## JAk UfY'8Y`]j YfUV`Y'FY`eagY'BchYg

This document does not apply to HPE Superdome servers. For information on HPE Superdome, see the following links:

<u>HPE Integrity Superdome X</u> HPE Superdome Flex

Information on HPE Synergy supported VMware ESXi OS releases, HPE ESXi Custom Images and HPE Synergy Custom SPPs is available at:

OS Support Tool for HPE Synergy

Information on HPE Synergy Software Releases is available at:

HPE Synergy Software Releases - Overview

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8f]i Yf:! BYlk cf.
8f]i Yf:! GhcfU[ Y'7cbhfc``Yf
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GcZrk UfY!! GhcfU[ Y'7cbhfc``Yf
GcZrk UfY!! GhcfU[ Y'7cbhfc``Yf
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### 6=CG! GnghYa FCA

<u>Hcd</u>

FCA ::`Ug\`:]fa k UfY`DUW\_U[Y'!`<D9`Dfc@|Ubh'8@%\$`; Yb%%`fl \*&Ł`GYfj Yfg J Yfg]cb. `&"( &S%&! \$\*! &\$&( `**ff7f]h]W0**`Ł

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#### =a dcfhUbh BchY°

#### =a dcfhUbhBchYg.

 $H\g'j Yfg]cb'cZ'h\Y'GmghYa'FCA'g\ci`X'VY'dU]fYX'k ]h\GYfj Yf'D'UhZcfa'GYfj ]W'g'fGDGL': ]fa k UfY'$*"$%"$("$+) "$fk"($$\%$S&' $&$&(L")"$ 

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### FY`YUgY'J Yfg]cb.

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#### DfYj ]ci g'FYj ]g]cb.

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#### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: =75 &\$&' gYW fY Vcch\_Ym'

I dXUhYX h\Y VcchXYj ]WY ghf]b[ 'fi 'Yg hc']bWi XY h\Y WUgY k \Yb J A 8 ']g YbUV YX"

5XXYX'h\Y'[Ga cch\'7cc`]b[î'gY`YVM]cb'hc'h\Y'H\Yfa U`'7cbZ[[i fUh]cb'cdh]cb']b'h\Y'F6GI P5Xj UbWYX'Cdh]cbgP. Ub'UbX'H\Yfa U`Cdh]cbg": H\]g;gY`YVM]cb'a cX]Z[Yg'h\Y'ZUb'gdYYX'fYgdcbgY'hc']a dfcj Y'UWti gh]Wg'VmfYXi VI]b['h\Y'fUhY'cZ'ZUb'gdYYX'W\Ub['Yg":'H\]g;WUb ]a dfcj Y'UWti gh]Wg'Zcf'k cf\_`cUXg'k \]W\[g][b]Z[WUbh'mj Ufm7DI 'i h]`]nUh]cb"'`BchY'h\Uh'h\]g;cdh]cb'VWb'fYgi 'h']b'U'ga U``fYXi Wh]cb']b dYfZcfa UbW'Xi Y'hc'h\Y'g\cfh'Xi fUh]cbg'cZ'7DI 'h\Yfa U`'h\fchh']b['UbX'gca Y'cdYfUh]b['gmghYa gz'gi W\'Ug'@]bi I z'a Um'c['7DI 'h\Yfa U`'h\fchh']b['Yj Ybhg''''H\YgY'Yj Ybhg'Xc'bch']bX]VWhY'Ub']ggi Y'k]h\'h\Y'gmghYa 'UbX'Wb'VY'][bcfYX"

#### DfcV`Ya g': ]I YX.

5XXfYggYX'Ub`]ggi Y'k\YfY'h\Y'gmghYa 'a ][\h'XYhYVMia Ya cfmi bWtffYVMUV`Y'Yffcf'k\]'Y'gmghYa '\Ug'VYYb`]X`Y'Zcf'Yl hYbXYX'dYf]cX'cZhla Y"

 $5XXfYggYX`Ub`]ggi Y`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][i fUh]cbPF 6GI PBYhk cf_`Cdh]cbgPBJAY!c: `7cbZ][i fUh]cbPBJAY!c: `5hhYa dh`UfY`gh]``]b`9b[`]g\ `UZhYf`gk ]h\X]b[`h\Y``Ub[i U[Y`hc`bcb!9b[`]g\ `j Yfg]cb"$ 

5XXfYqqYX Ub | |qqi Y k \ YfY h\ Y BJ A Y |a U | Y XYqWf|dh|cb |b F6GI a | | \ h VY |b WcffYWfk \ Yb J F C 7 | |q Yb UV YX"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gmghYa F6GL a Ybi a ][\hbchX]gd`UmVWUfXf]j Y `cWUh]cb ]bZcfa Uh]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`ZUbg`a ][\hfUd]X`mfUa d`i d`UbX`h\Yb`VUW\_`Xck b"

### ?bck b =ggi Yg.

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#### : ]I Yg

#### =a dcfhUbh BchYg.

 $H\ ]g'j\ Yfg]cb'cZ'h\ Y'GmghYa'FCA'g\ ci`X'VY'dU]fYX'k\ ]h\ GYfj\ Yf'D`UhZcfa'GYfj\ ]W'g'fGDGL':\ ]fak UfY'$*"$\%"$("$+)"$fk"($$\%$S&' $\&$&(L")"$ 

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa `a ][\h`XYhYVMia Ya cfmi bWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa `\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZ hla Y"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gmghYa a ][\h\Ub[ Uh'a Ya cfm]b]h]U`]nUh]cb UZhYf fYghcf]b[ gmghYa gYhh]b[ hc ZUWhcfmXYZUi `h'

 $5XXfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghXi d`]WUhY`cf`]bWtffYWh`bYHk cf_]bhYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y''' A Ybi `a ][ \h`]ghYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y''' A Ybi `a ][ \h`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYa `FfYWhYbY' `FfYWhYbY `FfYWhYbY' `FfYWhYbY$ 

 $5XXfYggYX`Ub`]ggi Y`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][i fUh]cbPF 6GI PBYhk cf_`Cdh]cbgPBJAY!c: `7cbZ][i fUh]cbPBJAY!c: `5hhYa dh`UfY`gh]``]b`9b[`]g\`UZhYf`gk ]h\X]b[`h\Y``Ub[i U[Y`hc`bcb!9b[`]g\`j Yfg]cb"$ 

5XXfYggYX Ub ]ggi Y k \ YfY h\ Y BJ A Y ]a U[ Y XYgWf]dh]cb ]b F6GI a ][ \ h VY ]b WtffYWfk \ Yb J FC7 ]g YbUV YX"

5XXfYggYX Ub ]ggi Y k \ YfY h\ Y gmghYa F6GI a Ybi a ][\hbchX]gd`UmWYUf Xf]j Y``cWUh]cb ]bZcfa Uh]cb"

5XXfYggYX Ub ]ggi Y k \YfY ZUbg a ][ \hfUd]X mfUa d i d UbX h\Yb VUW Xck b"

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5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 & \$&' gYW fY Vcch\_Ym'

5XXYX`h\Y`[Gacch\`7cc`]b[]`gY`YW]cb`hc`h\Y`H\YfaU``7cbZ][ifUh]cb`cdh]cb`]b`h\Y`F6GIP5XjUbWfX`Cdh]cbgP. Ub`UbX`H\YfaU`
Cdh]cbg"``H\]g`gY`YW]cb`acX]Z]Yg`h\Y`ZUb`gdYYX`fYgdcbgY`hc`]adfcjY`UWtigh]Wj`YmfYXiW]b['h\Y`fUhY`cZ`ZUb`gdYYX`W\Ub[Yg"``H\]g`WUb
]adfcjY`UWtigh]Wj`Zcf`kcf\_`cuXg`k\]W\g][b]Z]WUbhmjUfm7DI`ih]]nUh]cb"``BchY`h\Uh'h\]g`cdh]cb`Wub`fYgi`h]b`U`gaU```fYXiWf]cb`]b
dYfZcfaUbWfXiY`hc`h\Y`g\cfhXifUh]cbg`cZ`7DI`h\YfaU``h\fchi]b[`UbX`gcaY`cdYfUh]b[`gmghYagz`giW\`Ug`@]biIz`aUm`c[`7DI`h\YfaU`
h\fchi]b[`YjYbhg"``H\YgY`YjYbhg`Xc`bch`]bX]WUhY`Ub`]ggiY`k]h\`h\Y`gmghYa`UbX`WUb`VY`][bcfYX"

J Yfg]cb. `&"( &S%! \$\*! &\$&( `**fl7f]h]W0`Ł** : ]`YbUa Y. `I \*' \$&"( &S%&\$\$\*\$&&( "**Z**k d\_[

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#### 8Y`]j YfUV`Y'BUa Y.

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#### FY`YUgY'J Yfg]cb.

### @UghFYWta a YbXYX cf 7f]h]WV FYj ]g]cb.

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#### DfYj ]ci g F Yj ]g]cb.

#### : ]fa k UfY 8YdYbXYbVJYg.

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#### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk A ]WfcqcZhCdh]cb FCA I 9: = 75 & & 'qYW fY Vcch\_Ym'

I dXUhYX h\Y VcchXYj |WY qhf|b| fi Yq hc |bWi XY h\Y VWqY k \Yb J A 8 |q YbUV YX"

5XXYX h\Y i Gacch\ 7cc']b[i gY`YWh]cb hc h\Y H\YfaU``7cbZ[i fUh]cb cdh]cb jb h\Y F 6GI P5Xj UbWYX Cdh]cbgP. Ub UbX H\YfaU` Cdh]cbg" ``H\]g gY`YWh]cb a cX]Z]Yg h\Y ZUb gdYYX fYgdcbgY hc ja dfcj Y UWti gh]Wg VmfYXi Who [ h\ Y fUhY cZ ZUb gdYYX W\ Ub [ Yg" ``H\]g `Wb ]a dfcj Y `UWti gh]Wg Zcf k cf\_`cUXg k \]W\ g][b]Z]WUbhmj Ufm7DI i h] jhUh]cb" ``B chY h\ Uh'h\]g cdh]cb `Wb fYgi h]b 'U'ga U``fYXi Wh]cb jb dYfZcfa UbWYXi Y hc h\ Y g\ cfhXi fUh]cbg cZ 7DI h\ Yfa U``h\ fchi]b[ `UbX gca Y cdYfUh]b[ 'gmghYa gz gi W\ 'Ug'@]bi I z'a Um`c[ `7DI h\ Yfa U` h\ fchi]b[ `Yj Ybhg" ``H\ YgY Yj Ybhg Xc bch]bX]WUhY Ub jggi Y k ]h\ h\ Y gnghYa `UbX Wb VY][ bcfYX"

### DfcV`Ya g: ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa `a][\h`XYhYVMia Ya cfmi bWtffYVMUV`Y`Yffcf`k\]`Y`gmghYa `\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZ h]aY"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gmghYa a ][\h\Ub[ Uh a Ya cfm]b]h]U ]nUh]cb UZhYf fYghcf]b[ gmghYa gYhh]b[ hc ZJVWcfmXYZJi h'

 $5XXfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghXi d`]VVlhY`cf`]bVkffYVM`bYhk cf_]bhYfZUVYg`]b`h\Y`gY`YVM]cb`dU[Y"$ 

5XXfYggYX`Ub`]ggiY`k\YfY`gcaY`ghf]b[g`cZ]b`h\Y`GmghYa`7cbZ][ifUh]cbPF6GIPBYhkcf\_`Cdh]cbgPBJAY!c: '7cbZ][ifUh]cbPBJAY!c: 5HnYadh`UfY`gh]``]b`9b[`]g\`UZhYf`gk]h\X]b['h\Y``Ub[iU[Y`hc`bcb!9b[`]g\`jYfg]cb"

5XXfYggYX`Ub`]ggiYk\YfY`h\Y`BJAY`]aU[YXYgWf]dh]cb`]b`F6GI`a][\h'VY`]bWtffYWfk\Yb`JFC7`]g`YbUV`YX"

5XXfYqqYX Ub ]qqi Y k \YfY h\Y qmqhYa F6GI a Ybi a ][\hbchX]qd\Um\WYUf Xf]j Y `c\Wlh]cb ]b\Zcfa Uh]cb"

5XXfYqqYX Ub |qqi Y k \YfY ZUbq a |[\hfUd]X`mfUa d i d UbX h\Yb VUW Xck b"

### ?bck b =ggi Yg.

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#### =a dcfhUbh BchYg.

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### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa `a ][\h`XYhYVMia Ya cfmii bWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa `\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZ h]a Y"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gnghYa a ][\h\Ub[ Uha Ya cfm]b]h]U`]nUh]cb UZhYf fYghcf]b[ gnghYa gYhh]b[ hc ZUVWcfmXYZUi `h'

5XXfYqqYX`Ub`]qqiYk\YfY`qmqhYa`F6GI`aYbi`a][\h`]qhXid`]WUhY`cf`]bWcffYWhbYkcf\_]bhYfZUWYq`]bh\Y`qY`YWf]cb`dU[Y"

5XXfYggYX`Ub`]ggi Y`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][i fUh]cbPF6GI PBYhk cf\_`Cdh]cbgPBJAY!c: `7cbZ][i fUh]cbPBJAY!c: 5HhYa dh`UfY`gh]```]b`9b[`]g\`UZhYf`gk]hW\]b[`h\Y``Ub[i U[Y`hc`bcb!9b[`]g\`j Yfg]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`BJ A Y`]a U[ Y`XYgWf]dh]cb`]b`F6GI `a ][ \h'VY`]bWtffYWfk\Yb`J FC7`]g`YbUV`YX"

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa`F6GI`a Ybi`a][\hbchX]gd`UmWYUf`Xf]j Y``cWUh]cb`]bZcfa Uh]cb''

5XXfYggYX Ub ]ggi Y k \YfY ZUbg a ][\hfUd]X mfUa d i d UbX h\Yb VUW Xck b"

### ?bck b =ggi Yg.

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### 9b\UbWa Ybhg

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 & \$& gYW fY Vcch\_Ym'

IdXUhYX h\Y Vcch XYj ]WY ghf]b[ fi Yg hc ]bWi XY h\Y WUgY k \Yb J A 8 ]g YbUV YX"

5XXYX h, Y i Ga cch, 7cc][b] î gY YWl]cb hc h, Y H, Yfa U` 7cb2][i fUh]cb cdh]cb ]b h, Y F 6GI P5Xj UbWX Cdh]cbgP. Ub UbX H, Yfa U` Cdh]cbg" `H, ]g gY YWl]cb a cX]Z]Yg h, Y ZUb gdYYX fYgdcbgY hc ]a dfcj Y UWti gh]Wg VmfYXi W]b [ h, Y fUhY cZ ZUb gdYYX W, Ub [ Yg" `H, ]g `Wb ]a dfcj Y UWti gh]Wg Zcf k cf\_`cUXg k \]W. 'g][b]Z]WUbhmj Ufm7DI ii h]`]nUh]cb" `B chY h, Uh h, ]g cdh]cb `Wb fYgi `h ]b `U ga U` fYXi Wh]cb ]b dYfZcfa UbWY Xi Y hc h, Y g\cfh Xi fUh]cbg cZ 7DI 'h, Yfa U` h, fchh]b[ 'UbX gca Y cdYfUh]b[ 'gmghYa gž gi W, `Ug @]bi I ž a Um`c[ '7DI 'h, Yfa U` h, fchh]b[ 'Yj Ybhg" `H, YgY Yj Ybhg Xc bch]bX]WUhY Ub ]ggi Y k ]h, h, Y gmghYa 'UbX Wb VY ][ bcfYX"

FCA:: 'Ug\': ]fa k UfY:DUW\_U[Y'!'<D9'5``YhfU'(\%\\$#5``YhfU'(\&\\$#Dfc@]Ubh'8@, \$U'; Yb\%fl), Ł'GYfj Yfg J Yfg]cb. '&"(\\$S\%\4\\$, !&\\$&('**fF YWta a YbXYXL** :]'YbUa Y. 'I), S&"(\\$S\%S\\$, S&\\$&("Zk d\_[

#### =a dcfhUbhBchY°

#### =a dcfhUbhBchYg.

H\]g'j Yfg]cb'cZ'h\Y'GnghYa 'FCA 'WtbHJ]bg'i dXUhYg'U'][bYX'k]h\ h\Y'=bhY\'9; G'6?7'I D@F' 'fY'YUgY"'H\]g'j Yfg]cb'cZ'h\Y'GnghYa 'FCA q\ci 'X'VY'dU]fYX'k]h\ 'GYfj Yf'D'UhZcfa 'GYfj |WYg'fGDGL': ]fa k UfY'\$\* "\$\%\$("\$+) "\$'f&"(\$\$\%\$\$&' \$&\$&( L"

