

## A UI ]a ]`]Ub K ÒVYf ghÀf\_h X]Y K YfXYf! 8 Y ZYbg]j Y. '9]b B Yi Ub ZUb[ ']b '6 fYa Yb '

A UI ]a ]`]Ub'K ÒVYf'k YW\gY`h'ni f'GU]gcb'&\&\) 'U`g'@Y]\gd]Y`Yf ni 'K YfXYf'6fYa Ybž'i a 'X]Y'8YZYbg]j Y'ni 'j YfghÀf\_Yb"



6fYa Ybž·8 Yi hgWX `Ub X '! '9]b 'Zf]gWX Yf 'K ]bX 'k Y\h']b '6fYa Yb.

A UI ]a ]`]Ub 'K ÒVYf'\Uh'\Yi hYž'Ua ') "' \* `] '&\$&) ž'Y]bYb 'J YfhfU[ 'VY]a

GJ 'K YfXYf '6fYa Yb 'i bhYfnY]WX bYh" '8 Yf '8 YU` 'i a ZUggh'Y]bY

Y]b 'À\f][ Y @Y]\Y 'a ]h 'UbgWX `]Y » YbXYf '? Ui Zcdh]cb "' 8 Yf '&+! 'À\f][ Y

ÒghYffY]WX ]gWX Y 'B Uh]cbU`gd]Y `Yf 'Vf]b[ h'b]WX h'bi f'Y]bY 'A Yb[ Y

9fZU\fi b[ 'a ]hž'gcbXYfb 'Ui WX 'X]Y 'J cfZfYi XY 'Ui Z'X]Y 'bYi Y

<YfUi gZcfXYfi b[ ']b 'XYf '6i bXYg`][ U" 'K ÒVYf ']gh'XYf 'YfghY

BYi ni [ Ub[ 'XYg 'Gca a Yfg 'ZØf'X]Y '; fØb!K Y] » Yb 'i bX 'k ]fX 'X]Y

8 YZYbg]j Y 'XYg 'HYUa g'j YfghÀf\_Yb"

K ÒVYfž'XYf'VYfY]hg'6i bXYg`][U!@ Zh'VY]'6cfi gg]U A ÒbW\Yb[`UXVUW\'gW\bi ddYfb'Xi fZhYž']gh'j cb'XYf'ZUa ]`]ÀfYb 5ha cgd\ÀfY']a 'JYfY]b'VY[Y]ghYfh''6Y]'; YgdfÀW\Yb'a ]h'gY]bYb @UbXg`Yi hYbž`XUfi bhYf`A UfWc`: f]YX``i bX`F ca Ubc`GW\a ]Xž`Yf\]Y`h Yf`nU\`fY]W\Y`k Yfhj c``Y`H]ddg`ni `K c\bi b[Ybž'<chgdchg`i bX`XYa HYUa ž`X]Y`]\a `VY]`XYf`9]b[Yk Ò\bi b[`\Y`ZYb`k YfXYb"` 8U``]Y[h k Ug`Ub ž`VYgW\fY]Vh`K ÒVYf`gY]bY`YfghYb`9]bXfØW\_Y`j cb`6fYa Yb i bX`XYa `JYfY]bž`k c`Yf`X]Y`HfUX]h]cb`ÒghYffY]W\]gW\Yf`Gd]Y`Yf VYgcbXYfg`gW\Ahnh"

## $9]b^{6}UW_{ghU}[Y!9]bV^{W}$

8]Y'6]bXi b['ni 'gY]bYb'BUh]cbU`a UbbgW\UZhg\_c``Y[Yb'gd]Y`h'ZØf
K ÒVYf'Y]bY'YbhgW\Y]XYbXY'Fc``Y''' K ]f'\_YbbYb'i bg'gY]h

\$\frac{1}{2}\text{ if YbXhU[Yb\tilde{z} 'j Yff\tilde{A}h'Yf\tilde{z}'U`g'Yf'\tilde{\tilde{Q}}VYf'gY]bY'6Y\_UbbhgW\UZh'a ]h

A UfWc': f]YX`'d`Ui XYfh''; Ya Y]bgUa '\UVYb'g]Y'Y]bY'\_\`UfY'J]g]cb

Z\tilde{\tilde{Q}}f'X]Y'\_ca a YbXY'GU]gcb\tilde{z}X]Y']a 'NY]W\Yb'Y]bYg'VYggYfYb

