

9]bVfi W\`]b`K]W_YXY.`Dc`]nY]`gi W\h nYi [Yb`bUW\`bÀW\h`]W\Ya ', VYfZU``

 \pm 'K]W_YXY!Fi \f'_Ua 'Yg'ni 'Y]bYa '9]bVfi W\']b'Y]bY HUb_ghY``Y"'8]Y'Dc`]nY]'gi W\h'bUW\'NYi [Yb"'<]bk Y]gY'V]hhY a Y`XYb°

 $\begin{array}{l} \textit{K Yf'!K } \textit{JW_YXY'} \quad \Rightarrow \text{`XYf'B UWA h'ni a ': fY]hU['k i fXY'X]Y'Fi \Y']b \\ \textit{K } \textit{JW_YXY!Fi \f''A\ '[YghOfh"I a '$' .%) `I \f'YfY][bYhY'g]WA'Y]b \\ 6`]hnY]bVfi WA']b'Y]bY'HUb_ghY``Y'Ub'XYf'< Ui dhghfU» Y''8]YgYf \\ \textit{J cfZU```YfY][bYhY'g]WA']b'XYb'ZfØ\Yb'A cf[Ybghi bXYbž'U`g'X]Y \\ a Y]ghYb'A YbgWAYb'bcWA'gWA`]YZYb''5i Z'X]YgY'K Y]gY'_cbbhYb'X]Y \\ HÀhYf'i b[YghOfh'U[]YfYb'i bX'\]bhYf`]Y» Yb'Y]bY'Gdi f'XYf \\ \textit{J Yfk Øghi b["} \end{array}$

Jcf'Cfh'VfUWXYb'a Y\fYfYž'V]g\Yf'i bVY_UbbhY'DYfgcbYb']b'X]Y
HUb_ghY``Y'Y]bž']bXYa 'g]Y'Y]b': YbghYf'Y]bgWX`i [Yb"'8]Y'HÀhYf
\UhhYb'Yg'Ui Z'K Yfh[Y[YbghÀbXY'UV[YgY\Yb'i bX'Ybhk YbXYhYb
[fc»Y'AYb[Yb'Ub'N][UfYhhYb'gck]Y'X]Y'; Y`X_UggYhhY'XYf'?UggY"
K]Y'Yg']b'gc`WXYb': À``Yb'cZh']ghž'gWXY]bYb'X]Y'HÀhYf'[i h
cf[Ub]g]Yfh'ni 'gY]bž'XYbb'g]Y'k i gghYb'[YbUi ž'k Ug'g]Y'gi WXhYb"

8 | Y :: `i WX h · X Y f · H À h Y f

 $BUWX`XYa `YfZc`[fY]WXYb`9]bVfi WX`Zc\Yb`X]Y`A ÅbbYf`a]h`Y]bYa k Y]*Yb`6i ``]']b`F]WX hi b[`K YghYf\UUf"`8]YgY`HUhgUWXY`nY][hž`XUgg g]Y`k U\fgWXY]b`]WX`Y]b`: `i WXhZU\fnYi [`VYfY]h`\]Y`hYbž'i a `gWXbY`` Ui g`XYa `HUhcfh`ni `Ybh_ca a Yb"`8]Y`Dc`]nY]`_cbbhY`V]g`Ub[`_Y]bY gdYn]Z]gWXYb`<math>\oplus$ Zcfa Uh]cbYb`ni `XYb`HUhj YfXÂWXh][Yb`Yf`Ub[Ybž gcXUgg`X]Y`Gi WXY`bUWX`NYi [Yb'j cb`[fc*Yf`6YXYi hi b[`]gh"

 $8\,]Y\,^Dc\,^]nY\,]\,^K\,\,Yf\,^V\,]hhY\,h\,^X\,U\,\backslash\,Yf\,^U\,^Y\,\dot{z}\,^X\,]Y\,^a\,\,\dot{O}[\,\,^]W\!\lambda\,Yfk\,\,Y\,]gY\,^Yhk\,\,Ug$

J YfXÀW\h][Yg'VYa Yf_h'\UVYbž'g]W\ni 'a Y`XYb"'C V 'Yg'g]W\i a
j YfXÀW\h][Y: U\fnYi [Yž'DYfgcbYb'cXYf'; YfÀi gW\Y'\UbXY`h' 'YXY