#### 8Y`]j YfUV`Y'BUa Y.

< D9 5 ``YhfU'( \%\\$#5 ``YhfU'( \%\\$#Dfc@|Ubh 8@ , \$U'; Yb\% GmqhYa FCA!I),

#### FY`YUgY'J Yfg]cb.

### @UghFYWta a YbXYX cf 7f]h]WV FYj ]g]cb.

#### DfYj ]ci g F Yj ]g]cb.

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### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk = A @ a YggU[Yg hc ]bX]WUhY h\Y ghUh g cZBJ A Y gYW fY YfUgY UbX 5A H"

5XXYX`h\Y`GmghYa '7cbZ[i fUh]cb`fF6GI Ł`cdh]cb`"Dck Yf`UbX`DYfZcfa UbW'Cdh]cbg#;5Xj UbW'X`DYfZcfa UbW'Cdh]cbg#<UfXk UfYDA =bhYffi dh'`UbX`gYh'hc`"8]gUV`YX"VmXYZUi `h''H\]g`gYhh]b[ `\Ug`h\Y`Zc``ck ]b[ 'FYXZ]g\`dfcdYfhm

#fYXZ]g\#j %#gmghYa g#%#V]cg#gYhh]b[g#<kda =bhYffid

#### DfcV`Ya g: ]I YX.

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`"GYfj Yf`6cch'CfXYf"`]b`]@C`k YV`k Ug`bch'U`][ bYX`k ]h\`"I 9: =6cch'CfXYf`7cbhfc`"`]b`F6GI "

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`gmghYa `a ][\h`VY`UggYfhYX`k \Yb`d`i [[]b[`]b`AF(%\*]!d"

5XXfYggYX`Ub`]ggiY`k\\fY'Ub`Yffcf'a YggU[Y`]b`@]biI`k ci`X`]bX]\\\\h"H7; ``c[`g]nY`]g`bch\\\ta dUh]\\'Y''

5XXfYggYX`Ub`]ggiY`k\YfY`]bWcffYWfXf]jY``cWUh]cb`]bZcfaUh]cb`kci`X`VY`g\ckb"

5XXfYggYX Ub ]ggi Y k \YfY FGC8 a ][\hcWV f UZhYf YbUV Y D7 < JA8 k ]h\ &l A "& BJAY Xf]j Yg"

 $5XXfYggYX`Ub`]ggi\ Y`k\YfY`h\Y`gmghYa\ `X]gd`Umg`h\Y`k\ Ufb]b[\ ```7cc`]b[\ 'I\ b]h`%:\ Ubg```FYXi\ bXUbWh`@cgh`]b`J\ A\ k\ UfY`9GL\ ]`cdYfUh]b[\ gmghYa\ g''$ 

### ?bck b =ggi Yg.

BcbY

### : ]I Yg

#### =a dcfhUbh BchYg.

H\]g'j Yfg]cb'cZ'h\Y'GmghYa 'FCA 'WtbHJ]bg'i dXUhYg'U'][bYX'k]h\ 'h\Y'=bhY'`9; G'6?7'I D@F' 'fY'YUgY"'H\]g'j Yfg]cb'cZ'h\Y'GmghYa 'FCA g\ci 'X'VY'dU]fYX'k]h\ 'GYfj Yf'D'UhZcfa 'GYfj ]Wfg'fGDGL': ]fa k UfY'\$\* "\$%"\$("\$+) "\$'fk"(\$\$\%\$\$&\' \$\\$&\(\)E"

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`"GYfj Yf`6cch'CfXYf"`]b`]@C`k YV`k Ug`bch'U`][ bYX`k ]h\`"I 9: =6cch'CfXYf`7cbhfc`"`]b`F6GI "

5XXfYggYX`Ub`]ggiY`k\YfY`h\Y`gmghYa`a][\h'VY`UggYfhYX`k\Yb`d`i[[]b[`]b`AF(%\*]!d"

5XXfYggYX Ub ]ggi Y k \ YfY Ub Yffcf a YggU[ Y ]b @bi I k ci `X ]bX]WUhY H7; ``c[ 'g]nY ]g bch Wta dUh]V Y"

5XXfYqqYX Ub ]qqi Y k \YfY ]bWtffYWtXf]j Y`cWUh]cb ]bZcfa Uh]cb k ci `X VY q\ck b"

5XXfYggYX Ub ]ggi Y k \YfY FGC8 a ][\hcWW f UZhYf YbUV Y D7 < JA8 k ]h\ &l A "& BJAY Xf]j Yg"

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`gmghYa `X]gd`Umg`h\Y`k Ufb]b[ `"7cc`]b[ `I b]h'%: Ubg"`FYXi bXUbWh@cgh`]b`J A k UfY`9GL]`cdYfUh]b[ gmghYa g"

#### ?bck b =ggi Yg.

BcbY

#### 9b\UbWa Ybhq

5XXYX bYk = A @a YggU[Yg hc ]bX]WWhY h\Y ghUhi g cZBJAY gYW fY YfUgY UbX 5A H"

5XXYX`h\Y`GmghYa '7cbZ|[i fUh]cb`fF6GI L`cdh]cb`"Dck Yf`UbX`DYfZcfa UbWY`Cdh]cbg#5Xj UbWYX`DYfZcfa UbWY`Cdh]cbg#<UfXk UfYDA =bhYffi dh'`UbX`gYh`hc`"8]gUV`YX"VmXYZUi `h'`H\]g`gYhn]b[ `\Ug`h\Y`Zc``ck ]b[ `FYXZ]g\`dfcdYfhm

#fYXZ]g\#j %#gmghYa g#%#V]cg#gYhh]b[g#<kda =bhYffid

FCA: UgV: ]fa k UfY DUWU[Y! < D9.5``YhfU'(%(\$`fI) + L'GYfj Yfg)]

J Yfg]cb. `&"( &S%&! \$\*! &\$&( `**fl7f]h]vW`t** : ]`YbUa Y. `I ) +S&"( &S%&S\$\* S&\$&( "**Z**k d\_[

### =a dcfhUbhBchY°

#### =a dcfhUbh BchYg.

 $H\g''j Yfg]cb'cZ'h\Y'GmghYa'FCA'g\ci`X'VY'dU]fYX'k]h\GYfj Yf'D`UhZcfa'GYfj ]W'g'fGDGL': ]fa k UfY'$*"$%"$("$+) "$fk"($$\%$S&' $&$&(L")"$ 

#### 8Y`]j YfUV`Y'BUa Y.

< D9.5 "Yhfu" ( %( \$ 'Ghcfu[ Y 'GYfj Yf 'GmghYa 'F CA '! 'I ) +

### FY YUgY J Yfg]cb.

&"( &S%&! \$\*! &\$&(

### @UghFYVta a YbXYX cf 7f]h]Vt/ FYj ]g]cb.

&"( &S%&! \$\*! &\$&(

#### DfYj ]ci g F Yj ]g]cb.

### : ]fa k UfY 8YdYbXYbV¶Yg.

BcbY

#### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 & \$&' gYW fY Vcch\_Ym'

IdXUhYX h\Y VcchXYj ]WY ghf]b[ fi Yg hc ]bWi XY h\Y WUgY k \Yb J A 8 ]g YbUV YX"

5XXYX'h\Y'[Ga cch\'7cc`]b[î'gY`YVh]cb'hc'h\Y'H\Yfa U`'7cbZ[[i fUh]cb'cdh]cb']b'h\Y'F6GI P5Xj UbWYX'Cdh]cbgP. Ub'UbX'H\Yfa U`Cdh]cbg" 'H\]g;gY`YVh]cb'a cX]Z[Yg'h\Y'ZUb'gdYYX'fYgdcbgY'hc']a dfcj Y'UWti gh]Wg'VmfYXi V[b['h\Y'fUhY'cZ'ZUb'gdYYX'W\Ub['Yg" 'H\]g;WUb ]a dfcj Y'UWti gh]Wg'Zcf'k cf\_`cUXg'k \]W\[g][b]Z[WUbh'mj Ufm7DI 'i h]`]nUh]cb"'BchY'h\Uh'h\]g;cdh]cb'Wb'fYgi 'h']b'U'ga U`'fYXi Vh]cb']b dYfZcfa UbWf'Xi Y'hc'h\Y'g\cfh'Xi fUh]cbg'cZ'7DI 'h\Yfa U''h\fchh']b['UbX'gca Y'cdYfUh]b['gmghYa gz'gi VX'Ug'@]bi I z'a Um'c['7DI 'h\Yfa U''h\fchh']b['Yj Ybhg"''H\YgY'Yj Ybhg'Xc'bch']bX]VWhY'Ub']ggi Y'k]h\'h\Y'gmghYa 'UbX'Wb'VY'][bcfYX"

#### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggiY`k\YfY`h\Y`gmghYa`a][\h`XYhYVMiaYacfmibWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa`\Ug`VYYb`]X`Y`Zcf`YIhYbXYX`dYf]cX`cZh]aY"

5XXfYgqYX'Ub |qqiYk\YfYh\Y'gnqhYa a |[\h\Ub| Uh'a Ya cfm|b|h|U`|nUh|cb UZhYffYqhcf|b| qnqhYa 'qYhh|b| hc 'ZUVVcfmXYZUi 'h'

5XXfYggYX`Ub`]ggiY`k\YfY`gmghYa`F6GI`aYbi`a][\h`]gh`Xid`]WUhY`cf`]bWcffYWh`bYhk.cf\_]bhYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y"

 $5XXfYggYX`Ub`]ggiY`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][ifUh]cbPF6GIPBYhkcf_`Cdh]cbgPBJAY!c: `7cbZ][ifUh]cbPBJAY!c: 5hHYa dh`UfY`gh]``]b`9b[`]g\`UZhYf`gk]h\X]b['h\Y``Ub[iU[Y`hc`bcb!9b[`]g\'jYfg]cb"$ 

5XXfYqqYX Ub | |qqi Y k \ YfY h\ Y BJ A Y |a U | Y XYqWf|dh|cb |b F6GI a | | \ h VY |b WcffYWfk \ Yb J F C 7 | |q Yb UV YX"

5XXfYggYX Ub ]ggi Y k \ YfY h\ Y gnghYa F6GI a Ybi a ][ \ h bch X]gd `Um\W Uf Xf]j Y ``c\Wh]cb "]bZcfa Uh]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`ZUbg`a ][\hfUd]X`mfUa d`i d`UbX`h\Yb`VUW\_`Xck b"

### ?bck b =ggi Yg.

BcbY

#### : ]I Yg

#### =a dcfhUbh BchYg.

 $H\ ]g'j\ Yfg]cb'cZ'h\ Y'GmghYa'FCA'g\ ci`X'VY'dU]fYX'k\ ]h\ GYfj\ Yf'D`UhZcfa'GYfj\ ]W'g'fGDGL':\ ]fak UfY'$*"$\%"$("$+)"$fk"($$\%$S&' $\&$&(L")"$ 

#### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa`a][\h`XYhYVMia Ya cfmi bWtffYVMUV`Y`Yffcf`k\]`Y`gmghYa`\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZh]aY"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gnghYa a ][\h\Ub[ Uh'a Ya cfm]b]h]U`]nUh]cb UZhYf fYghcf]b[ 'gnghYa 'gYhh]b[ 'hc 'ZUVMcfmXYZUi 'h'

 $5XXfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghXi d`]WUhY`cf`]bWtffYWh`bYHk cf_]bhYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y''' A Ybi `a ][ \h`]ghYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y''' A Ybi `a ][ \h`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYggYX`Ub`]ghYfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghYfYa `FfYWhYbY' `FfYWhYbY `FfYWhYbY' `FfYWhYbY$ 

 $5XXfYggYX`Ub`]ggi Y`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][i fUh]cbPF 6GI PBYhk cf_`Cdh]cbgPBJAY!c: `7cbZ][i fUh]cbPBJAY!c: `5hhYa dh`UfY`gh]``]b`9b[`]g\`UZhYf`gk ]h\X]b[`h\Y``Ub[i U[Y`hc`bcb!9b[`]g\`j Yfg]cb"$ 

5XXfYggYX Ub ]ggi Y k \YfY h\Y BJ A Y ]a U[ Y XYgWf]dh]cb ]b F6GI a ][ \h VY ]bWtffYWfk \Yb J FC7 ]g YbUV YX"

 $5XXfYggYX`Ub`]ggi\ Y`k\ YfY`h\ Y`gmghYa\ `F6GI\ `a\ Ybi\ `a\ ][\ h`bch`X]gd`Um\WYUf`Xf]j\ Y``c\Wh]cb`]bZcfa\ Uh]cb''$ 

5XXfYggYX Ub ]ggi Y k \YfY ZUbg a ][ \hfUd]X mfUa d i d UbX h\Yb VUW Xck b"

#### ?bck b =ggi Yg.

BcbY

### 9b\UbWa Ybhg

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 & \$&' gYW fY Vcch\_Ym'

 $\label{eq:localization} I \ dXUhYX \ h\ Y \ Vcch XYj \ ]W \ ghf]b[ \ fi \ Yg \ hc \ ]bWi \ XY \ h\ Y \ VWgY \ k \ Yb \ J \ A \ 8 \ ]g \ YbUV \ YX"$ 

5XXYX'h\Y'| Ga cch\'7cc`|b[|îgY`YW]cb'hc'h\Y'H\Yfa U``7cbZ|[ifUh]cb'cdh]cb']b'h\Y'F6GI P5Xj UbWX'Cdh]cbgP. Ub`UbX'H\Yfa U`Cdh]cbg"\H\]ggYYW]cb'a cX]Z|Yg'h\Y'ZUb'gdYYX'fYgdcbgY'hc']a dfcj Y`UWti gh]Wg'VmfYXi W]b['h\Y'fUhY'cZZUb'gdYYX'W\Ub['Yg''\H\]g\Wb ]a dfcj Y`UWti gh]Wg'Zcf'k cf\_`cUXg'k \]W\[g][b]Z]WUbhmj Ufm7DI 'ih]nUh]cb"\BchY'h\Uh'h\]g'cdh]cb'Wb'fYgi 'h']b'U'ga U``fYXi Wh]cb']b dYfZcfa UbW'Xi Y'hc'h\Yg\cfhXi fUh]cbg'cZ'7DI 'h\Yfa U`h\fchh]b['UbX'gca Y'cdYfUh]b['gmghYa gz'gi W\'Ug'@]bi I z'a Um`c['7DI 'h\Yfa U`h\fchh]b['Yj Ybhg'\'H\YgY'Yj Ybhg Xc'bch]bX]WUhY'Ub']ggi Y'k]h\'h\Y'gmghYa 'UbX'Wb'VY'][bcfYX"

FCA: `Ug\`:]fa k UfY DUW\_U[Y!'<D9'Dfc@|Ubh8@)\*\$; Yb%%fl)-L'GYfj Yfg J Yfg]cb. '&"(&S%&!\$\*!&\$&( 'ff7f]h]VW'L

## : ]`YbUa Y. T ) - S&"( &S%&S\$\* S&\$&( "**Z**k d\_[

=a dcfhUbhBchY°

### =a dcfhUbh BchYg.

H\]g'j Yfg]cb'cZ'h\Y'GmghYa 'FCA 'g\ci `X'VY'dU]fYX'k]h\'GYfj Yf'D'UhZcfa 'GYfj ]WYg'flGDGL':]fa k UfY'\$\* "\$%"\$("\$+) "\$fl&"(\$\$%\$\$&' \$&\$&(L"

#### 8Y`]j YfUV`Y'BUa Y.

< D9 Dfc@JUbh 8@) \* \$ ; Yb % GmghYa FCA ! I) -

#### FY`YUgY'J Yfg]cb.

### @UghFYVta a YbXYX cf 7f]h]Vtf FYj ]g]cb.

&"( &S%&! \$\*! &\$&(

#### DfYj ]ci g F Yj ]g]cb.

#### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

#### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk A ]WfcqcZhCdh]cb FCA I 9: = 75 & & 'qYW fY Vcch\_Ym'

I dXUhYX h\Y VcchXYj |WY qhf|b| fi Yq hc |bWi XY h\Y VWqY k \Yb J A 8 |q YbUV YX"

