bX'XYa ''Y]Xj c``Yb'<]bhYf[fi bX'XYf'`Y]XhfU[YbXYbN]j]`VYj Ò`_Yfi b[']gh'Yg'i bYf`Àgg`]W\ž'XUgg'YXYf'JYfgi W\'ni f6Y]`Y[i b['XYg'?cbZ]_hg'Yfbgh'[Ybca a Yb'k]fX"

9]bV`]W_Y']b'X]Y'Ni _i bZh

8]Y '6Ya Ø\i b[Yb'i a ': f]YXYb']a 'BU\Yb'CghYb'g]bX'_ca d`]n]Yfh i bX'YfZcfXYfb'; YXi `X'gck]Y'X]d`ca Uh]gW\Yg'; YgW\]W_"'K]Y gW\bY``'Y]bY'@Ògi b['[YZi bXYb'k YfXYb'_Ubbž'\Àb[h'b]W\h'bi f'j cb XYb'J Yf\UbX`i b[Yb'nk]gW\Yb'XYb'DUfhY]Yb'UVž'gcbXYfb'Ui W\'j cb XYb'FYU_h]cbYb'XYf']bhYfbUh]cbU`Yb'; Ya Y]bgW\UZh'Ui Z'X]YgY?f]gY"'9g'V`Y]Vh'ni '\cZZYbž'XUgg'XYf'8fi W_'Ui Z'X]Y JYfUbhk cfh`]W\Yb'`YhnhYbX`]W\'ni 'Y]bYf'XUi Yf\UZhYb'6YYbX][i b[XYf'; Yk U`h'ZØ\fh"

 $8]Y`[Ycdc`]h]gWXYb`5igk]f_ib[Yb`XYg';UnU!?f]Y[g]$

8 Yf; UnU!?f]Y['\Uhrb]W\hrbi fini 'Y]bYa 'Ybcfa Yb'a YbgW\`]W\Yb
@Y]X'[YZØ\fhzgcbXYfb'Ui W\k Y]hfY]W\YbXY'[Ycdc`]h]gW\Y
?cbgYei YbnYb"'8]Y'FY[]cb']gh'Y]b'_ca d`Yl Yg'BYhn'Ui g
dc`]h]gW\Yb'5``]UbnYbz']b'XYa 'j YfgW\]YXYbY'5_hYi fY'k]Y'X]Y'l G5z
X]Y'9i fcdA]gW\Y'l b]cbz'Fi gg`UbX'i bX'fY[]cbU'Y'A AW\hY'k]Y
Ÿ[mdhYb'i bX'=fUb'i a '9]bZi gg'f]b[Yb"'8Yf'?cbZ]_h'\UhrX]Y
GdUbbi b[Yb'nk]gW\Yb'=gfUY`i bX'gY]bYb'BUW\VUfb'k Y]hYf
j YfgW\AfZhz'k A\fYbX'X]Y'l bhYfghØhni b['ZØf'X]Y'DU`Agh]bYbgYf']b
j]Y`Yb'UfUV]gW\Yb'@AbXYfb'ni [Ybca a Yb'\Uh''8]Yg'_ObbhY'ni
Y]bYf'`Ab[YfZf]gh][Yb'8YghUV]`]g]Yfi b['XYf'FY[]cb'ZØ\fYb"

9]b 6`]W_'Ui Z'X]Y FYU_h]cbYb j cb VYbUW\VUfhYb @\abXYfb nY][h i bhYfgW\]YX`]W\Y 5bg\abXy'' Y [mdhYb i bX x fXUb]Yb z'X]Y VY]XYb Y]bn][Yb UfUV]gW\Yb GhUUhYb a]h: f]YXYbgj Yfhf\abX[Yb a]h y fUY\z ghY\Yb i bhYf'8 fi W_z Y]bY j Yfa]hhY`bXY F c``Y Y]bni bY\a Yb z k \abX\fYbX'\def Ub X]Y I bhYfgh\text{\text{\text{o}hni}} b[\frac{7}{20}f'X]Y' < Ua Ug'j Yfgh\abXf_h'\Uh'' 8]YgY 8]j Yf[Ybn']b XYb FYU_h]cbYb'_\text{\text{o}bbhY'X]Y FY[]cb'k Y]hYf dc`Uf[g]YfYb'i bX'ni 'bYi Yb'?cbZ']_hYb'\frac{7}{20}\fYb''