♣b Zcfa Uh]cb'_Ubb'YbhgW\Y]XYbX'gY]b"' ♣bhYfYgg]YfhY'NYi [Yb
_`ObbYb'X]Y'Dc`]nY]'i bhYf'XYf'HY`YZcbbi a a Yf'\$&- &&'- %\$\$\$
_cbhU_h]YfYb'cXYf'g]W\X]fY_h'Ub'X]Y'bÀW\ghY'Dc`]nY]X]YbghghY``Y
k YbXYb"

K Ufi a X]YgYf 9]bVfi W j cb 6YXYi hi b[]gh

9]bVfØWXY'k]Y'X]YgYf'g]bX'b]WXh'bi f'_UhUghfcd\U`'ZØf'X]Y
6YhfY]VYf'XYf'HUb_ghY``Yž'gcbXYfb'Ui WX'ZØf'X]Y'[YgUa hY
; Ya Y]bgWXUZh"'Gc`WXY'JcfZÀ``Y'ghY``Yb'Y]bY'k UWXgYbXY
6YXfc\i b['ZØf'`c_U`Y'I bhYfbY\a Yb'XUfž'X]Y'cZh'Ui Z'X]Y
I bhYfghØhni b[']\fYf'GhUa a _i bXYb'Ub[Yk]YgYb'g]bX"'8]YgY'5fh
j cb'?f]a]bU`]hÀh'_Ubb'Ui WX'XUni 'ZØ\fYbž'XUgg'g]WX'X]Y'A YbgWXYb
]b']\fYa 'Y][YbYb'K c\b!'i bX'; YgWXÀZhqi a ZY`X'i bq]WXYf'ZØ\`Yb"

a :: U```XYf`HUb_ghY``Y`]b`K]W_YXY!Fi\f`k]fZh`XYf`JcfZU```: fU[YbUi Z`K Ug`_Ubb`[YhUb`k YfXYbži a `gc`W\Y`9]bVfØW\Y`ni
j Yf\]bXYfb3`J]Y`Y`HUb_ghY``Yb`j YfZØ[Yb`ØVYf
G]W\Yf\Y]hga U» bU\a Ybž`XcW\`X]Y`HÀhYf`gW\Y]bYb`ni bY\a YbX
g_fi dY``cg`ni `U[]YfYb"`9g`k]fX`cZh`ØVYf`X]Y`9]bZØ\fi b['j cb
VYggYfYb`, VYfk UW\i b[ghYW\bc`c[]Yb`bUW\[YXUW\hž`X]Y`XYb
9][YbhØa Yfb`Y]b`\O\YfYg`A U» `Ub`G]W\Yf\Y]h`V]YhYb`_ObbhY"`5VYf
Ui W\`X]Y`I bhYfghØhni b[`Xi fW\`X]Y``c_U`Y`6Yj O`_Yfi b[`]gh
i bYf`Agg`]W\"

8]Y @Y]hghY``Y XYfDc`]nY]`\Uh`VYfY]hg`AU» bU\aYb`Yf[f]ZZYbžiaX]Y `G]W\Yf\Y]h`]b`XYfFY[]cb`ni `Yf\O\Yb"`DUhfci]``Yb`kYfXYbUig[YkY]hYhžia`g]W\YfnighY``YbžXUgg`X]Y `6Øf[Yf`g]W\`g]W\YfZØ\`Yb`_ObbYb"'\D`NY]hYb`ghY][YbXYf`9]bVfi W\gnU\`Yb`]gh`Ygk]W\h][ž`XUgg`X]Y`;YaY]bgW\UZh`nigUaaYbUfVY]hYhžia`gc`W\YbGhfUZhÀhYfb`XUg`<UbXkYf_`ni``Y[Yb"

8]Y'G]hi Uh]cb']b'K]W_YXY!Fi \f']gh'Y]b'6Y]gd]Y`'ZØf'Y]b'DfcV`Ya ž XUg'j]Y`Y'GhÀXhY'VYhf]ZZh''K À\fYbX'X]Y'Dc`]nY]'i a 'Xf]b[YbXY NYi [Yb\]bk Y]gY'V]hhYhž']gh'Ui W\'XUg'6Yk i gghgY]b'XYf 2 ZZYbh`]W_Y]h'ZØf'G]W\Yf\Y]hgZfU[Yb'j cb'nYbhfU`Yf'6YXYi hi b["'CV Xi fWX 'B UWX VUfgWX UZhg\]`ZY 'c XYf'XYb'5i ghUi gWX 'j cb ±b Zcfa Uh]cbYb' '[Ya Y]bgUa '_Ubb'a Ub'XYf'?f]a]bU`]hÀh Ybh[Y[Ybk]f_Yb"