5XXYX h\Y i Gacch\ 7cc']b[i gY`YWh]cb hc h\Y H\YfaU``7cbZ[i fUh]cb cdh]cb jb h\Y F 6GI P5Xj UbWYX Cdh]cbgP. Ub UbX H\YfaU` Cdh]cbg" ``H\]g gY`YWh]cb a cX]Z]Yg h\Y ZUb gdYYX fYgdcbgY hc ja dfcj Y UWti gh]Wg VmfYXi Who [ h\ Y fUhY cZ ZUb gdYYX W\ Ub [ Yg" ``H\]g `Wb ]a dfcj Y `UWti gh]Wg Zcf k cf\_`cUXg k \]W\ g][b]Z]WUbhmj Ufm7DI i h] jhUh]cb" ``B chY h\ Uh'h\]g cdh]cb `Wb fYgi h]b 'U'ga U``fYXi Wh]cb jb dYfZcfa UbWYXi Y hc h\ Y g\ cfhXi fUh]cbg cZ 7DI h\ Yfa U``h\ fchi]b[ `UbX gca Y cdYfUh]b[ 'gmghYa gz gi W\ 'Ug'@]bi I z'a Um`c[ `7DI h\ Yfa U` h\ fchi]b[ `Yj Ybhg" ``H\ YgY Yj Ybhg Xc bch]bX]WUhY Ub jggi Y k ]h\ h\ Y gnghYa `UbX Wb VY][ bcfYX"

### DfcV`Ya g: ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa `a][\h`XYhYVMia Ya cfmi bWtffYVMUV`Y`Yffcf`k\]`Y`gmghYa `\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZ h]aY"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gmghYa a ][\h\Ub[ Uh a Ya cfm]b]h]U ]nUh]cb UZhYf fYghcf]b[ gmghYa gYhh]b[ hc ZJVWcfmXYZJi h'

 $5XXfYggYX`Ub`]ggiY`k \YfY`gmghYa `F6GI `a Ybi `a ][ \h`]ghXi d`]VVlhY`cf`]bVkffYVM`bYhk cf_]bhYfZUVYg`]b`h\Y`gY`YVM]cb`dU[Y"$ 

5XXfYggYX`Ub`]ggiY`k\YfY`gcaY`ghf]b[g`cZ]b`h\Y`GmghYa`7cbZ][ifUh]cbPF6GIPBYhkcf\_`Cdh]cbgPBJAY!c: '7cbZ][ifUh]cbPBJAY!c: 5HnYadh`UfY`gh]``]b`9b[`]g\`UZhYf`gk]h\X]b['h\Y``Ub[iU[Y`hc`bcb!9b[`]g\`jYfg]cb"

5XXfYggYX`Ub`]ggiYk\YfY`h\Y`BJAY`]aU[YXYgWf]dh]cb`]b`F6GI`a][\h'VY`]bWtffYWfk\Yb`JFC7`]g`YbUV`YX"

5XXfYqqYX Ub ]qqi Y k \YfY h\Y qmqhYa F6GI a Ybi a ][\hbchX]qd\Um\WYUf Xf]j Y `c\Wlh]cb ]b\Zcfa Uh]cb"

5XXfYqqYX Ub |qqi Y k \YfY ZUbq a |[\hfUd]X`mfUa d i d UbX h\Yb VUW Xck b"

### ?bck b =ggi Yg.

BcbY

### : ]I Yg

#### =a dcfhUbh BchYg.

H\]g'j Yfg]cb'cZh\Y'GmghYa 'FCA 'g\ci `X'VY'dU]fYX'k]h\'GYfj Yf'D'UhZcfa 'GYfj ]WYg'fGDGL':]fa k UfY'\$\* "\$%"\$("\$+) "\$fk"(\$\$%\$\$&' \$&\$&(L"

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa `a ][\h`XYhYVMia Ya cfmii bWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa `\Ug`VYYb`]X`Y`Zcf`Yl hYbXYX`dYf]cX`cZ h]a Y"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gnghYa a ][\h\Ub[ Uha Ya cfm]b]h]U`]nUh]cb UZhYf fYghcf]b[ gnghYa gYhh]b[ hc ZUVWcfmXYZUi `h'

5XXfYqqYX`Ub`]qqiYk\YfY`qmqhYa`F6GI`aYbi`a][\h`]qhXid`]WUhY`cf`]bWcffYWhbYkcf\_]bhYfZUWYq`]bh\Y`qY`YWf]cb`dU[Y"

5XXfYggYX`Ub`]ggi Y`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][i fUh]cbPF6GI PBYhk cf\_`Cdh]cbgPBJAY!c: `7cbZ][i fUh]cbPBJAY!c: 5HhYa dh`UfY`gh]```]b`9b[`]g\`UZhYf`gk]hW\]b[`h\Y``Ub[i U[Y`hc`bcb!9b[`]g\`j Yfg]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`BJ A Y`]a U[ Y`XYgWf]dh]cb`]b`F6GI `a ][ \h'VY`]bWtffYWfk\Yb`J FC7`]g`YbUV`YX"

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`gmghYa`F6GI`a Ybi`a][\hbchX]gd`UmWYUf`Xf]j Y``cWUh]cb`]bZcfa Uh]cb''

5XXfYggYX Ub ]ggi Y k \YfY ZUbg a ][\hfUd]X mfUa d i d UbX h\Yb VUW Xck b"

### ?bck b =ggi Yg.

BcbY

### 9b\UbWa Ybhg

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 & \$& gYW fY Vcch\_Ym'

IdXUhYX h\Y Vcch XYj ]WY ghf]b[ fi Yg hc ]bWi XY h\Y WUgY k \Yb J A 8 ]g YbUV YX"

5XXYX'h\Y'[Ga cch\'7cc']b[î'gY'YM]cb'hc'h\Y'H\Yfa U''7cbZ[i fUh]cb'cdh]cb']b'h\Y'F6GI P5Xj UbWYX'Cdh]cbgP. Ub'UbX'H\Yfa U'Cdh]cbg": H\]g'gY'YM]cb'a cX]Z]Yg'h\Y'ZUb'gdYYX'fYgdcbgY'hc']a dfcj Y'UWti gh]Wg'VmfYXi Who['h\Y'fUhY'cZZUb'gdYYX'W\Ub[Yg'':H\]g'Wbb]a dfcj Y'UWti gh]Wg'Zcf'k cf\_`cUXg'k \]W\[g][b]Z]WUbh'mj Ufm'7DI 'i h]`]nUh]cb"'BchY'h\Uh'h\]g'cdh]cb'Wb'fYgi 'h']b'U'ga U'''fYXi Wh]cb']b dYfZcfa UbWY'Xi Y'hc'h\Y'g\cfh'Xi fUh]cbg'cZ'7DI 'h\Yfa U''h\fchh']b['UbX'gca Y'cdYfUh]b['gmghYa gz'gi W\'Ug'@]bi I z'a Um'c['7DI 'h\Yfa U''h\fchh']b['Yj Ybhg''''H\YgY'Yj Ybhg'Xc'bch']bX]WUhY'Ub']ggi Y'k]h\'h\Y'gmghYa 'UbX'WUb'VY'][bcfYX"

FCA:`Ug\`:]fa k UfY`DUW\_U[Y'!`<D9`Dfc@|Ubh`A@)\$#8@\*\$#8@,\$`;Yb%%`fl)(Ł`GYfjYfg JYfg]cb.`&"(&S%&!\$\*!&\$&(`**ff7f]h]VW**`L :]YbUaY.`I)(S&"(&S%&S\$\*S&\$&("Zk d\_[

#### =a dcfhUbhBchY

#### =a dcfhUbhBchYg.

H\]g'j Yfg]cb'cZ'h\Y'GmghYa 'FCA'g\ci `X'VY'dU]fYX'k]h\'GYfj Yf'D'UhZcfa 'GYfj ]WYg'fGDG\:]fa kUfY'\\*"\$\"\$("\\$+)"\\$f\\"(\\$S\\\$S\\"\\$\"\\$\"\\$

#### 8Y`]j YfUV`Y'BUa Y.

< D9 Dfc@JUbh 8@ , \$ ; Yb\\#A@ ) \$ ; Yb\\#8@ \*\$ ; Yb\\GnghYa FCA!I)(

### FY`YUgY'J Yfg]cb.

&"( &S%&! \$\*! &\$&(

### @UghFYWta a YbXYX cf 7f]h]WV FYj ]g]cb.

&"( &S%&! \$\*! &\$&(

### DfYj ]ci g F Yj ]g]cb.

&"(\$S\\ \$,!&\&(

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX bYk A ]WfcgcZhCdh]cb FCA I 9: = 75 %\$&' gYW fY Vcch\_Ym'

IdXUm/X h\Y Vcch XYj ]WY ghf]b[ fi Yg hc ]bWi XY h\Y WUgY k \Yb J A 8 ]g YbUV YX"

5XXYX`h\Y`[Gacch\`7cc`]b[Î`gY`YVM]cb'hc'h\Y`H\YfaU``7cbZ[[ifUh]cb'cdh]cb']b'h\Y`F6GIP5XjUbWYX`Cdh]cbgP. Ub`UbX`H\YfaU`Cdh]cbg"``H\]g`gY`YWM]cb'acX]ZJYg'h\Y`ZJJb`gdYYX`fYgdcbgY`hc`]adfcjY`UWtigh]Wg`VmfYXiW]b['h\Y`fUhY`cZZJJb`gdYYX`W\Ub['Yg"``H\]g`Wb]adfcjY`UWtigh]Wg`Zcf`kcf\_`cUXg`k\]W\g][b]ZJWUbh'mjUfm7DI`ih]`nUh]cb"``BchY`h\Uh'h\]g`cdh]cb`Wb`fYgi`h`]b`U`gaU``fYXiWf]cb`]bdYfZcfaUbWfXiY`hc'h\Y`g\cfhXifUh]cbg`cZ`7DI`h\YfaU`h\fchh`]b[`UbX`gcaY`cdYfUh]b[`gmghYagžgiW\Ug`@]biIž`aUm`c[`7DI`h\YfaU`h\fchh`]b[`UbX`gcaY`cdYfUh]b[`gmghYagžgiW\Ug`@]biIž`aUm`c[`7DI`h\YfaU`h\fchh`]b[`YjYbhg"``H\YgY`YjYbhg`Xc`bch`]bX]WUhY`Ub`]ggiY`k]h\`h\Y`gmghYa`UbX`WUb`VY`][bcfYX"

### DfcV`Ya g': ]I YX.

 $5XXfYggYX`Ub`]ggi\ Y`k\YfY`h\Y`gmghYa\ `a\ ][\h`XYhYVM`a\ Ya\ cfmi\ bWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa\ `\Ug`VYYb`]X`Y`Zcf`YI\ hYbXYX`dYf]cX`cZh]a\ Y"$ 

5XXfYggYX`Ub`]ggiY`k\YfY`h\Y`gmghYa`a][\h\Ub[`Uh'aYacfm]b]h]U`]nUh]cb`UZhYf`fYghcf]b['gmghYa'gYht]b['hc`ZJUWhcfmXYZJJi`h'

5XXfYggYX`Ub`]ggiY`k\YfY`gmghYa`F6GI`aYbi`a][\h`]gh`Xid`]WUhY`cf`]bWcffYWh`bYhkcf\_]bhYfZUWYg`]b`h\Y`gY`YWh]cb`dU[Y"

 $5XXfYggYX`Ub`]ggi\ Y`k\ YfY`gca\ Y`ghf]b[\ g`cZ]b`h\Y`GmghYa\ `7cbZ][\ i\ fUh]cbPF\ 6GI\ PBYhk\ cf_`Cdh]cbgPBJ\ A\ Y!\ c:\ `7cbZ][\ i\ fUh]cbPBJ\ A\ Y!\ c:\ `7cbZ][\ i\ fUh]\ A\ Y!\ c:\ `7cbZ][\ i\ fU$ 

5XXfYggYX`Ub`]ggi Y`k \YfY`h\Y`BJAY`]a U[Y`XYgWf]dh]cb`]b`F6GI `a ][\h'VY`]bWtffYWfk\Yb`JFC7`]g`YbUV`YX"

5XXfYggYX`Ub`]ggiY`k\YfY`h\Y`gmghYa`F6GI`aYbi`a][\hbchX]gd`UmVWUf`Xf]jY``cVWh]cb`]bZcfaUh]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`ZUbg`a ][\hfUd]X`mfUa d`i d`UbX`h\Yb`VUW\_Xck b"

### ?bck b =ggi Yg.

BcbY

### : ]I Yg

#### =a dcfhUbhBchYg.

H\]g'j Yfg]cb`cZh\Y`GmghYa `FCA`g\ci``X`VY`dU]fYX`k]h\`GYfj Yf`D`UhZcfa `GYfj ]WYg`fGDGŁ': ]fa k UfY`\$\* "\$%"\$( "\$+) "\$f&"( \$\$%\$S&' \$&\$&( Ł"

#### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggiY`k\YfY`h\Y`gmghYa`a][\h`XYhYVMiaYacfmibWcffYVMUV`Y`Yffcf`k\]`Y`gmghYa`\Ug`VYYb`]X`Y`Zcf`YIhYbXYX`dYf]cX`cZh]aY"

5XXfYggYX Ub ]ggi Y k \YfY h\Y gnghYa a ][\h\Ub[ Uh'a Ya cfm]b]h]U`]nUh]cb UZhYf fYghcf]b[ gnghYa gYhh]b[ hc ZUVMcfmXYZUi `h'

5XXfYqqYX`Ub`]qqiYk\YfY`qmqhYa`F6GI`aYbi`a][\h`]qhXid`]WUhY`cf`]bWtffYWh'bYkkcf\_`]bhYfZUWYq`]bh\Y`qY`YWf]cb`dU[Y"

 $5XXfYggYX`Ub`]ggiY`k \YfY`gca Y`ghf]b[g`cZ]b`h\Y`GmghYa `7cbZ][ifUh]cbPF6GIPBYhkcf_`Cdh]cbgPBJAY!c: `7cbZ][ifUh]cbPBJAY!c: 5HhYa dh`UfY`gh]``]b`9b[`]g\`UZhYf`gk]hW\]b[ih\Y``Ub[iU[Y`hc`bcb!9b[`]g\`jYfg]cb"$ 

5XXfYqqYX`Ub`]qqiYk\YfY'h\Y`BJAY`]a U[YXYqWf]dh]cb`]b`F6GI`a][\hVY`]bWtffYWfk\YbJFC7`]q`YbUV`YX"

5XXfYggYX Ub ]gqi Y k \YfY h\Y gmghYa F6GI a Ybi a ][\hbchX]gd`UmVWUfXf]j Y `cVWh]cb ]bZcfa Uh]cb"

5XXfYggYX Ub ]ggi Y k \YfY ZUbg a ][ \hfUd]X mfUa d i d UbX h\Yb VUW\_ Xck b"

### ?bck b =ggi Yg.

BcbY

### 9b\UbWa Ybhg

5XXYX bYk 'A ]WfcqcZhCdh]cb FCA I 9: = 75 % & 'gYW fY Vcch\_Ym'

I dXUhYX h\Y VcchXYj ]WY ghf]b[ 'fi 'Yg hc']bWi XY h\Y WUgY k \Yb J A 8 ']g YbUV YX"

5XXYX h, Y i Ga cch, '7cc`]b[î gY`YW]cb hc h, Y H, Yfa U``7cbZ][i fUh]cb cdh]cb gb h, Y F 6GI P5Xj UbWX Cdh]cbgP. Ub 'UbX' H, Yfa U` Cdh]cbg" 'H, ]g gY`YW]cb a cX]Z]Yg h, Y ZUb gdYYX fYgdcbgY hc i]a dfcj Y 'Uwti gh]Wg 'VmfYXi W]b[ h, Y fUhY cZ ZUb gdYYX W, Ub[ Yg" 'H, ]g 'Wb ]a dfcj Y 'Uwti gh]Wg 'Zcf k cf\_`cUXg k \]W, 'g][b]Z]WUbhmj Ufm7DI ii h]`]nUh]cb" 'B chY h, Uh h, ]g cdh]cb 'Wb fYgi 'h ]b 'U ga U``fYXi Wh]cb ']b dYfZcfa UbWY Xi Y hc h, Y g\cfh Xi fUh]cbg cZ 7DI 'h, Yfa U` h, fchh]b[ 'UbX gca Y 'cdYfUh]b[ 'gmghYa gz gi W, 'Ug @]bi I z a Um`c[ '7DI 'h, Yfa U` h, fchh]b[ 'Yj Ybhg" 'H, YgY Yj Ybhg Xc bch ]bX]WUhY 'Ub ']gqi Y k ]h, h, Y gmghYa 'UbX 'Wb 'VY ][ bcfYX"