<ia Ub]hÀfY'?f]gY']a ; UnUghfY]ZYb

8]Y`\ia Ub]hÀfY`G]hi Uh]cb`]a ; UnUghfY]ZYb`\Uh`g]W\`XfUa Uh]gW\
j YfgW\`YW\hYfh"`@Ui h`XYa `6Øfc`XYf`J YfY]bhYb`BUh]cbYb`ZØf`X]Y
?ccfX]b]Yfi b[`\ia Ub]hÀfYf`5b[Y`Y[Yb\Y]hYb`fC7<5Ł`g]bX`X]Y
[fi bX`Y[YbXYb`8]Ybgh`Y]ghi b[Yb`k]Y`K UggYf!`i bX
Ghfca j Yfgcf[i b[`ghUf_`Y]b[YgW\fÀb_h"`A Y\f`U`g`X]Y`<À`ZhY`XYf
6Yj O`_Yfi b[`]a ; UnUghfY]ZYb`]gh`Ui Z`\ia Ub]hÀfY`<]`ZY
Ub[Yk]YgYb"`8]Y`Ub\U`hYbXYb`5b[f]ZZY`\UVYb`nU\`fY]W\Y

\$\delta ZfUghfi _hi fYb`nYfghOfhz`gcXUgg`Yg`Ub`a YX]n]b]gW\Yb
9]bf]W\hi b[Yb`i bX`BU\fi b[ga]hhY`b`a Ub[Y`h"

8]Y'JYfY]bhYb'BUh]cbYb'\UVYb'k]YXYf\c`h'UiZ'X]Y'8f]b[`]WX_Y]h
XYf'G]hi Uh]cb'\]b[Yk]YgYb'i bX'ZcfXYfb'Y]bYb'gcZcfh][Yb'Ni [Ub[ZØf'\i a Ub]hÀfY'<]`ZY"'8YbbcWX'g]bX'X]Y'6YX]b[i b[Yb'j cf'Cfh
Ài »Yfgh'[YZÀ\f`]WXži bX'j]Y`Y'Cf[Ub]gUh]cbYb'\UVYb
GWXk]Yf][_Y]hYbž']\fY'bÒh][Yb'<]`Zq[ØhYf'ni 'hfUbgdcfh]YfYb"'

±bhYfbUh]cbU`Yf'8fiW_'UiZ'X]Y'IG5

±0.5bVYhfUW\h'XYf'Ub\U`hYbXYb'?Àa dZY'i bX'XYf'\i a Ub]hÀfYb?f]gY'k]fX'XYf'8fi W_'Ui Z'X]Y'I G5ž'U`g'k]W\h][Yb'JYfVØbXYhYbæfUY`gž']a a Yf'[fÒ»Yf"'Dc`]h]_Yf'i bX
A YbgW\YbfYW\hgcf[Ub]gUh]cbYb'ZcfXYfb'j cb'XYf'6]XYb!
5Xa]b]ghfUh]cb'Y]bY'ghÀf_YfY'9]bZi ggbU\a Yž'i a 'Y]bY
K UZZYbfi \Y'ni 'YffY]W\Yb"'8]Y'I G5'\UVYb']b'XYf'JYf[Ub[Yb\Y]hgck c\``a]`]hÀf]gW\Y'U`g'Ui W\'Z]bUbn]Y``Y'I bhYfghØhni b['ZØf'=gfUY`ni f'JYfZØ[i b['[YghY``hž'k Ug'bi b'j cb'j]Y`Yb'U`g'a cfU`]gW\ZfU[k ØfX]['Ub[YgY\Yb'k]fXž'gc`Ub[Y'XYf'?cbZ]_h'k Y]hYf[Y\h'i bXi bqW\i X][Y'N]i]`]ahYb'`Y]XYb"