G]WXYf\Y]hga U»bU\a Yb i bX DfÀj Ybh]cb

DZC`[Y'X]YgYg'JcfZU``g'_ÒbbhY'X]Y'HUb_ghY``Y'[Ynkib[Yb'gY]bž]\fY'G]W\Yf\Y]hgghfUhY[]Yb'ni'ØVYfXYb_Yb"'J]Y`Y'IbhYfbY\aYb]bjYgh]YfYb']b'G]W\Yf\Y]hg_UaYfUg'ibX'5`UfagmghYaYž'ia'g]W\jcf'gc`W\Yb',VYf[f]ZZYb'ni'gW\ØhnYb"'5iW\'fY[Y`aÀ»][YGW\i`ib[Yb'ZØf'XUg'DYfgcbU``ØVYf'jYfXÀW\h][Y'5_h]j]hÀhYb_ÒbbYb'\]`ZfY]W\'gY]b"

5``YfX]b[g`]gh'Yg`b]W\h'bi f`X]Y`JYfUbhk cfhi b[`XYf`I bhYfbY\a Yfž
ZØf`]\fY`G]W\Yf\Y]h'ni 'gcf[Yb"'\XXYf`9]bnY`bY`_Ubb`Y]bYb`6Y]hfU[
`Y]ghYbž']bXYa 'Yf`Ui Za Yf_gUa 'V`Y]Vh'i bX`gY]bY`A]ha YbgW\Yb`Ui Z
j YfXÀW\h][Y`Jcf_ca a b]ggY`\]bk Y]gh"'\d=b`Y]bYf`NY]hž']b`XYf`X]Y`5fh
XYf`?f]a]bU`]hÀh'g]W\'j YfÀbXYfhž'V`Y]Vh'X]Y`K UW\\gUa _Y]h'XYf
; Ya Y]bgW\UZh'i bYf`Àgg`]W\"

8]Y '9fa]hhìi b[Yb 'XUi Yfb 'Ub 'i bX 'X]Y 'Dc`]nY] 'V`Y]Vh'cdh]a]gh]gW\ž XUgg 'g]Y 'X]Y 'HÀhYf 'Yfa]hhY`b '_Ubb" '8 U ']b 'XYf'\Yi h][Yb 'NY]h'X]Y 5i Z_`Àfi b['j cb 'J YfVfYW\Yb '\Ài Z]['Xi fW\ ']b Zcfa]YfhY '6Øf[Yf Yf`Y]W\hYfh'k]fXž'V`Y]Vh'UVni k UfhYbž'cV'X]Y '<]bk Y]gY 'XYf 6Yj Ò`_Yfi b['ni 'Y]bYa 'gW\bY``Yb '9fZc`['ZØ\fYb'k YfXYb"

<]bhYf[fi bX]bZcfa Uh]cbYb ni f ? f]a]bU`]hÀh]b 8 Yi hgW\`UbX</pre>

8]Y`NU\``XYf`9]bVfØWXY`]b`8Yi hgWX`UbX`\Uh`]b`XYb``YhnhYb`\J\fYbGWXY`]b`8Yi hgWX`UbX`\Uh`]b`XYb``YhnhYb`\J\fYbGWXY`]b`Yb'i bhYf`Y[Yb"'@Ui h`XYf`Dc`]nY]`]WXYb?f]a`]bU`ghUh]gh]_`k i fXYb`]a`\J\f`&\$&%`Yhk U`, \$"\$\$\$`9]bVfØWXY`]b K c\bi b[Yb`i bX`[Yk YfV`]WXYb`FÀi a`]WX_Y]hYb`Xc_i a Ybh]Yfh"8]Yg`ghY``h`Y]bYb``Y]WX hYb`FØW_[Ub[']a`JYf[`Y]WX`ni`XYbJcf'U\fYb`XUfž`k Ug`hY]`k Y]gY`Ui Z`Yf\O\hYDfÀj Ybh]cbga U»bU\a Yb`ni fØW_[YZØ\fh`k YfXYb`_Ubb"'8]Y`Dc`]nY]gYhnh`ni bY\a YbX`Ui Z`OZZYbh`]WXY`5i Z_`Àfi b['i bX`X]Y