 $FCA: `Ug\ 'Ib]j YfgU`: ]fa k UfY `DUW U[Y'! < D9` Dfc@JUbh 8@%()'; Yb\%'fb), £'GYfj Yfg LYG-JUB UG (1996) A LYG-JUB UG (1996$ 

J Yfg]cb. %" \$\$%\$! \$(!&\$&( fCdh]cbU'Ł : ]YbUa Y. 5), \$%" \$\$%\$\$(\$&\$&( "Zk d\_[

### =a dcfhUbh BchY°

#### =a dcfhUbhBchYg.

 $H\ ]g\ fYj\ ]g]cb\ cZ\ h\ Y\ GmghYa\ FCA\ ]bWi\ XYg\ 5A\ 8\ fYZYfYbW'\ WcXY';\ YbcUD=\%"\$"\$"8\ Zcf\ 5A\ 8\ (h\ ;\ YbYfUh]cb\ 9DM'\ dfcW'ggcfg"$ 

### 8Y`]j YfUV`Y'BUa Y.

< D9 8 @%(); Yb %% GmghYa FCA ! 5),

### FY`YUgY'J Yfg]cb.

%"' \$S%\$!\$(!&\$&(

### @UghFYVta a YbXYX cf 7f]h]Vt0 FYj ]g]cb.

%"&\$\$\$,!\$-!&\$&(

### DfYj ]ci g'FYj ]g]cb.

%"&\$\$\$,!\$-!&\$&(

#### : ]fa k UfY 8YdYbXYbVWg.

BcbY

#### 9b\UbWa Ybhg#BYk : YUhi fYg.

5XXYX FYXZ]g\ 5D= Zcf 6cch Dfc[ fYgg"

#### DfcV`Ya g: ]I YX.

5XXfYggYX Ub ]ggi Y k \ YfY GmghYa =bZcfa Uh]cbP8Yj ]WY =bj Ybhcfm]b ]@C k YV a Umg\ ck i b\_bck b Ybhf]Yg UZhYf YbUV ]b[ V]Zi fWUh]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`CbY`Vi htcb`gYWfY`YfUgY`fC6G9Ł`fYdcfh`a Umg\ck `]bWtffYWf8f]j Y`Dcfh`Bi a VYf`UbX`6cl `Bi a VYf`Zcf A ]Wfc7\]d`GF`Wtbhfc``Yfg"

5XXfYggYX Ub ]ggi Y k \YfY gmghYa a UmVYWta Y ghi W\_ UZhYf Ybfc``]b[ a UbmWYfh]ZJWJhYg UbX g][ bUhi fYg"

#### ?bck b =ggi Yg.

BcbY

#### : ]I Yg

### =a dcfhUbhBchYg.

 $\label{thm:conditional} $$H\ \g^fYj\ \g] = CZh\ \GmghYa\ \FCA\ \gmghYa\ \FCA\ \gmghYa\ \FCA\ \gmghYa\ \FCA\ \gmghYa\ \FCA\ \gmghYa\ \FCA\ \gmghYa\ \gmgmhYa\ \gmgmmhYa\ \gmgmmhYa\ \gmgmmhYa\ \gmgmmhYa\ \gmgmhYa\ \gmgmmhYa\ \gmgmmhY$ 

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

#### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggiY`k\\YfY`GmghYa`=bZcfa Uh]cbP8Yj ]WY=bj Ybhcfm]b`]@C`kYV`a Umg\ck`ib\_bckb`Ybhf]Yg`UZhYf`YbUV`]b[`V]Zi fWUh]cb"

5XXfYggYX`Ub`]ggi Y`k \YfY`CbY`Vi htcb`gYWfY`YfUgY`fC6G9Ł`fYdcfha Umg\ck `]bWtffYWf8f]j Y`DcfhBi a VYf`UbX`6cl `Bi a VYf`Zcf A ]Wfc7\]d`GF`Wtbhfc``Yfg"

 $5XXfYggYX`Ub`]ggi\ Y`k\ \ YfY`gmghYa\ `a\ UmVYWta\ Y`ghi\ \underline{W}\_`UZhYf`Ybfc``]b[\ `a\ Ubm`Wfh]Z]WUhYg`UbX`g][\ bUhi\ fYg'']$ 

### ?bck b =ggi Yg.

BcbY

#### 9b\UbWa Ybhg

5XXYX FYXZ]g\ 5D=Zcf 6cch Dfc[fYgg"

FCA: `Ug\`I b]j YfgU`: ]fa k UfY`DUW\_U[Y`!`<D9`Dfc@]Ubh'8@ &) #8@ ()`; Yb%%`f5)\*L'GYfj Yfg J Yfg]cb. `&"&\$S%\d \$, !&\$&(`**fF YWta a YbXYXL**:]`YbUa Y. `5)\*S&"&\$S%\S\$, S&\$&("**Z**k d\_[

#### =a dcfhUbh'BchY°

### =a dcfhUbhBchYg.

 $H\ ]g\ fYj\ ]g]cb\ cZ\ h\ Y\ GmghYa\ FCA\ ]bWi\ XYg\ 5A\ 8\ fYZYfYbW'\ WcXY\ Hi\ f]bD=\ '''$"$"$\ Zcf\ 5A\ 8\ )\ h\ ;\ YbYfUh]cb\ 9DM'\ dfc\ Wggcfg"\ H\ ]g\ fYj\ ]g]cb\ cZ\ h\ Y\ GmghYa\ FCA\ ]bWi\ XYg\ 5A\ 8\ fYZYfYbW'\ WcXY\ ;\ YbcUD=\ '''$"$"8\ Zcf\ 5A\ 8\ (h\ ;\ YbYfUh]cb\ 9DM'\ dfc\ Wggcfg"$ 

### 8Y`]j YfUV`Y'BUa Y.

< D9 Dfc@Ubh8@ &); Yb\\#8@ (); Yb\\GmghYa FCA ! 5) \*

### FY`YUgY'J Yfg]cb.

&"&\$S%\d\$,!&\$&(

#### @UghFYWta a YbXYX cf 7f]h]WU FYj ]g]cb.

&"&\$S%\d\\$,!&\$&(

### DfYj ]ci g'FYj ]g]cb.

&"%( S%\$! %%! &\$&(

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### 9b\UbWa Ybhg#BYk : YUhi fYg.

=a dfcj YX gmghYa dck Yf Wcbgi a dh]cb ]b ]X`Y ghUhY"

 $\label{eq:final_continuous_problem} \mbox{\em #fYXZ} \mbox{\em g} \mbox{\em w} \mbox{\em g} \mbox{\em w} \mbox{\em g} \mbox{\em g} \mbox{\em h} \mbox{\em b} \mbox{\em g} \mbox{\em g} \mbox{\em h} \mbox{\em b} \mbox{\em g} \mbox{\em g} \mbox{\em h} \mbox{\em g} \mbox{\em h} \mbox{\em g} \mbox{\em h} \mbox{\em h} \mbox{\em g} \mbox{\em h} \mbox{\em h} \mbox{\em h} \mbox{\em g} \mbox{\em h} \m$ 

### DfcV`Ya g': ]I YX.

 $5XXfYggYX`Ub`]ggi\ Y`k\ YfY`h\ Y```GYfj\ Yf`6cch`CfXYf``]b`]@C`k\ YV`k\ Ug`bch`U`][\ bYX`k\ ]h\ ```I\ 9: = 6cch`CfXYf``7cbhfc```]b`F6GI "$ 

5XXfYggYX Ub ]ggi Y k \YfY 7DI a UmbchgYh WH8D hc a Ul ]a i a 'VmXYZUi 'h'

5XXfYggYX`Ub`]ggiY`k\YfY`Ub`Yffcf`a YggU[Y`]b`@]biI`kci`X`]bX]WUhY`H7; ``c[`g]nY`]g`bch`Wta dUh]V`Y"

### ?bck b =ggi Yg.

BcbY

#### : ]I Yg

#### =a dcfhUbh BchYg.

H\]g`fYj ]g]cb`cZh\Y`GmghYa`FCA`]bWi XYg`5A8`fYZYfYbWr'WtXY`Hi f]bD=%"\$"\$"&`Zcf`5A8`) h\`; YbYfUh]cb`9DMr`dfcWrggcfg"`H\]g`fYj ]g]cb
cZh\Y`GmghYa`FCA`]bWi XYg`5A8`fYZYfYbWr'WtXY`; YbcUD=%"\$"\$"8`Zcf`5A8`(h\`; YbYfUh]cb`9DMr`dfcWrggcfg"

#### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`"GYfj Yf`6cch'CfXYf"]b`]@C`k YV`k Ug`bch'U`][ bYX`k ]h\`"I 9: =6cch'CfXYf`7cbhfc`"]b`F6GI "

5XXfYggYX`Ub`]ggiY`k\YfY`7Dl`a UmbchgYhWH8D'hc`a Ul]aia 'VmXYZUi`h'

5XXfYggYX Ub ]ggi Y k \YfY Ub Yffcf a YggU[ Y ]b @bi I k ci `X ]bX]WWHY H7; ``c[ 'g]nY ]g bch Wta dUh]V`Y"

#### ?bck b =ggi Yg.

BcbY

### 9b\UbWa Ybhg

#fYXZ]g\#j %#gmghYa g#%#V]cg#gYhh]b[g#DVJY<chDi[9ff7cbhfci

FCA: `Ug\`I b]j YfgU``: ]fa k UfY DUW\_U[ Y!! < D9 Dfc@|Ubh8@ \* ) #8@ , ) ; Yb‰ff5) ) Ł GYfj Yfg

#### =a dcfhUbhBchY

### =a dcfhUbhBchYg.

H\]g`fYj ]g]cb`cZh\Y`GmghYa`FCA`]bWl XYg`5A8`fYZYfYbWl`WcXY`Hi f]bD='%'\$"\$"& Zcf`5A8`) h\; YbYfUh]cb`9DMl`dfcWlggcfg"`H\]g`fYj ]g]cb cZh\Y`GmghYa`FCA`]bWl XYg`5A8`fYZYfYbWl`WcXY; YbcUD='%'\$"\$"8 Zcf`5A8`(h\; YbYfUh]cb`9DMl`dfcWlggcfg"

### 8Y`]j YfUV`Y'BUa Y.

< D9 Dfc@JUbh8@ , ) ; Yb%#8@ \*) ; Yb%% GmghYa FCA ! 5))

### FY`YUgY'J Yfg]cb.

&"&\$S%%|\$,!&\$&(

#### @UghFYWta a YbXYX cf 7f]h]WV FYj ]q]cb.

&"&\$S%\\ \$,!&\$&(

### DfYj ]ci g F Yj ]g]cb.

&"%( S%\$! %%! &\$&(

### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

### 9b\UbWa Ybhg#BYk : YUhi fYg.

=a dfcj YX gmghYa 'dck Yf Wcbgi a dh]cb ']b ']X Y ghUhY"

#fYXZ]g\#j %#gmghYa g#%#V]cg#gYhh]b[g#DV]Y<chD`i[9ff7cbhfc`

### DfcV`Ya g': ]I YX.

5XXfYggYX`Ub`]ggi Y`k\YfY`h\Y`"GYfj Yf`6cch'CfXYf"`]b`]@C`k YV`k Ug`bch'U`][ bYX`k ]h\`"I 9: =6cch'CfXYf`7cbhfc`"`]b`F6GI "

5XXfYggYX Ub Jggi Y k \YfY 7DI a UmbchgYhWH8D hc a Ul Ja i a 'VmXYZUi 'h'

5XXfYggYX`Ub`]ggiYk\YfY`Ub`Yffcfa YggU[Y]b`@biI'kci`X]bX]WUhY`H7; ``c['g]nY`]g'bch'Wta dUh]V`Y"

#### ?bck b =ggi Yg.

BcbY

#### : ]I Yg

#### =a dcfhUbh BchYg.

H\]g`fYj ]g]cb cZh\Y`GmghYa `FCA`]bWl XYg`5A8`fYZYfYbWf`WcXY`Hi f]bD=`%"\$"\$"&`Zcf`5A8`) h\; YbYfUh]cb '9DM7`dfcWfggcfg"`H\]g`fYj ]g]cb cZh\Y`GmghYa `FCA`]bWl XYg`5A8`fYZYfYbWf`WcXY'; YbcUD=`%"\$"\$"8`Zcf`5A8`(h\; YbYfUh]cb '9DM7`dfcWfggcfg"

#### : ]fa k UfY 8YdYbXYbVJYg.

BcbY

#### DfcV`Ya g: ]I YX.

5XXfYqqYX Ub |qqi Y k \YfY h\Y "GYfj Yf 6cch CfXYf" |b |@C k YV k Uq bch U || bYX k |h\ "I 9: = 6cch CfXYf 7cbhfc" |b F6GI "

5XXfYggYX Ub ]ggiY k \YfY 7Dl a UmbchgYhWH8D hc a Ul ]a i a VmXYZUi h

5XXfYggYX Ub ]ggi Y k \ YfY Ub Yffcf a YggU[Y]b @bi I k ci `X ]bX]WUhY H7; ``c[ 'g]nY ]g bch Wa dUh]V Y"

### ?bck b =ggi Yg.

BcbY

### 9b\UbWa Ybhgi

#fYXZ]g\#j %#gmghYa g#%#V]cg#gYhh]b[g#DVJY<chDi[9ff7cbhfci

### 8f]j Yf ! BYkk cf\_

<u>Hcd</u>

<D9`6fcUXWta 'BYHL HfYa Y! 9`8f]j Yfg'Zcf'J A k UfY'j Gd\YfY'+"\$
J Yfg]cb. '&\$&("%\"\$\$ 'fF YWta a YbXYX\!
: ]'YbUa Y. 'Wd\\$\*' \* &+"Wta dg][ / 'Wd\\$\*' \* &+"n]d</pre>

### <u>=a dcfhUbhBchY°</u>

- H\]g'Wta dcbYbh']g']bhYbXYX'hc'VY'i gYX'Vm<D9'Udd`]WUh]cbg"'=h']g'U'n]d'Z]Y'h\Uh'WtbhU]bg'h\Y'gUa Y'Xf]j Yf'XY`]j YfUV'Y'Uj U]'UV'Y Zfca 'h\Y'j a k UfY"Wta 'UbX'h\Y'<D9'j ]VgXYdch'\dY"Wta 'k YVdU[ Ygz'd'i g'Ub'<D9'gdYWJZ]W7D\$IIIII"I a 'Z]'Y"</p>
- <D9 fYWta a YbXg h\Y HPE Broadcom NetXtreme-E Firmware Version, & "%"%" &\$\$%cf``UhYfz'Zcf`i gY`k ]h\ h\ ]g'Xf]j Yf"</p>

#### : ]I Yg

- H\]g\dfcXi\Wh\UXXfYggYg\Ub\]ggi\Y\h\Uh\dfYj\Ybh\X\fYgYfj\]b[\h\Y\bcb!g\UdYX\hf\Ubga\]gg]cb\ei\Y\]\]h\Y\bcb!g\UdYX\hf\Ubga\]gg]cb\cb\h\Y\bYh\cf\_\UXUdh\f\"
- H\]g'dfcXi Wh'UXXfYggYg'Ub']ggi Y'k\YfY'h\Y'Xf]j Yf'Wti `XbBrgYh'h\Y'H SYbXSdc]bhSfUhY`]a ]h'cb'A i `h]! fcch'5XUdhYfgz'YbUV`]b[
   dfcdYf'VUbXk ]Xh\ 'Wtbhfc``UbX']a dfcj YX'bYhk cf\_'hfUZZJWa UbU[ Ya Ybh'

#### 9b\UbWa Ybhg

- $\bullet \quad \text{HL}[g'dfcXi\ VM'Yb\UbW'g'hc'UXX'gi\ ddcfh'hc'\UbX'Y'HD=8'fHU['DfchcWc''=XYbh]Z]Yfk'']$
- H\]g dfcXi WhYb\UbWfg UXX]b[ j Yfg]cb ]bZcfa Uh]cb ]b 6fcUXWca gbUdXi a d Xf]j Yf c[ g"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi VM gi ddcfhg h\Y Zc ``ck ]b[ bYhk cf\_ UXUdhYfg.