I a 'X]Y 'ÒZZY bh`]W\Y'K U\fbY\a i b['ni 'VYY]bZi ggYbž'\Uh'Y]bY

J]Y`nU\``j cb'B; Cg'i bX'UbXYfYb'; fi ddYb']b'XYb'`YhnhYb'K cW\Yb

DfchYghY'cf[Ub]g]Yfh"'8]YgY'8Ya cbghfUh]cbYb'f]W\hYhYb'g]W\
[Y[Yb'X]Y'I G!Dc`]h]_']a 'BU\Yb'CghYb'i bX'ZcfXYfhYb'Y]bY

BYi Ui gf]W\hi b['XYf'Ua Yf]_Ub]gW\Yb'5i »Ybdc`]h]_']b'6Yni ['Ui Z

XYb'=gfUY`!DU`Àgh]bU!?cbZ]_h"

JYfVcf[YbY'8mbUa]_Yb

8]Y'8 mbUa]_']bbYf\U`V'XYf'DU`Àgh]bYbg]gW\Yb'5i hcbca]YVY\ÒfXY fD5\Li bX'XYfYb'J Yf\À`hb]g'ni f'<Ua Ug']gh'YVYbZU``g'j cb YbhgW\Y]XYbXYf'6YXYi hi b["'8]Y'D5`\Uh']b'XYf'J Yf[Ub[Yb\Y]h j Yfgi W\hž'g]W\'U`g'a cXYfUhYf'5_hYi f'ni 'dcg]h]cb]YfYbž'YXcW\']gh]\fY'; `Ui Vk ØfX][_Y]h'i bhYf'DU`Àgh]bYbgYfb'ghUf_'Ub[YgW\`U[Yb" J]Y`Y'gY\Yb'X]Y'D5'U`g'i bZ\]['Ubž'X]Y'`Y[]h]a Yb'\DhYfYggYb'XYf DU`Àgh]bYbgYfni 'j YfhfYhYb"'8]Yg'_ObbhY'XUni 'ZØ\fYbž'XUgg'X]Y < Ua Ug'Ub'l bhYfghØhni b['[Yk]bbhž'k Ug'X]Y'GhUV]`]h\h']a K Ygh'cfXUb`UbX'[YZ\A\fXYb'i bX'ni 'Y]bYa 'Ub\U`hYbXYb'?cbZ]_h nk]gW\Yb'j YfgW\]YXYbYb'dU`\Agh]bYbg]gW\Yb': fU_h]cbYb'ZØ\fYb_ObbhY'"

8]Y ZcfhXUi YfbXY; Yk U`h'i bX`X]Y YfgW\ØhhYfbXY`\i a Ub]hÀfY?f]gY ZcfXYfb b]W\h'bi f`k]fhgW\UZh`]W\Y'i bX`X]d`ca Uh]gW\Y
A U» bU\a Ybž'gcbXYfb 'Ui W\ Y]b [fi bX`Y[YbX'bYi Yg'J YfghÀbXb]g i bX`Y]bY bYi Y`GhfUhY[]Y ZØf: f]YXYb i bX`G]W\Yf\Y]h']b XYf
FY[]cb"'9a dUh\]Y i bX`6YfY]hgW\UZh'ni f`Ni gUa a YbUfVY]h'g]bX
YbhgW\Y]XYbXži a 'Y]bY`bUW\\U`h][Y`@Ògi b['ni 'Z]bXYb"

8 Y hU]`a

6 Ygi WX Yb 'G]Y i bg Ui Z 'b!U["XY