5\tilde{\tilde{Q}}bY\XYbg'ghY\Yb'gc``''8\Yf'bYi Y'7\YZhfU]bYf'<cfgh'GhYZZYb

g]Y\h']b'K \(\tilde{\tilde{Q}}VYf'Y]bY'k\Yfhj c``Y'Cdh]cb'gck c\``U`g'\D\tilde{\tilde{Q}}bYb!'U`g'Ui W\

U`g'@]b\_gj YfhY]X][Yf\tilde{z}'i bX'VYhcbh\tilde{z}'XUgg'Yf'ghUf\_']a 'Nk Y]\_Ua dZ'i bX

?cd\tilde{\tilde{Z}}VU``gd]Y``]gh''

K ÒVYfʻgY`VghʻZfYi hʻg]WX ʻb]WX hʻbi fʻUi ZʻXUgʻHYUa žʻgcbXYfbʻUi WX Ui ZʻgY]bʻVYj cfghY\YbXYgʻJ UhYfk YfXYbʻ]a '8YnYa VYf"'8]YgY dYfgÒb`]WXYʻJ YfÀbXYfi b[ '\UhʻgY]bYʻ9bhgWXY]Xi b[ 'ZØfʻXYb K YWXgY``bUWXʻ6fYa YbʻVYY]bZi gghi bXʻ]ghʻY]bʻk Y]hYfYfʻ; fi bXʻZØf gY]bYbʻC dh]a ]ga i g"' =\WX`[ `Ui VYžʻXUggʻ\]Yfʻi bhYfʻXYa 'bYi Yb HfU]bYfhYUa 'j ]Y``a Ò[ `]WXʻ]ghžʻVYhcbh'Yf"

## K OVYfg ? Uff]YfY ]b XYf 6i bXYg`][ U

 $\label{thm:con:condition} Hfc hn `Y]b Y f `g W k ] Y f] [Yb ``YhnhYb `GU]gcb ``Uh `g] W `K `OVYf `]b `XYf \\ B Uh]cbU`a UbbgW UZh `ni f Ø W_[Ya Y`XYh "`GY]b Y `]b hYfb Uh]cbU`Y \\ 9 f Z U `fi b[ `i b X `X]Y :: Å `][ _Y]h \check{z} X]Y `8 Y Z Y bg]j Y `ni `gh UV]`]g] Y f Y b \check{z} \\ k Uf Yb `Ui gg W `U[ [YVYb X `ZØf `X]Y `9b hg W Y] Xi b[ `j cb `K Yf X Yf 6 f Ya Yb \check{z}] `b `ni `j Y f d Z ] W hYb "`DYhYf `B] Ya Ym Y f \check{z} `Gd cfh`] W Yf `@ Y]h Y f \check{z} `YVh `Yfj cf. `A Ul ]a ]`] Ub `Vf]b[ h Y]b Y `A Yb[ Y `E i U`]h Åh `i b X `k ] f X Y]b Y `G W `Øgg Y `fc ``Y `]b `i bg Y f Y f `8 Y Z Y bg]j Y `gd] Y `Yb "$ 

A ]h'K ÒVYfž'XYf'XUb\_'dcg]h]j Yf'F YgcbUbn'j cb'gY]bYb'@UbXg`Yi hYbY]b'[i hYg'; YZØ\`'ZØf'6fYa Yb'\Uhž'j Yfgdf]W\h'XYf'GJ'K YfXYf

6fYa Yb'Y]bY'gdUbbYbXY'GU]gcb"'8]Y': Ubg'XØfZYb'[YgdUbbh'gY]bžk]Y'g]W\'X]YgYf'BYi ni [Ub['Y]b[`]YXYfh'i bX'cV'Yf'X]Y
8 YZYbg]j fY]\Y'YbhgW\Y]XYbX'j YfghÀf\_Yb'\_Ubb"'\dagger'\d

: Øf'k Y]hYfY' ₺ Zcfa Uh]cbYb'ni 'K ÒVYf'i bX'gY]bYb'K YWkgY``ni K YfXYf'6fYa Yb'\_ÒbbYb'G]Y'X]Y'6Yf]WkhY'j cb'8Y]Wkghi VY'i bX' K YfXYf"XY'bUWk`YgYb"

| 8 YhU]`g |                          |
|----------|--------------------------|
| Cfh      | 6fYa Ybž'8Yi hgWX`UbX    |
| EiY``Yb  | • k k k "XY]WX ghi VY"XY |
|          | • k k k "k YfXYf"XY      |

6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'X]Y!bUWX f]WX hYb "Wca