- < D9 9h\YfbYh'%; V'&!dcfh')'): @F!H'5XUdhYf</p>
- <D9 9h\YfbYh%\$; V &! dcfh) ') H 5XUdhYf</p>
- < D9 9h\YfbYh'%; V'&!dcfh') '+G: DŽ 5XUdhYf'</li>
- < D9 9h\YfbYh%\$; V &! dcfh) ' +G: DŽ : @F 5XUdhYf</li>
- < D9 9h\YfbYh%\$#&); V &! dcfh\*' % @F!G: D&, 5XUdhYf</li>

- < D9 9h\YfbYh %\$#&); V &! dcfh\*' %G: D&, 5XUdhYf</li>
- < D9 9h\YfbYh%; V &! dcfhG: DŽ 67A) +( % C7D' 5XUdhYf</li>
- < D9 9h\YfbYh'%; V'&! dcfh'G: DŽ '67A) +( % 5XUdhYf</li>
- < D9 9h\YfbYh%; V &! dcfh6UgYH 67A) +(%\* C7D' 5XUdhYf</li>
- < D9 9h\YfbYh'%\$; V &! dcfh'6UgYH'67A) +( %\* 5XUdhYf</li>
- < D9 9h\YfbYh%\$#&); V &! dcfhG: D&, 67A) +(%( C7D' 5XUdhYf</li>
   < D9 9h\YfbYh%\$#&); V &! dcfhG: D&, 67A) +(%( 5XUdhYf</li>
- 6fcUXVta 67A) +) \$( 9h\YfbYh%\$#&); V (!dcfhG: D&, 5XUdhYf Zcf < D9
- 6fcUXWda 67A)+)\$( 9h\YfbYh%\$#&); V(!dcfhG: D&, C7D 5XUdhYf Zcf < D9

< D9 =bhY`][ Vb 8f]j Yf Zcf J A k UfY j Gd\YfY +"\$
J Yfg]cb. &\$&("\$-"\$\$ fF YWta a YbXYXL
: ]YbUa Y. Wd\$\* &%\* &"Wta dg][ / Wd\$\* &%\* &"n]d</pre>

#### =a dcfhUbhBchY°

H\]gʻWta dcbYbh`]gʻ]bhYbXYX`hc`VY`i gYX`Vm<D9`Udd`]\Wlh]cbg"ʻ⊨n`]gʻUʻn]dʻZ]Y`h\Uh`WtbHJ]bgʻh\Y`gUa Y`Xf]j YfʻUV`Y`Uj U]`UV`Y`Zfca h\Y`j a k UfY"Wta `UbX`h\Y`<D9`j ]VgXYdch"\dY"Wta `k YVdU[ Ygž'd`i gʻUb`<D9`gdYWJZ]W7D\$IIIII"la ``Z]`Y"

< D9 fYWta a YbXg'h\Y'ZJfa k UfY'dfcj ]XYX']b HPE Intel Online Firmware Upgrade Utility for VMwarež'j Yfg]cb'' "&( "\$''cf'`UhYfž'Zcf'i gY k ]h\'h\]g'Xf]j Yf"

#### 9b\UbWa Ybhgi

H\]g dfcXi WhUXXYX gi ddcfh hc bYk ; Yb \% gYfj Yfg"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\YqY Xf]i Yfq qi ddcfh h\Y Zc ``ck ]b[ bYhk cf\_ UXUdhYfq.

- < D9 '9h\ YfbYh'% V'&! dcfh' \* %H'5XUdhYf'
  </p>
- <br/>
   <br/>
- <D9'9h\YfbYh% V'&!dcfh' \*']'5XUdhYf'''
- <D9'9h\YfbYh% V'(!dcfh'' \*\*: @F'5XUdhYf''''
- <D9'9h\YfbYh'% V'(!dcfh' \*\*H'5XUdhYf''''
- < D9 9h\YfbYh% V (!dcfh' \*\*] 5XUdhYf \*\*\*
  </p>
- <D9'9h\YfbYh% V'(!dcfh' \*\*]'7ca a i b]\Whch'6cUfX''''
- =bHY`=') \$! H( '9h\YfbYh%' V'(!dcfh65G9! H'5XUdhYf'Zcf'<D9''''
- =bhY`=')\$!H('9h\YfbYh'% V'(!dcfh'65G9!H'C7D' 5XUdhYf'Zcf'<D9'
- =bhY`fFŁ'=')\$; ][UV]h'BYhk cf\_ 7cbbYVh]cb

=bhY``]W'b'8f]j Yf'Zcf'JAkUfY'j Gd\YfY'+"\$ JYfg]cb. '&\$&("%%"\$\$'**fFYWtaaYbXYXŁ** : ]YbUaY. 'W1\$\*' %) \$"Wtadq][/'W1\$\*' %) \$"n]d

#### =a dcfhUbhBchY°

- H\]g'Wta dcbYbh']g']bhYbXYX'hc'VY'i gYX'Vm<D9'Udd`]WUh]cbg"'=h']g'U'n]d'Z]Y'h\Uh'WtbhU]bg'h\Y'gUa Y'Xf]j Yf'XY']j YfUV'Y'Uj U]'UV'Y Zfca 'h\Y'j a k UfY"Wta 'UbX'h\Y'<D9'j ]VgXYdch"\dY"Wta 'k YVdU[Ygz'd'i g'Ub'<D9'gdYW]Z]W7D\$IIIII"I a `'Z]'Y"</p>
- < D9 fYWta a YbXg'h\Y'Z|fa k UfY'dfcj |XYX']b Intel Firmware Package For E810 Ethernet Adapterz'j Yfg]cb'("\*\$'cf'`UhYfz'Zcf'i gY k ]h\'h\YgY'Xf]j Yfg"</p>

### : ]I Yg

- H\]g'dfcXi VM:UXXfYggYX:h\Y'gYWbXUfmei Yi Yg'i gU[Y'Zcf'ZfU[a YbhYX'=D'dUW\_Yhg"
- H\]q'dfcXi Wh'UXXfYqqYX'h\Y'dYf!ei Yi Y'qhUh]qh]Wq'Zcf'bUh]j Y'a cXY"
- H\]g`dfcXiVM`UXXfYggYX`h\Y`6fcUXWUgh`dUW\_Yhg`ZcfkUfX]b[`fi`Yg`hc`Uj`c]X`5FD``ccdVUW\_`]ggiY`Zcf`JA8E`hfUZZWV

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

- =bHY`9, \%! 7E 85& 9h\YfbYh\%\$: V &! dcfh E G: D& 5XUdhYf Zcf < D9
- $\pm$ bHY`9, %! 7E 85&'9h\YfbYh'%\$; V'&! dcfh'E G: D&, 'C7D' '5XUdhYf'Zcf' < D9
- =bhY``9, %\$!LLJ85(`9h\YfbYh`%\$#&); V`(!dcfh`G: D&, `5XUdhYf`Zcf`<D9
- =bHY''9, %\$!LLJ 85&'9h\YfbYh'\\$#&); V'&!dcfh'G: D&, '5XUdhYf'Zcf' < D9'''
- =bhY 9, %\$!LLJ85& 9h\YfbYh %\$#&); V &! dcfhG: D&, C7D' 5XUdhYf Zcf < D9</li>
- =bHY`9, %\$! &7E 85& 9h\ YfbYh %\$\$; V &! dcfh E G: D&, 5XUdhYf Zcf < D9
- =bHY`9, %\$!LLJ85( 9h\YfbYh%\$#&); V(!dcfhG: D&, C7D' 5XUdhYfZcf < D9

Bj ]X]U'7cbbYVML!(ž'7cbbYVML!\*'UbX'7cbbYVML!+'"ba`l) SYb"'8f]j Yf'7ca dcbYbh'Zcf'J A k UfY'9GL]'+"\$'l dXUhY'' J Yfg]cb. '&\$&("\$) "&, '**fF YVta a YbXYXŁ**:]'YbUa Y. 'Vd\$\*%(, ("Wta dg][/'Vd\$\*%(, ("n]d

#### =a dcfhUbhBchY°

=a dcfHJbh J Yfg]cb ("&&"+' "%\$\$\* gi ddcfhg J A k UfY '9GL] '+"\$ I dXUhY ' cb`m'

?bck b =ggi Yg k ]h\ Xf]j Yf j Yfg]cb ( "&&"+' "%\$\$\*.

- $\bullet \quad \text{Ci H} \text{ c2 Vi ZYf} \text{ dUW} \text{ Yhg} \text{ UfY bch} \text{ VY} \text{ b} \text{ [ 'We'i bhYX 'Ug'FI 'Xfcdg'']}$
- 8i Y'hc \ UfXk UfY \cdot ]a \[ \frac{1}{1}\text{JhJh]cbgz'A cXY\cdot \cdot \c
- H\YXf]jYfjYfg]cb]b]8F57]gbchX]gd`UmYXWcffYVMm"
- ; YbYj Y'cdh]cbg``Yb[h\ 'gi ddcfh']g``]a ]hYX'hc') \*6"'FYWY]j YX'dUW\_Yhg'k ]h\ 'cdh]cbg``Yb[h\ 'V][[Yf'h\ Ub') \*6''UfY'XfcddYX"
- 5 a ]ga UhW VYrk YYb 'h\ Y' i d`]b\_ `UbX'h\ Y' J : 'A HI 'j U'i Yg'a UmfYgi 'h']b '7E 9 k ]h\ Yffcf" K cf\_Ufci bX. . '5`][ b 'h\ Y' i d`]b\_ `UbX'h\ Y' J : 'A HI 'j U'i Yg"
- 9bUV ]b[ 'gf]cj Sa Ws]gc`Uh]cb`a cXi `Y'dUfUa YhYf`a UmfYgi `h']b'j a \_b]WUbX`Ya i `UhYX`B =7 g'a i `h]WUgh'UbX`=Dj \* 'hfUZZ]W`cgg"
   K cf\_Ufci bX. 'I bqYh'cf'qYh'h\Y'a cXi `Y'dUfUa YhYf`hc`\$"
- F8A 5 ]g bch gi ddcfhYX ]b h\Y < mdYfj ]gcf k ]h\ 9BG ff9b\UbWYX BYhk cf\_ GHUW\_L a cXY`&"</p>
- GYHn]b["h\Y"5"ck"; i Ygh'A HI '7\Ub[Y"cdh]cb"]b"j Gd\YfY'7"]Ybh']g"W'ffYbhmbch'ZI bWh]cbU""5 h\ci [\'[i Ygh'A HI 'V\\Ub[Yg']b GF!=CJ 'UfY'U"ck YX\"h\YmXc'bch'UZZYWh'h\Y'dcfhfq"A HI 'UbX'h\Y'[i Yghfq"A HI 'fYa U]bg'h\Y'gUa Y'Ug'h\Y'D: 'A HI "
- 97 B 'fi'9I d')Wjh Wtb [ Ygh]cb 'bch]ZJWUh]cbŁ 'ghUh]gh]WWti bhYfg 'UWW a i 'UhcfgDYf]cX 'UbX YWbA Uf\_YXF cWfDUW\_Yhg 'X]gd 'Umk fcb [ 'j U'i Yg UbX 'WUbbch'VY 'WYUfYX"
- 97B hi bUV`Y`dUfUa YhYf`]b]h]U`5`d\WJU`i Y`Zcf`h\Y`FYUVM]cb`Dc]bhdfchcWt``WUbbch'VY`a cX]Z[YX"
- 7 UfXfg gdYYX fYa U]bg nYfc UZhYf dcfh[cYg Xck b UbX fYVcch]g dYfZcfa YX"
- Fc79 hfUZZ]Wa UmZU] UZhYf j A ch]cb k \Yb i g]b[ bUa YgdUWY"
- @Y[UWmGF!=CJ]gbchgiddcfhYXk]h\AcXY`%"
- K\Yb]b9BGacXYzWXUb[]b[h\YgWXYXiYfhc<7@zaUmWUigYhfUZZ]Wcgg"</li>
- H\Y`fYgl W]`a Y``Ubcl ii d`]b\_``]b\_`]bZc!i Oj a b]W\$bUa Y2fiWta a ÜbX`fYdcfhg`h\Y`f\$i hc`bY[ch]Uh]cbfiWddV\]`]hm'U'k Umg`Ug`flifi Yfl
- GAD'A 58g f[]VbYhX]gWcj Yfž ga ]bZcž ]V`]b\_]bZcž ga dXi a dž ]Vei YfmYffž ]VX]U[ bYh'UbX ga dei Yfmz UfY bchgi ddcfhYX cb h\Y'J:g"
- 5`h\ci [\`h\Y`a Ul Sj Zg'a cXi `Y`dUfUa YhYf`fUb[Y`]g'"\$!%, "ž'Xi Y`hc`Zļfa k UfY``]a ]hUh]cbgž'h\Y`Zc``ck ]b[ `UfY`h\Y`gi ddcfhYX`J: g dYf`g]b[`Y`dcfh`XYj ]Wfg.
  - 7cbbYWML!(#7cbbYWML!).idhc:%&+

### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg\Uj Y VYYb Z]I YX ]b Xf]j Yf j Yfg]cb ("&&"+' "%\$\$\*.

- DYfZcfa UbWY ]ggi Yg'k YfY cVgYfj YX Xi Y hc WbhYl hgk ]hW(Yg'cj Yf'h\Y`\UfXk UfY df]cf]hmVi ZZYfg h\UhWi gYX g'ck Yf'dUW\_Yh VY]b[ gYbh'k \Yb gYbX]b[ 'hfUZ]Wk ]h\ a UbmX]ZZYfYbh'J @5B ff7 cG D7 D#, \$%"&dŁ'df]cf]h]Yg" 'Hc 'ZJ 'h\Y 'Xf]j Yf'dfcj ]XYg'U bYk a cXi 'Y'dUfUa YhYf'hfi ghSXgWdSgUa YSdf]cf]hmhc a Ud 'U``8G7 D'df]cf]h]Yg'hc h\Y 'gUa Y hfUZZ]WWUgg hc 'Uj c]X'gi W\ 'VY\Uj ]cf"
- 5 gdYVNZJWghYYf]b[ fi Y WfYUh]cb ]ggi Y k \Yb h\Y hYUa ]b[ a cXY ]g cb"
- DUW\_Yng k YfY XfcddYX Vm9BG h\Unk YfY bchgYh Ug A 5F? "Bck A 5F? UWM]cbg UfY Uj U] UVY ]b Vch\ @5; UbX bc @5; a cXYg"

#### 9b\UbWa Ybhg

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

< D9 DUfh Bi a VYf	8Yj]WY`BUaY	DG=8
D&( , ' +! 6&%	< D9 '9h\ YfbYh'%\$#&); V '&! dcfh'* ( &G: D&, '5XUdhYf	<d9\$\$\$\$\$\$\$)(< td=""></d9\$\$\$\$\$\$\$)(<>
D‰'',!6&%	<d9^9h\yfbyh'%\$; '5xudhyf<="" (,="" dž="" g:="" td="" v^&!dcfh')=""><td>&lt; DS % \$\$ \$ % % \$ &amp; '</td></d9^9h\yfbyh'%\$;>	< DS % \$\$ \$ % % \$ & '
, &) % ! 6 & %	<pre>CD9 =bZ]b]6UbX 98F#9h\YfbYh'%\$\$; V'%\dcfh, (\$EG:D&amp;, 5XUdhYf</pre>	<ds&% \$%%\$\$'="" &<="" td=""></ds&%>
, &) %%4 6&%	<pre>CD9 =bZ]b]6UbX 98F#9h\YfbYh'%\$\$; V &amp;! dcfh, (\$E G: D&amp;, 5XUdhYf</pre>	<ds&% \$%%\$\$'="" &<="" td=""></ds&%>
, +&+&*!6&%	<d9 %e="" &!="" (="" 5xudhyf<="" 98f#9h\yfbyh'%\$\$;="" =bz]b]6ubx="" d&,="" dcfh,="" g:="" p="" v=""></d9>	<d9\$\$\$\$\$\$\$-< td=""></d9\$\$\$\$\$\$\$-<>
, +- ( , &! 6&%	<pre>CD9 =bZ]b]6UbX : 8F#9h\YfbYh(\$#)\$; V &amp;! dcfh)(+: @F!EG: D 5XUdhYf</pre>	< D9\$\$\$\$\$\$\$&&
, %++(-!6&%	< D9 '9h\ Yfb Yh %\$#&); V &! dcfh: @F!G: D&, 'A 7L (	< DS&* - \$%\$\$' (
, %++) ' !6&%	<pre>CD9 9h\YfbYh%\$#&amp;); V &amp;! dcfhG: D&amp;, A 7L ( %&amp;%5! 57I H 5XUdhYf</pre>	<ds&( &\$%\$\$'="" (<="" td=""></ds&(>
D&% &+! 6&%****	< D9 '9h\ YfbYh'%\$\$; V '&! dcfh'E G: D&, 'A 7L) %* 5! 77 < H'5XUdhYf	A HS\$\$\$\$\$\$(%+
D%\$%%&! 6&%****	A Y``Ubcl `A 7L) * &5! 575=`9h\ YfbYh`%\$#&); V`&! dcfh`G: D&, `C7D' `5XUdhYf`Zcf` <d9< td=""><td>A HS\$\$\$\$\$\$&amp;( %</td></d9<>	A HS\$\$\$\$\$\$&( %
D% % , ! 6&%****	A Y``Ubcl `A 7L) \&: !57 <h`9h\yfbyh`\\$#&); `5xudhyf`zcf`<d9<="" d&,="" td="" v`&!dcfh`g:=""><td>A HS\$\$\$\$\$\$( %*</td></h`9h\yfbyh`\\$#&);>	A HS\$\$\$\$\$\$( %*
D%% (%46&%****	< D9 '9h\ YfbYh'%\$; V &! dcfh'G: DŽ 'A 7L ( * &%5! 5756 C 7D' '5XUdhYf	A HS\$\$\$\$\$\$&' ,
D&% ' \$! 6&%	< D9 '9h\ YfbYh'%\$; V '&! dcfh'G: DŽ 'A 7L ( \%\%5! L 7 < H 5XUdhYf	A HS\$\$\$\$\$\$( %( )