Ni gUa a YbUfVY]h'a]h'G]W\Yf\Y]hgi bhYfbY\a Ybž'i a 'X]Y 6Yj Ò`_Yfi b['ØVYf'G]W\Yf\Y]hga U» bU\a Yb'Ui Zni _`ÀfYb"

9]b VYgcbXYfg VYgcf[b]gYffY[YbXYf HfYbX]ghXYf 5bgh]Y[jcbgc[YbUbbhYb 6]hnY]bVfØWXYb žVY] XYbYb HÅhYf gY\f gWxbY ibX [Yn]Y h]b; YgWx AZhY cXYf 9]bf]Wx hib[Yb Y]bXf]b[Ybžia6YihY ni a UWxYb "Gc Wxy 9]bVfØWXY [YgWxY\Yb \ Ai Z][]b XYfBUWxhibX nY]WxbYb g]Wx XifWx YlhfYa Y GWxbY [_Y]hibX 9ZZ]n]Ybn Uigžk cVY] cZh UiWx Yf\YV]WxYf GUWxgWx UXYbj fgUWxhk]fX "8]Y Dc]nY] YadZ]Y\ h XU\Yf j YfghAf_hž G]WxYf\Y]hga U bU\aYb k]Y 5`Ufa gmghYaYibX VYfk UWxib[g_UaYfUg ni]bghU``]YfYb"

GhUh]gh]_Yb i b X 8 UhYb ni 9]b V f Ø W Y b

9]bY'U_hi Y``Y'I a ZfU[Y'XYg'G]W\Yf\Y]hgZcfi a g'8Yi hgW\`UbX'nY][hž XUgg'*' i 'XYf'8Yi hgW\Yb'g]W\'Gcf[Yb'i a 'X]Y'Y][YbY'G]W\Yf\Y]h a UW\Ybž']bgVYgcbXYfY']b'6Yni ['Ui Z'9]bVfØW\Y"'8UfØVYf'\]bUi g [UVYb'() i 'XYf'6YZfU[hYb'Ubž'XUgg'g]Y'dYfgÒb`]W\Y'9fZU\fi b[Yb a]h'Y]bYa '9]bVfi W\'[Ya UW\h'\UVYb'cXYf']b'Y]bYf'I a [YVi b[`YVYbž']b'XYf'X]YgY'_f]a]bY``Yb'5_h]j]hÀhYb'ØV`]W\'g]bX"'

#D**ij]Y*Yb*: À``Yb*k i fXYb*X]Y*HÀhYf*Xi fWX*NYi [YbUi ggU[Yb*cXYf

J]XYcØVYfk UWXi b[Yb*X]b[ZYgh*[Ya UWXh***9]b*; fc**hY]``XYf

9]bVfØWXY*V*Y]Vh*YXcWX*i b[Y`Òghž*k Ug*X]Y*6YXYi hi b[Y]bYf

U_h]j Yb*BUWXVUfgWXUZh*i bX*X]Y*X]fY_hY*A Y`Xi b[*j cb
j YfXÀWXh][Yb*5_h]j]hÀhYb*Ub*X]Y*Dc*]nY]*i bhYfghfY]WXh***8]Y*Dc*]nY]

\Uh*Ui WX*ZYgh[YghY*`hž*XUgg*9]bVfYWXYf*cZh*[Yn]Y*h*bUWX

#DZcfa Uh]cbYb*ØVYf*]\fY*CdZYf*gi WXYbž*i a *\YfUi gni Z]bXYbž*k Ubb

X]YgY*b]WXh*ni *< Ui gY*g]bX***8U\Yf*]gh*Yg*ZØf*X]Y*6Yj Ò`_Yfi b[
k]WXh][ž*Ui Z*X]Y*Y][YbY*G]WXYf\Y]h*ni *UWXhYb*i bX*]\f*Ni \Ui gY*]b

XYf*I f*Ui VgnY]h*cXYf*VY]*`Ab[YfYb*5Vk YgYb\Y]hYb*UVni g]WXYfb**</pre>

: Øf'k Y]hYfY' ±bZcfa Uh]cbYb'ni f'?f]a]bU`ghUh]gh]_']b'8Yi hgW\`UbX VYgi W\Yb'G]Y'X]Y'6i bXYg_f]a]bU`Ua h'K YVgY]hY"

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