

## A YggYfa YggYf!5hhUW\_Y`]a `G]Y[YbYf`6i g. GYWXg'JYf`YhnhYž'9fa ]hh`i b[Yb``Ui ZYb

±b 'G]Y[Yb 'UhhUW\_YX 'Y]bY '' &! 'À\f][Y : fUi 'a ]h'Y]bYa 'A YggYf ]a '6i gž gYW g'J Yf`YhnhY "'9fa ]hh`i b[Yb '`Ui ZYbž'\_Y]b dc`]h]gW Yg'A ch]j "

± Y]bYf'VYgcf[b]gYffY[YbXYb'JcfZU``]b'G]Y[Yb'\Uh'Y]bY
'&!^À\f][Y': fUi 'Ua 'gdÀhYb'5VYbX'a Y\fYfY'DYfgcbYb']b'Y]bYa
6i g'a ]h'Y]bYa 'A YggYf'Ub[Y[f]ZZYb"'8]YgYf'JcfZU``'YfY][bYhY'g]W\
]b'XYf'GhUXh']a '?fY]g'G]Y[Yb!K]hh[YbghY]b'i bX'\Uh'gYW\g
A YbgW\Yb'j Yf`Yhnhž'X]Y'nk]gW\Yb'%\* 'i bX'' \$'IJ\fY'U`h'g]bX"
9fgW\fYW\_YbXYfkY]gY'[Y\ÔfYb'U``Y'JYf`YhnhYb'Ui g'XYf'FY[]cb"
8]Y'cZZ]n]Y``Y'6YghÀh][i b['j cb'Dc']nY]'i bX'GhUUhgUbk U`hgW\UZh
XYi hYh'XUfUi Z'\]bž'XUgg'XfY]'XYf'JYf`YhnhYb'VYfY]hg'bUW\
Ua Vi `UbhYf'6Y\UbX`i b['XUg'?fUb\_Yb\Ui g'j Yf`UggYb'\_cbbhYbž
k Ug'Ui Z'Y]bY'[`ØW\_`]W\Y'K YbXi b[']ba]hhYb'XYg'GW\fYW\_Ybg
\]bXYi hYh"

## 9fa ]hh`i b[Yb'ni f'HUh

 $5\_hi~Y```[~]Vh`Yg`\_Y]bY`5bnY]WXYb`cXYf`<]bk~Y]gYž`X]Y`XUfUi~Z~`]bXYi~hYbž`XUgg`XYf`5b[~f]ZZ`Ui~g`Y]bYa~`dc`]h]gWXYb`cXYf`fY`][~]ÒgYb~`dc`]h]gWXYb`cXYf`fY`][~]$ 

A ch]j '\YfUi g'[YgW\U\"'8]Yg']gh'VYgcbXYfg'k ]W\h][ž'XU'À\b`]W\Y J cfZÀ``Y'cZh'a ]h'gc`W\Yb'<]bhYf[fi bX[YgW\]W\hYb']b'JYfV]bXi b[ [YVfUW\h'k YfXYb"'8YbbcW\'V`Y]VYb'X]Y'9fa ]hh`i b[Yb']bhYbg]j i bX'\_cbnYbhf]Yfhž'XU'X]Y'Dc`]nY]'j Yfgi W\hž'X]Y'[YbUi Yb I a ghÀbXYž'X]Y'ni 'X]YgYa 'gW\cW\_]YfYbXYb'5b[f]ZZ'ZØ\fhYbž'ni j YfghY\Yb"

 $: \emptyset f'X]Y'6YhfcZZYbYb'k Uf'Yg'Y]b'hfUi a Uh]gWXYg'9f`YVb]gž'k Ug'g]WXb]WXh'bi f'Ui Z'X]Y'_OfdYf`]WXYbž'gcbXYfb'Ui WX'Ui Z'X]Y'dgmWX]gWXYb:c`[Yb'Ui gk]f_h''8]Y'8 i fWXZØ\fi b['XYf'9fa]hh`i b[Yb'_ObbhYY]b][Y'NY]h']b'5bgdfi WX'bY\a Ybž'i bX'X]Y': UWX_fÀZhY'ghY\YbVYfY]hž'i a 'XYb'CdZYfb'<]`ZY'i bX'I bhYfghØhni b['Ubni V]YhYb''8]YDc`]nY]'k]fX'kY]hYf\]b'<math>\oplus$ Zcfa Uh]cbYb'gUa a Y`b'i bX'\cZZhž'VU`Xa Y\f'?`Uf\Y]h'ni '[Yk]bbYbž'i a 'XYb'JcfZU`'j c``ghÀbX]['Ui Z\_`ÀfYbni '\_ObbYb''

 $8 \ Yf' 9] bg Uhn' XYf' FYhhi b[g_f AZhY' i bX' X] Y' n \emptyset[][Y' 9fghj Yfgcf[i b[XYf' JYf' YhnhYb' nY][Yb ž' k]Y' k]W h][XUg' gW bY``Y' < UbXY`b'] bgc`W Yb' Bch`U[Yb']gh'' 8] YgY' hfU[]gW Y' 6Y[YVYb \Y]h'Yf] bbYfh' i bgXUf Ub ž' k] Y' gW bY```g] W 'X Ug' @YVYb' AbXYfb'_Ubb' i bX' k]Y' Ui g'Y] bYfbcfa U`Yb' 6i gZU \fh'Y] bY' G] hi Uh] cb' kYfXYb'_Ubb ž' X]Y' X Ug'; YZØ\`j cb' G] W Yf\Y]h'] b' XYf'^2 ZZYbh`] W _Y]h'] bZfU[Y' ghY``h'']$ 

±b 'Y]bYf'NY]hž']b 'XYf'G]WXYf\Y]hgZfU[Yb 'ni bY\a YbX'Ui Z'XYf
5[YbXU'ghY\Ybž'V`Y]Vh'UVni k UfhYbž'k Y`WXY'k Y]hYfYb

±b Zcfa Uh]cbYb 'ØVYf'X]Y 'HÀhYf]b 'Ubg'@]WX h'\_ca a Yb 'i bX'k Ug'X]Y
6Y\ÒfXYb 'hi b'k YfXYbž'i a 'gc`WXYb'J cfZÀ``Yb']b 'Ni \_i bZh
j cfni VYi [Yb": Øf'X]Y '5bk c\bYf'i bX'X]Y '[YgUa hY'FY[]cb']gh'Yg
j cb'k YgYbh`]WXYf'6YXYi hi b[ž'XUgg'XUg'J YfhfUi Yb']b'X]Y
ÒZZYbh`]WXYf'G]WXYf\Y]h'Ui ZfYWXhYf\U`hYb'V`Y]Vh"

8]Y'\_ca a YbXYb'HU[Y'i bX'K cW\Yb'k YfXYb'YbhgW\Y]XYbX'gY]bž k À\fYbX'X]Y'9fa ]hh`i b[Yb'j cfUbgW\fY]hYb'i bX'a Y\f'?`Uf\Y]h ØVYf'X]Y'A ch]j Y'i bX'<]bhYf[fØbXY'XYg'5b[f]ZZg'Yfk UfhYh'k ]fX"'9]b XYfUfh][Yf'J cfZU```\Uh'k Y]hfY]W\YbXY'5i gk ]f\_i b[Ybž'X]Y'gck c\`XUg'@YVYb'XYf'X]fY\_h'VYhfcZZYbYb'DYfgcbYb'U`g'Ui W\'XUg G]W\Yf\Y]hg[YZØ\`'XYf'[YgUa hYb'; Ya Y]bgW\UZh'VYY]bZi ggYb \_ObbYb"

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