, +( &) ' !6&%	< D9 9h\YfbYh%\$\$; V % dcfhE G: D&, A 7L) % 5! 775H 5XUdhYf	< D9\$\$\$\$\$\$\$%(
D&) - * \$! 6&%	A Y``Ubcl `A 7L * &' %\$ * 5G! 7 8 5H 9h\ YfbYh'%\$\$; V`&! dcfh'E G: D) * `5XUdhYf`Zcf` < D9	A HS\$\$\$\$\$\$('+
D\$*%)(!6&%	<pre>CD9 =bZ]b]6UbX &lt; 8F#9h\YfbYh&amp;\$\$; V % dcfhE G: D) * D7 =Y' I %* A 7L*) ' %\$) 5! &lt; 85H 5XUdhYf</pre>	<d9\$\$\$\$\$\$\$ (<="" td=""></d9\$\$\$\$\$\$\$>
D\$* &) \$! 6&%	<d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh'%\$\$; %\$)="" %*="" '="" *="" *)="" 5!="" 7l="" 975h<br="" `a="" `d7="Y'" `i="" v`%idcfh'eg:d)="">5XUdhYf</d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh'%\$\$;>	< D9\$\$\$\$\$\$\$ )
D\$* &) % 6&%	<d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$; %\$*="" %*="" '="" *="" *)="" 5!="" 7l="" 975h<br="" `a="" `d7="Y'" `i="" v`&!dcfh'eg:d)="">5XUdhYf</d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$;>	< D9\$\$\$\$\$\$\$ * *
D&' **(!6&%	<pre>CD9 =bZ]b]6UbX &lt; 8F#9h\YfbYh&amp;\$\$; V % dcfhEG: D) * D7=Y( I %* A 7L*) ' %\$) 5! &lt; 85H 5XUdhYf</pre>	A HS\$\$\$\$\$\$()%
D&' **)!6&%	<d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$; %\$)="" %*`a="" *="" 5!975h<br="" 7l*)'="" `d7="Y(`I" v`%\dcfheg:d)="">5XUdhYf</d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$;>	A HS\$\$\$\$\$\$() &
D&' ***!6&%	<d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$; %\$*="" %*="" '="" *="" *)="" 5!="" 7l="" 975h<br="" `a="" `d7="Y(`I" d)="" g:="" v`&!dcfh'e="">5XUdhYf</d9`=bz]b]6ubx`<8f%\$\$#9h\yfbyh%\$\$;>	A HS\$\$\$\$\$\$()'
D%\$% \$!6&%	A Y``Ubcl `A 7L * &' %\$) 5G! J 85H 9h\ YfbYh &\$\$; V `% dcfh E G: D) * `5XUdhYf Zcf < D9	A HS\$\$\$\$\$\$(')
D' %&( *!6&%	< D9 '9h\ YfbYh'%\$\$; V'%  dcfh'E G: D&, 'D7=Y' 'I %* 'A 7L) %) 5! 775H'5XUdhYf	A HS\$\$\$\$\$\$) - %
D' % &' !6&%	<d9`=bz[b]6ubx`<8f#9h\yfbyh'&\$\$; %*="" *="" `a7l*)'(')5!<85="&lt;br" `c7d'="" `d7="Y(`I" v`%idcfh'eg:d)="">5XUdhYf</d9`=bz[b]6ubx`<8f#9h\yfbyh'&\$\$;>	A HS\$\$\$\$\$\$) - &
D' % (,!6&%	<pre><d9`=bz[b]6ubx`<8f#9h\yfbyh&\$\$; %*="" '="" ('="" *="" *5!="" <85="&lt;br" `a7l*)="" `c7d'="" `d7="Y(" `i="" d)="" dcfh'e="" g:="" v`&!="">5XUdhYf</d9`=bz[b]6ubx`<8f#9h\yfbyh&\$\$;></pre>	A HS\$\$\$\$\$\$) - '
D' % &(!6&%	<pre>CD9 =bZ]b]6UbX &lt; 8F#9h\YfbYh&amp;\$\$; V &amp;! dcfhEG: D) * D7=Y( I %* A 7L*) ' %\$*5! &lt; 85H 5XUdhYf</pre>	A HS\$\$\$\$\$\$) - (
D( &\$( %! 6&%	A Y``Ubcl `A 7L *' %(' &5G! 585= 9h\ YfbYh %\$#&); V &! dcfh'G: D&, `C7D' 5XUdhYf Zcf < D9	A HS\$\$\$\$\$\$))%
D( &\$( (!6&%	A Y``Ubcl `A 7L * ' % \$ & 5G! 58 5H 9h\ YfbYh \$ #&); V & ! dcfh G: D&, `5XUdhYf Zcf < D9	A HS\$\$\$\$\$\$) +)
D*)'''!6&%	<d9`=bz]b]6ubx`b8f&\$\$#9h\yfbyh`&\$\$; %\$*="" %*="" 57!="" 5xudhyf<="" 7l+))="" 95h="" <="" `a="" `i="" d%%&`d7="Y)" dcfh'e="" g:="" td="" v9`&!=""><td>A HS\$\$\$\$\$\$%\$,</td></d9`=bz]b]6ubx`b8f&\$\$#9h\yfbyh`&\$\$;>	A HS\$\$\$\$\$\$%\$,
D()*(&!6&&	<pre>CD9 =bZJb]6UbX B8F &amp;\$\$#9h\YfbYh &amp;\$\$; V % dcfh CG: D D7=Y) I %* A 7L+) ' %\$55G! &lt; 95H 5XUdhYf</pre>	A HS\$\$\$\$\$\$%%%-
D()*(%16&'	<pre>&lt; D9 =bZ]b]6UbX B8F#9h\YfbYh(\$\$; V % dcfhCG: D D7=Y) I %* A 7L +) ' %\$55G! B95H 5XUdhYf</pre>	A HS\$\$\$\$\$\$

### 8f]j Yf '! 'GhcfU[ Y '7cbhfc "Yf

Hcd

<D9`AF(%\*]!dz`AF(%\*]!cz`AF&\*\*]!cz`AF&\*\*]!cz`AF&\*\*]!d; Yb%\$D'UbX; Yb%%Wtbhfc``Yf`ff\*(!V]ht:8f]j Yf`Zcf`j Gd\YfY`+"\$
J Yfg]cb. `&\$&("%\$"\$%'**fF YWta a YbXYXt**:]'YbUa Y. `Wd\$\*\$,)\$"Wta dg][ / `Wd\$\*\$,)\$"n]d

### <u>: ]I Yg</u>

• :]I `Ub`]ggi Y`h\Uh`Wcbhfc``Yf`a Umghi W\_`]b`Vcch`ghUhY`UbX`Wui gY`i bYI dYWhYX`Wcbhfc``Yf`fYgYhk\Yb`h\YfY`]g`C7F`flcb`]bY`Wcbhfc``Yf`fYgYhL''`C7F`VWb`\UddYb`k\Yb`Xc]b[`cb`]bY`Z]fa k UfY`i dXUhY''

### 9b\UbWa Ybhg

BYk fY YUgY Zcf j Yfg]cb +"+&, "\$&"\$\$"

< D9`Dfc@JUbh'; Yb%\$`Ga Ufh'5ffUm'UbX'; Yb%\$`D'i g'UbX'; Yb%%`Ga Ufh'F 5=8`7cbhfc``Yf`8f]j Yf`Zcf`J A k UfY'j Gd\YfY`+"\$`fBf]j Yf`7ca dcbYbhŁ"
J Yfg]cb. `&\$&( "%\$"\$%'**fF YWta a YbXYXŁ**: ]`YbUa Y. 'Wd\$) - ) \$%'Wta dg][ / 'Wd\$) - ) \$%''n]d

### =a dcfhUbh BchY°

- 5VM U 9GL] J Yfg]cb ]g +\$"(\*+&"\$"%\$(

### : ]I Yg

- $\bullet : ] I \ YX`Ub`] ggi \ Y`k \ YfY`U`DGC 8`c \\ VVV \ ffYX`Xi \ f] b[ \ `UffUmXY`YhY`cdYfUh] cbg''$
- •: ]I YX Ub ]ggi Y k \YfY ZU]YX `c[]WW j c`i a Yg`hU\_Y hcc `cb[ hc VY fYa cj YX Uh h\Y CG `Yj Y "
- :]I YX`Ub`]ggi Y`k \YfY`BJ A Y`Xf]j Yg`k YfY`bch`X]gWtj YfYX`UZhYf`\ch!d`i [ `cdYfUh]cb"
- 。:]IYX`U`dchYbh]U``XUhU``cgg`f]g\_ Zcf`Ga Ufh7UW\Y`@c[]WU``8f]j Yg`WbZ][ifYX`]b`K f]hY6UW\_a cXY`Xif]b[`g\ihXck b"

:]fakUfY!BYHkcf\_

#### =a dcfhUbhBchY°

- : cf: ]fa k UfY ]bqhU``Uh]cbž'h\YfY ]q bc CG UbX Xf]j Yfq XYdYbXYbWh'
- :cf:]fakUfY:WtadUh]V]:]hmXif]b[ˈdfcXiVM]cbž<Ď9`fYWtaaYbXg'h\YXf]jYfg'ZcfigYk]h\ h\YZ]fakUfY`DUW\_U[Y'dfcXiVM;Ug'VY`ckž
  - 6fcUXWta BYhLhfYa Y! 9 8f]j Yf Zcf A ]WfcgcZh K ]bXck g GYfj Yfz j Yfg]cb &' %"\$"%) , "\$ cf ``UhYf
  - < D9 6fcUXWta BYhLhfYa Y! 9 8f]j Yfg Zcf @|bi | z j Yfg|cb "%\$" ! &' %"\$"% &"\$ cf ``UhYf</p>
  - < D9'6fcUXWta 'BYhLhfYa Y!9'8f]j Yfg'Zcf'JAk UfYž'j Yfg]cb'&\$&( "%&"\$\$'cf''UhYf</p>

#### : ]I Yg

- H\]g`dfcXiVM`UXXfYggYg`]ggiY`UVcih`=DJ`Ub`giddcfh'
- H\]g'dfcXi Wh'Z|l Yg'Ub']ggi Y'k\YfY'h\Y'HfUbgWY]j Yf'HYa dYfUhi fY']g'Ub YffcbYci g'i b]hj U'i Y"
- H\]g dfcXi Wh'UXXfYggYg hc YI dcg]b[ A 7HD X]gWcj Yfmh\fci [\ B=77@=i h]]hm'
- H\]g'dfcXi V\[KZ]I Yg'Ub']ggi Y'k\YfY'a ]gg]b['gi ddcfh\[YX'gd\[YYX']g'g\[YYb'\]Zcf'UXUdh\[Yf'']
- H\]gdfcXiWhz]IYgUb]ggiYk\YfYYh\hcc`g\ckgkfcb[acXiYhmdYk\YbUdcfh]g]bUWfhJ]bVfYU\_cihacXY"
- H\]g dfcXi VMz]l Yg Ub ]ggi Y k \YfY h\Y a ]gg]b[ gi ddcfhYX gdYYX ]g gYYb Zcf h\Y UXUdhYf ]b F89 FYXZ]g\"
- H\]g'dfcXi VMrZJI Yg'Ub']ggi Y`k\YfY`Ub']bVbfffYVMrj U'i Y`]g'g\ck b'Zcf'G: D": ]VYf7cbbYVMjcbHmdY`dfcdYfhmk\Yb'hfUbgWr]j Yfg'UfY VbbbYVMrX`]b'F89'FYXZJg\"
- H\]g'dfcXi VM'ZJI Yg'Ub']ggi Y'k\YfY'GmghYa 8YgWf]dh]cb'a ]gg]b['h\Y'W\UfUVMYf'UbX']bUddfcdf]UhY'>GCB'Zcfa Uh'X]gd'Um]b['i bXYfdcfh'gV\Ya U']b'F89'FYXZJg\"
- H\]g dfcXi WhUXXfYggYg hc fYa cj Y gi ddcfh A UbU[ Ya YbhJ `Ub=X dfcdYfhm Zcf h\Y F89 FYXZ]g\"

### 9b\UbWa Ybhg

- H\]q dfcXi VMYb\UbWYqB7!G= |a dYa YbHJh|cb Zcfa i `h|d`Y d\mq]VW` a YX|i a q"
- H\]g'dfcXi Wh'Yb\UbWrg'Z]fa k UfY'XYVi [ 'hfUWr']a dfcj Ya Ybh'
- $\bullet \quad \text{H\)} \\ \text{g dfcXi WhYb\UbW} \\ \text{g hc UXX a cfY XYVi [ XUhU hc WcfYXi a d" } \\$
- H\]g'dfcXi Wh'Yb\UbWrg'hc']bWfYUgY fYgci fWr'hc'\UbX'Y'h\Y'B7!G='Wta a UbXg'WtbW'ffYbh'm'
- H\]g dfcXi WhYb\UbWrg hc gYh@@8D8]gUV`Y fYei Ygh]Z876L ]g YbUV`YX"
- H\]g'dfcXi Wh'Yb\UbWfg'a i `h]d`Y `cgg`Ygg'hfUZZJWWUggYg'gi ddcfh'
- H\]g dfcXi WhYb\UbWg hc UXX GmghYa 8YgWl]dh]cb gi ddcfh Zcf h\Y F89 FYXZ]g\ DcfhgW\Ya U"

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g dfcXi VM gi ddcfhg h\Y Zc ``ck ]b[ bYhk cf\_ UXUdhYfg.

- < D9 9h\YfbYh %\$; V &! dcfh G: DŽ 67A) +( % 5XUdhYf
- < D9 9h\YfbYh%; V &! dcfhG: DŽ 67A) +( & C7D' 5XUdhYf</li>
- < D9 9h\YfbYh %; V &! dcfh 6UgYH 67A) +( %\* 5XUdhYf</li>
- < D9 9h\YfbYh%; V &! dcfh 6UgYH 67A) + (%\* C7D' 5XUdhYf
  </p>
- < D9 9h\YfbYh %\$#&); V &! dcfhG: D&, 67A) +( %( 5XUdhYf)
  </p>
- < D9 9h\YfbYh'%\$#&); V &! dcfh'G: D&, 67A) +(%( C7D' 5XUdhYf</li>

6fcUXWta: ]fa k UfY DUWU[Y Zcf 67A) +) \$1 UXUdhYfg

J Yfg]cb. &' %"%"%\* &"% **fF YWta a YbXYXŁ** : ]YbUa Y. VWa &' %"%"\* &"%SH\cf"di d"**Z**k d\_[

#### =a dcfhUbhBchY°

: cf : ]fa k UfY ]bghU``Uh]cbž'h\YfY ]g'bc'CG'UbX'Xf]j Yfg'XYdYbXYbWh'

:cf:]fakUfYWoradUh]V]`]hmXif]b[ˈdfcXiWh]cbž<D9ˈfYWoraaYbXg'h\YXf]jYfgZcfigYk]h\h\YZ]fakUfYDUW\_U[YdfcXiWh]cbž<D9ˈfYWoraaYbXg'h\YXf]jYfgZcfigYk]h\h\YZ]fakUfYDUW\_U[YdfcXiWh]ugVY`ckž

- 6fcUXWta 'BYhLhfYa Y! 9 8f]j Yfr Zcf 'A ]WfcgcZh K ]bXck g 'GYfj Yfz'j Yfg]cb '&' %"\$"%) , "\$ cf ``UhYf
- < D9 6fcUXWca BYHL hfYa Y! 9 8f]j Yfg Zcf @bi I z j Yfg]cb "%\$" ! &' %"\$"% &"\$ cf \UhYf
- < D9 6fcUXWta 'BYhLhfYa Y! 9 8f]j Yfg'Zcf' J A k UfYž'j Yfg]cb &\$&( "%&"\$\$ cf``UhYf</li>

### : ]I Yg

- H\]g'dfcXi Wh'Z|l Yg'Ub']ggi Y'k\Yb'A 57 "ccdVUW\_]g'YbUV'YXz'h\Y'Z|fa k UfY'fZU\_Yg'ci hfih\Y'`]b\_'ghUhi g'hc'h\Y'\cgh"
- H\]g'dfcXi VMrZ|l Yg'Ub']ggi Y`k\YfY`Ub']bWcffYVMrj U'i Y`]g'g\ck b'Zcf'G: D": ]VYf7cbbYVMjcbHmdY'dfcdYfhmk\Yb'hfUbgWr]j Yfg'UfY WcbbYVMYX`]b'F89'FYXZ|g\"
- H\]g'dfcXi VM'UXXfYggYg'hc'fYa cj Y'gi ddcfh'A UbU[Ya Ybh]`Ub=X'dfcdYfhmZcf'h\Y'F89'FYXZ]g\"

### 9b\UbWa Ybhg

H\]g dfcXi WhYb\UbWrg hc UXX GmghYa 8YgWf]dh]cb gi ddcfh Zcf h\Y F89 FYXZJg\ Dcfh gW\Ya U"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

- 6fcUXVca 67A)+)\$( 9h\YfbYh%\$#&); V (!dcfh'G: D&, 5XUdhYf Zcf < D9
- 6fcUXWta 67A)+)\$( 9h\YfbYh%\$#&); V (!dcfhG: D&, C7D' 5XUdhYf Zcf < D9'</li>

6fcUXWta 'BL%Cb']bY': ]fa k UfY'l d[ fUXY'l h]`]lm'Zcf'JAk UfY J Yfq]cb. '%'( \$"\$ '**fF YWt**a **a YbXYXŁ** 

:]YbUa Y. 7D\$\*' \* %\* "Wta dg][ / 7D\$\*' \* %\* "n]d

#### =a dcfHUbhBcHY°

H\]g'qcZrkUfY'dUWU[Y'WtbhJ]bq'WtaVc']aU[Y'j&\$"' %"(%k]h\ h\Y'Zc``ck]b['Z]fakUfY'jYfq]cbq.

B =7	6cch7cXY'J Yfg]cb	DL 9'J Yfg]cb	B7G='J Yfg]cb	I 9: ='J Yfg]cb
67A ) +% % V9 (d 65G9! H 5Xdhf	%") +	&%"* "(	%") ") )	&%"* ", )
67A ) +% % V9 (d 65G9! H C 7D 5Xdhf	%") +	&%"* "(	%") ") )	&%"* ", )
67A ) +% % V9 (d 65G9! H @CA 5Xdhf	%") +	&%"* "(	%") ") )	&%"* ", )
67A ) +&\$ % V9 &d 65G9! H @CA 5Xdhf	%"( '	&%"* "(	%") ") )	&%"* ", )

### DfYfYei ]g]hYg

H\]g'dfcXiVMfYei]fYg'h\Y'Uddfcdf]UhY'Xf]jYf'Zcf'mcif'XYj]Wf'UbX'cdYfUh]b['gmghYa'hc'VY']bghU``YX'VYZcfY'h\Y'Z]fakUfY']g'idXUhYX"

### : ]I Yg

- H\]g'dfcXi VM'Zll Yg'Ub']ggi Y'k\YfY'U'Xi a a mGYf]U'Bi a VYf']g'gYYb']a a YX]UhY`mUZhYf'i dXUhY'h\Y'UXUdhYf'Zlfa k UfY'hc'j Yfg]cb
   \*" \$'fcf'YUf']YfŁ"

### 9b\UbWa Ybhgi

 $H\ [g'dfcXi\ VViYb\ Ub\ VVg']\ VZk\ i\ d[\ hc'] a\ dfcj\ Y'BJF5A' VVcbZj[i\ fUh]cb'i\ dXUhYg''$ 

#### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

- 6fcUXWta 67A) +&\$ 9h\YfbYh% V &! dcfh 65G9! H @CA 5XUdhYf Zcf < D9
- 6fcUXWta 67A) +% 9h\YfbYh% V (!dcfh6UgY!H5XUdhYfZcf < D9)
- 6fcUXVca 67A)+% 9h\YfbYh% V(!dcfh6UgY!HC7D 5XUdhYfZcf<D9
- 6fcUXWta 67A) +% 9h\YfbYh% V (!dcfh6UgY!H@CA 5XUdhYfZcf < D9

< D9 6fcUXWta 'BYhLhfYa Y! 9 Cb`]bY : ]fa k UfY I d[ fUXY I h]`]rmZcf J A k UfY
J Yfg]cb. '&&\* "%"%+ "\$ fF YWta a YbXYXL
: ]YbUa Y. '7 D\$\* &%( ' "Wta dg][ / 7 D\$\* &%( ' "n]d</pre>

### =a dcfhUbhBchY°

< D9 fYWta a YbXg HPE Broadcom NetXtreme-E Drivers for VMwarez j Yfg]cbg &\$&' "\$- "\$\$ cf "UhYfz Zcf i gY k ]h\ h\]g Z[fa k UfY"

 $H\ ]g\ gc\ Z^{h}k\ UfY\ dUW\underline{U}[\ Y\ WcbhU]bg\ BJ\ A\ =a\ U[\ Y\ j\ Yfg]cb\ \&\&^*\ "\%"\%+\$\$\$" k\ ]h\ 'h\ Y\ 'Zc\ ``ck\ ]b[\ 'Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

B=7	6cc <b>h/t</b> XY J Yfg]cb	B7G= J Yfg]cb	A 65 J Yfg]cb	I 9: = J Yfg]cb	F c 79 J Yfg]cb
<pre><d9 %(="" &!="" '5xudhyf<="" 'c7d'="" +(="" 67a)="" 9h\yfbyh'%\$#&);="" d&,="" dcfh'g:="" pre="" v=""></d9></pre>					
<pre><d9 +(%('5xudhyf')<="" 67a)="" 9h\yfbyh'\\$#&);="" d&,="" pre="" v'&!dcfh'g:=""></d9></pre>					
<pre> &lt; D9 '9h\ YfbYh'%\$; V' &amp;! dcfh 6UgYH' 67A ) +( %*  </pre>					

<d9'9h\yfbyh'%\$; +(%*<br="" dcfh'6ugyh'67a)="" v'&!="">5XUdhYf</d9'9h\yfbyh'%\$;>	&&* "\$"%( ) "\$	&&* "\$"%( ) "\$	&&* "\$"% ) "\$	&&* "\$"%' ) "\$	  -&&* "\$"%( ) "\$
<pre><d9 &!="" +(%&<br="" 67a)="" 9h\yfbyh%;="" dcfhg:="" dž="" v="">C7D 5XUdhYf</d9></pre>	αα \$ /0( ) \$				
< D9 '9h\YfbYh'%\$; V &! dcfhG: DŽ '67A) +( \& 5XUdhYf					
<pre><d9'9h\yfbyh'%\$#&); \$('5xudhyf<="" +)="" 67a)="" d&,="" pre="" v'(!dcfh'g:=""></d9'9h\yfbyh'%\$#&);></pre>					
<pre><d9 \$(="" '5xudhyf<="" 'c7d'="" (!dcfhg:="" +)="" 67a)="" 9h\yfbyh%\$#&);="" d&,="" pre="" v=""></d9></pre>					

### DfYfYei ]g]hYg

H\]grdfcXiVMrfYei]fYgrh\YrUddfcdf]UHYXf]jYfrZcfmcifXYj]WYrUbXrcdYfUh]b[rgmghYarVY]bghU``YXrVYZcfYrZ]fakUfY]gridXUhYX''

#### : ]I Yg

- H\]g'dfcXi Wh'UXXfYggYX XYj ]W'`cgh'gma dhca 'UZhYf Wtbh]bi ci g'mi b[fUW'Zi `fYghUfh'cb 67A) +(% 'C7D' 'UXUdhYf"
- H\]gdfcXiVMUXXfYggYXgcaYF89dUhYfbZcfaUhZcfgcaY@8DdfcdYfh]Yg"
- H\]g dfcXi VM UXXfYggYX bYk a YVX Ub]ga Zcf `cUX]b[ ZUVMcfmXYZUi `H'

### 9b\UbWa Ybhg

- H\]g'dfcXi Wh'Yb\UbWYX'h\Y'XYj ]WY'gY`Z!X]U[ bcgh]Wa Uhf]I 'UbX'A 57 j Yf]Z]WUh]cb"
- H\]g'dfcXi WhYb\Ub\WYX'h\Y'`]b\_!gdYYX'VW\W\`Uh]cb'Zcf']bhYfbU`'j Uf]UV`Y"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

- < D9 9h\YfbYh % #&); V &! dcfh'G: D&, 67A) +( %( C7D' 5XUdhYf
- < D9 9h\YfbYh%; V &! dcfh6UgYH 67A) +(%\* 5XUdhYf
- < D9 9h\ YfbYh %\$; V &! dcfh 6UqYH 67A) +( %\* C7D' 5XUdhYf</li>
- < D9 9h\YfbYh%; V &! dcfhG: DŽ 67A) +( % 5XUdhYf</li>
- < D9 9h\YfbYh%\$; V &! dcfhG: DŽ 67A) +( % C7D' 5XUdhYf
- < D9 9h\YfbYh %#&); V &! dcfh G: D&, 67A) +(%(5XUdhYf
- 6fcUXWta 67A)+)\$( 9h\YfbYh%\$#&); V(!dcfhG: D&, 5XUdhYf Zcf < D9
- 6fcUXVta 67A)+)\$( 9h\YfbYh%\$#&); V (!dcfhG: D&, C7D' 5XUdhYf Zcf < D9

⇒bHY`:]fa k UfY DUW\_U[Y: cf 9, %\$! &7E 85& 9h\YfbYh%\$\$; V &! dcfh E G: D&, 5XUdhYf J Yfg]cb. ( "\* \$ fF YWta a YbXYXŁ

: ] YbUa Y. ' < D9S9, %\$S&7E 85&SCSG97S( d\* \$SD@8A cA 7HDS, \$\$%9, 6\* "7k d\_[

### =a dcfhUbh BchY°

 $: cf : ]fa \ k \ UfY \ ]bghU``Uh]cbž'h \ YfY \ ]g'bc \ CG \ UbX \ Xf]j \ Yfg \ XYdYbXYbWh''$ 

 $: cf': ]fa\ k\ UfY'We^{\bar{a}}\ dUh]V]^]hmXi\ f]b[\ 'dfcXi\ Wh]cb\bar{z}' < D9'fYWe^{\bar{a}}\ a\ YbXg'h\ Y'Xf]j\ Yfg'Zcf'i\ gY'k\ ]h\ 'h\ Y'Z]fa\ k\ UfY'DUW_U[\ Y'dfcXi\ Wh'Ug'VY`ck\ \bar{z}'] + (1-1)^2 (1-$ 

- `=bhY``]WYU'8f]jYf'Zcf'A]WfcgcZh'K]bXckg'GYfjYfž'jYfg]cb'%"%)"%&%"\$`cf``UhYf
- ʻ⊫bhY``]WY`8f]jYfgʻZcfʻ@]bilžjYfg]cbʻ%"%)"(!%`cf``UhYf
- =bhY`]WYb`8f]jYf'Zcf'JAkUfYžjYfg]cb`&\$&("%;"\$\$`cf``UhYf

 $H\ ]g:K\ j\ Yfg]cb\ XcYg\ bchgi\ ddcfh\ Dcfh''F\ YgYh\ F\ 89\ a\ Yhf]Wg'''\ H\ ]g\ dfcXi\ Whik\ ]```VY'Yb\ Ub\ W'\ hc\ ]a\ dfcj\ Y'h\ Y'\ Z\ b\ Wh]cbg'\ ]b'\ h\ Y'\ Z\ hi\ fY$ fY`YUgY

### 9b\UbWa Ybhg

- H\]g dfcXi WhYb\UbWYX h\Y Wta dUh]V]]hmk]h\]WYU Xf]j Yf"
- H\YfY`UfY``]a ]hUh]cbg`k ]h\ h\YgY`dfcXi Wfg`]b`j Yfg]cb`("\*"`fl\_bck b`]ggi YŁ =Zmci YbUV`Yh\Y`ffifUbga ]h'VU`UbW]b[fiZYUhi fY`]bh\Y`<=a Ybi z`mci a UmgYYh\Y`Zc``ck ]b[ @]bi I Xa Yg[ ``c[ . f88D`dUW\_U[Y XcYgʻbchgiddcfhh\Yʻhfubga]hVuʻubWjb[ʻZYuhifYžfik\Ybʻfibb]b[ʻk]h\ʻ]bWcadUh]VYʻ≟WrXf]jYfʻfYj]g]cbgžgiWkʻUgʻ]Wfʻj%")"(ž k \ ]W\ 'W\b'``YUX'\c'U``]b\_'Z\J]`i fY"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi VW gi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

• =bHY`9, %\$! &7E 85& 9h\ YfbYh'%\$\$; V &! dcfh'E G: D&, 5XUdhYf Zcf < D9

J Yfg]cb. ("\* \$ fF YVta a YbXYXŁ

: ]`YbUa Y. '<D9S9, %\$S7E 85&S(d\*\$SD@8A cA 7HDS, \$\$%9, 6%'Zk d\_[

#### =a dcfhUbh BchY°

: cf: ]fa k UfY:]bghU``Uh]cbž'h\YfY:]g'bc'CG'UbX'Xf]j Yfg'XYdYbXYbWh'

:cf:]fakUfY`WofadUh]V]`]hmXif]b[`dfcXiWh]cbž< Ď9`fYWofaaYbXg'h\Y`Xf]jYfg`Zcf`igY`k]h\`h\Y`Z]fakUfY`DUW\_U[Y`dfcXiWh]cbž< Ď9`fYWofaaYbXg'h\Y`Xf]jYfg`Zcf`igY`k]h\`h\Y`Z]fakUfY`DUW\_U[Y`dfcXiWh]cbž< Ö9`fYWofaaYbXg'h\Y`Xf]j

- "=bhY``]WYU'8f]j Yf'Zcf'A]WYcgcZhK]bXckg'GYfj Yfž'j Yfg]cb'%''%) "%&%"\$'cf``UhYf
- =bhY`]WY 8f]j Yfg Zcf @]bi I ž j Yfg]cb %"%) "(!%cf `UhYf
- =bhY``]WYb'8f]jYfZcfJAkUfYžjYfg]cb'&\$&("%%"\$\$`cf``UhYf

### 9b\UbWa Ybhg

- H\]gdfcXiWhYb\UbWYXh\YWcadUh]V]`]hmk]h\`]WYUXf]jYf"
- H\YfY\UfY\`]a ]hUh]cbg\k]h\\h\YgY\dfcXi\Wfg\]b\j\Yfg]cb\(\text{\formalform}\tex

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

• =bhY 9, %! 7E 85& 9h\YfbYh %\$; V &! dcfh E G: D&, 5XUdhYf Zcf < D9

=bh/``: ]fa k UfY`DUW\_U[Y`: cf'9, %\$! 7E 85&'9h\YfbYh'%\$\$; V'&! dcfh'E G: D&, 'C7D' '5XUdhYf J Yfg]cb. '("\* \$'**fF YW**a a **YbXYX**Ł

: ]YbUa Y. < D9S9, %\$S7E 85&SC7DS(d\*\$SB7G→ D@8A cA 7HDS, \$\$%9, 6) "Zk d\_[

### =a dcfhUbh BchY°

: cf : ]fa k UfY ]bqhJ``Uh]cbž h\YfY ]q bc CG UbX Xf]j Yfq XYdYbXYbWh'

:cf`:]fakUfY`WoadUh]V]`]hmXif]b[`dfcXiWh]cbž< D9`fYWoaaYbXg'h\Y`Xf]jYfg`Zcf`igY`k]h\`h\Y`Z]fakUfY`DUW\_U[Y`dfcXiWh`ug`VY`ckž

- 。 ∷=bhY`]WYU`8f]jYfZcf`A]WfcgcZhK]bXckg`GYfjYfž'jYfg]cb`%"%)"%&%"\$`cf``UhYf
- =bhY`]WY8f]jYfgZcf@]bilžjYfg]cb%"%)"(!%cf`UhYf
- '=bhY``]\\b 8f]j Yf \\Zcf\J A k UfY\`z j Yfg]cb \&\\$\&( "\\%\"\\$\"\cf\`\Uh\Yf

H\]g: K 'j Yfg]cb'XcYg'bch'gi ddcfh'Dcfh'FYgYh'F89'a Yhf]Wg"'H\]g'dfcXi Wh'k]``VY'Yb\UbW'hc']a dfcj Y'h\Y'Z bWh]cbg']b'h\Y'Z hi fYfYUqY

### 9b\UbWa Ybhg

- H\]g'dfcXi Wh'Yb\UbW'X`h\Y`Wta dUh]V]`]hmk]h\`]W'U`Xf]j Yf"
- H\YfY'\UfY'\]a ]h\Uh]cbg'k ]h\\h\YgY'dfcXi Whg']b'j Yfg]cb'("\*"'fl\_bck b']ggi YŁ =Z'mci 'YbUV'Y'h\Y'flifUbga ]h'VU'UbW]b[ fiZYUhi fY']b'h\Y'<='a Ybi ž'mci 'a UmgYY'h\Y'Zc``ck ]b[ '@]bi I 'Xa Yg[ '`c[ . 'f88D'dUW\_U[Y XcYg'bch'gi ddcfh'h\Y'hfUbga ]h'VU'UbW]b[ 'ZYUhi fYžfik\Yb'fi bb]b[ 'k ]h\']bWta dUh]V'Y'=\W'Xf]j Yf'fYj ]g]cbgž'gi W\'Ug']\W'j %"%) "(žk\]W\'V\Ub'`YUX'hc'U']b\_ 'ZU]'i fY"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g'dfcXi Whgi ddcfhg h\Y'Zc``ck]b[ bYhk cf\_ UXUdhYfg.

• =bHY`9, %\$!7E85&9h\YfbYh'%\$\$; V`&!dcfh'EG:D&, C7D' 5XUdhYf Zcf < D9

⇒bhY`:]fa k UfY`DUW\_U[Y: cf'9, %\$!LLJ85&'9h\YfbYh'%\$#&); V'&!dcfh'G: D&, '5XUdhYf J Yfg]cb. ("\*\$'**fF YW£a a YbXYXŁ** :]'YbUa Y. '<D9S9, %\$SLLJ85&SG8S(d\*\$SD@8A cA 7 HDS, \$\$%9, 6' "Zk d\_[

#### =a dcfhUbhBchY

: cf::]fa k UfY:]bghU``Uh]cbž'h\YfY']g'bc'CG'UbX'Xf]j Yfg'XYdYbXYbWh'

:cf: ˈʃfa k UfY ˈWea dUh[V] ˈ]hm Xi f]b j dfcXi Wh[cbz < D9 fYWea a Yb Xg h\ Y Xf] j Yfq Zcf i gY k ]h\ h\ Y Z]fa k UfY DUW U[Y dfcXi Wh]ug VY ck ž

- =bhY`]WYU'8f]j Yf Zcf A ]WfcgcZh K ]bXck g GYfj Yfz j Yfg]cb %"%) "%%%"\$ cf `UhYf
- "=bhY``]WY`8f]j Yfg`Zcf`@]bilžj Yfg]cb`%"%) "(!%cf``UhYf
- =bhY`]Wfb 8f]j Yf Zcf J A k UfYž j Yfg]cb &\$&( "%"\$\$ cf `UhYf

 $\label{eq:hamiltonian} $H^{g}: K _{j} Yfg]cb_{X}cYg_{b}h_{G} ddcfh_{D}cfh_{F}YgYh_{F}89_{a} Yhf_{W}_{b}^{m}H_{g}dfcXi Whk_{j}^{m}VY_{b}\\UbW_{h}^{m}h_{G}_{a} dfcj Y_{h}Y_{a} bW_{h}^{m}cbg_{j}h_{Y}Y_{a} h_{f}Y_{b}Y_{b}^{m}H_{g}^$ 

### 9b\UbWa Ybhg

- H\]g'dfcXi Wh'Yb\UbWYX'h\Y'Wta dUh]V]`]hmik ]h\`]WYU'Xf]j Yf"
- H\YfY``UfY``]a ]hUh]cbg`k ]h\`h\YgY`dfcXi Whg`]b`j Yfg]cb`("\*"`fl\_bck b`]ggi YŁ
  =Z`mci `YbUV`Y`h\Y`fhfUbga ]h`VU`UbW]b[ fiZYUhi fY`]b`h\Y`<=a Ybi ž`mci `a UmgYY`h\Y`Zc``ck ]b[`@]bi I `Xa Yg[ ``c[. `f88D`dUW\_U[Y XcYg`bch`gi ddcfh`h\Y`hfUbga ]h`VU`UbW]b[ `ZYUhi fYžfik\Yb`fi bb]b[ `k ]h\`]bWta dUh]V`Y`=WY`Xf]j Yf`fYj ]g]cbgž`gi W\`Ug`]WY`j %"%) "(žk\]W\`WUb``YUX`hc`U``]b\_`ZU]`i fY"</p>

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g'dfcXi VMigi ddcfhg'h\Y'Zc``ck]b[ 'bYhk cf\_'UXUdhYfg.

• =bHY`9, %\$!LLJ85&9h\YfbYh%\$#&); V &! dcfh'G: D&, 5XUdhYf Zcf < D9

=bhY``: ]fa k UfY`DUW\_U[Y`: cf`9, %\$!LLJ85&`9h\YfbYh'%\$#&); V`&!dcfh`G: D&, `C7D' `5XUdhYf J Yfg]cb. `("\*\$`**fF YWa a YbXYXŁ** : ]'YbUa Y. '<D9S9, %\$SLLJ85&SG8SC7DS(d\*\$SB7G=k D@8 A cA 7HDS, \$\$%9, 6\$"Zk d\_[

### =a dcfhUbh BchY

: cf : ]fa k UfY ]bghU``Uh]cbž'h\YfY ]g'bc CG UbX Xf]j Yfg'XYdYbXYbWh'

:cf: ˈʃfa k UfY ˈWta dUh]V] ˈ]hm Xi f]b [ dfcXi Wh]cbž < D9 fYWta a Yb Xg h\ Y Xf]j Yfg Zcf i gY k ]h\ h\ Y Z]fa k UfY DUW\_U[Y dfcXi Wh]ug VY ck ž

- =bHY``]WYU`8f]j Yf`Zcf`A]WfcgcZhK]bXckg`GYfj Yfž`j Yfg]cb`%''%) "\&\"\$ cf``UhYf
- =bhY`]WY8f]j Yfg Zcf@]bilžj Yfg]cb%"%) "(!%cf``UhYf
- =bhY``]WYb'8f]j Yf`Zcf'JAk UfYž'j Yfg]cb'&\$&( "%;"\$\$'cf``UhYf

 $H\ ]g': K\ 'j\ Yfg]cb'XcYg'bch'gi\ ddcfh'Dcfh'FYgYh'F89'a\ Yhf]Wg'''H\ ]g'dfcXi\ Wh'k\ ]```VY'Yb\ Ub\W''hc']a\ dfcj\ Y'h\ Y'\ Z \ b\ Wh]cbg']b'h\ Y'\ Z \ hi\ fY fY'YUqY$ 

### 9b\UbWa Ybhg

- H\]g'dfcXi Wh'Yb\UbWYX h\Y'Wca dUh]V]`]hmk ]h\ `]WYU'Xf]j Yf"

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g'dfcXi VMgi ddcfhg'h\Y'Zc``ck ]b[ 'bYhk cf\_'UXUdhYfg.

=bHY`9, %\$!LLJ85&'9h\YfbYh'%\$#&); V &! dcfh'G: D&, 'C7D' '5XUdhYf'Zcf' < D9</li>

=bH': ]fa k UfY DUW\_U[Y: cf'9, %\$!LLJ 85( '9h\YfbYh'%\$#&); V'(!dcfh'G: D&, '5XUdhYf J Yfg]cb. ("\*\$ 'fF YV&a a YbXYX\!: ]YbUa Y. '< D9S9, %\$SLLJ 85(S: <S( d\* \$SD@8 A cA 7 HDS, \$\$%9, 6&"Zk d\_[

### =a dcfhUbh BchY

: cf : ]fa k UfY ]bghU``Uh]cbž'h\YfY ]g'bc CG UbX Xf]j Yfg'XYdYbXYbWh'

cf: ]fakUfY:WtadUh]V]`]hmXif]b['dfcXiVM]cbž<D9'fYWtaaYbXq'h\YXf]jYfq'Zcf'iqY'k]h\'h\Y'Z]fakUfYDUW\_U[Y'dfcXiVM;Uq'VY`ckž

- '=bhY``]WYU'8f]j Yf'Zcf'A]WfcgcZh'K]bXckg'GYfj Yfž'j Yfg]cb'%'%) "%&%"\$'cf'`UhYf
- =bhY``]WY'8f]j Yfg'Zcf'@|bilž'j Yfg]cb'%"%) "(!%cf``UhYf
- "=bHY``]WYb 8f]j Yf Zcf J A k UfYž j Yfq]cb &\$&( "\%"\$\$ cf ``UhYf

 $H\ ]g': K\ 'j\ Yfg]cb'XcYg'bch'gi\ ddcfh'Dcfh'FYgYh'F89'a\ Yhf]Wg'''H\ ]g'dfcXi\ Wh'k\ ]```VY'Yb\ Ub\W''hc']a\ dfcj\ Y'h\ Y'Zi\ b\Wh]cbg']b'h\ Y'Zi\ hi\ fYfYYUgY$ 

#### 9b\UbWa Ybhg

- H\]q dfcXi WhYb\UbWYX h\Y Wca dUh]V]\[]hmk ]h\ ]WYU Xf]j Yf"
- H\YfY'UfY']a ]hUh]cbg'k ]h\ h\YgY'dfcXi Wfg']b'j Yfg]cb'("\*"'fl\_bck b']ggi YŁ =Z'mci 'YbUV'Y'h\Y'flifUbga ]h'VU'UbV]b[ fiZYUhi fY']b'h\Y'<=ia Ybi ž'mci 'a UmgYY'h\Y'Zc``ck ]b[ '@]bi I 'Xa Yg[ '`c[ . 'f88D'dUW\_U[Y XcYg'bch'gi ddcfh'h\Y'hfUbga ]h'VU'UbV]b[ 'ZYUhi fYžfik\Yb'fi bb]b[ 'k ]h\']bWta dUh]V'Y'=\W'Xf]j Yf'fYj ]g]cbgž'gi W\'Ug']\W'j %"%) "(žk\]W\'Wb'`YUX'hc'U'`]b\_ ZJ]'i fY"

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

 $H\ ]g'dfcXi\ VM'gi\ ddcfhg'h\ Y'Zc``ck\ ]b[ 'bYhk cf_'UXUdhYfg.$ 

=bhY 9, %\$!LLJ85( 9h\YfbYh %\$#&); V (!dcfhG: D&, 5XUdhYf Zcf < D9</li>

=bhY`:]fa k UfY`DUW\_U[Y`: cf'9, %\$!LLJ85(`9h\YfbYh'%\$#&); V`(!dcfhG: D&, `C7D' `5XUdhYf

J Yfg]cb. ("\* \$ fF YV&a a YbXYXŁ

: ]YbUa Y. < D9S9, %\$SLLJ (SC7DS(d\*\$SB7G=k D@8AcA7HDS, \$\$%9, 5: "Zkd\_[

### =a dcfHUbhBcHY°

: cf : ]fa k UfY ]bghU``Uh]cbž'h\YfY ]g'bc'CG'UbX'Xf]j Yfg'XYdYbXYbWh'

:cf:]fakUfY`WtadUh]V]`]hmXif]b[`dfcXiWh]cbž<D9`fYWtaaYbXg'h\YXf]jYfg'Zcf`igY`k]h\'h\Y`Z]fakUfY`DUW\_U[Y`dfcXiWh]cbž<D9`fYWtaaYbXg'h\YXf]jYfg'Zcf`igY`k]h\'h\Y`Z]fakUfY`DUW\_U[Y`dfcXiWh`Ug`VY`ckž

- =bhY`]WYU'8f]j Yf Zcf`A]WYcgcZhK]bXckg'GYfj Yfž'j Yfg]cb'%'%) "\%%"\$ cf``UhYf
- =bhY`]WY`8f]j Yfg`Zcf`@]bi | ž'j Yfg]cb`%"%) "(!%cf``UhYf
- =bhY`]WYb 8f]j Yf Zcf J A k UfYž j Yfg]cb &\$&( "%"\$\$ cf `UhYf

 $\label{eq:hamiltonian} $H^{g}: K _{j} Yfg]cb_{Xc}Yg_{bch'gi} ddcfh_Dcfh'FYgYh_F89'a Yhf]Wg''_H^{g}dfcXi Wh'k ]^{Y}VY_{b}UbW'_hc']a dfcj Y'h_Y'Z bWh]cbg']b'h_Y'Z hi fYfYYUgY$ 

### 9b\UbWa Ybhg

- H\]g'dfcXi Wh'Yb\UbWYX'h\Y'Wca dUh]V]`]hmk]h\']WYU'Xf]j Yf"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

H\]g dfcXi Whgi ddcfhg h\Y Zc``ck ]b[ bYhk cf\_ UXUdhYfg.

• =bhY`9, %\$!LLJ85( '9h\YfbYh'%\$#&); V'(!dcfh'G: D&, 'C7D' '5XUdhYf'Zcf' < D9

=bhY`Cb`]bY: ]fa k UfY I d[fUXY I h]`]hmZcf J A k UfY

J Yfg]cb. " "&) "\$ fF YVta a YbXYXŁ

: ] YbUa Y. 7D\$\*' %) &"Wta dg][ / 7D\$\*' %) &"n]d

#### =a dcfhUbh BchY°

H\]g'gcZhk UfY'dUW\_U[Y'WbhU]bg'h\Y'Zc``ck ]b['Z]fa k UfY'j Yfg]cbg'Zcf'h\Y'VY`ck ``]ghYX'gi ddcfhYX'bYhk cf\_ 'UXUdhYfg.

B=7	99DF CA #BJ A J Yfg]cb	CFCA J Yfg]cb	BJ A J Yfg]cb
<pre>&lt; D9`9h\YfbYh'%\$; V`&amp;! dcfh'G: DŽ 'C7D' 'L+%\$! 85&amp; 5XUdhYf</pre>	, \$\$\$: *75	%"' *, &"\$	- ") &
SXUANY1			

< D9 9h\YfbYh%; V &! dcfhG: DŽ L+%\$!85&5XUdhYf	, \$\$\$: *7-	%"' *, &"\$	- ") &
=bhY`=')\$!H(`9h\YfbYh% V`(!dcfh65G9!H5XUdhYf	, \$\$\$%&' :	%"' *, &"\$	B#5
=bHY`=')\$!H('9h\YfbYh% V'(!dcfh'65G9!H C7D' 5XUdhYf	, \$\$\$%&' (	%"' *, &"\$	B#5
=bhYfFt=')\$; ][UV]hBYhkcf_7cbbYVhJcbfk!dcfhL	, \$\$\$% 7	%"' *, &"\$	B#5
=bhY`fFŁ=')\$;][UV]hBYhkcf_7cbbYVhJcbf(!dcfhŁ	, \$\$\$% 8	%"' *, &"\$	B#5

H\Y`Wta Vc`]a U[Y`j`%" \*, &"\$`]bWi XYg. `6cch5[Ybh `% V9'! j %")"-\$ž`%\$; V9'! j &"(")(ž`(\$; V9'! j %"%"() / `I 9: ='8f]j Yfg. `% V9'! j - ", "\* &ž %; V9 ! j , "&"( +ž (\$; V9 ! j ) "\$"%

G]b[ YBJA JYfg]cb ]g bYk Z]fa k UfY Zcfa Uhk\]W fYdfYgYbhUb i b]Z[YX j Yfg]cb ]b d`UW cZh\Y dfYj ]ci g`mi gYX 99DFCA#BJA JYfg]cb cf CFCA j Yfg]cb"

### <u>DfYfYei</u> <u>lglhYg</u>

H\]grdfcXiVMrfYei]fYgrh\YrUddfcdf]UHYXf]jYfrZcfmcifXYj]WYrUbXrcdYfUh]b[rgmghYarVY]bghU``YXrVYZcfYrZ]fakufyr]eidXUhYX''

### 9b\UbWa Ybhg

 $\label{eq:hammer} $H\ ]g'dfcXi \ Wh'Yb\ Ub\ WYX'h\ Y'\ Wca \ dUh]V]']hmk \ ]h\ 'h\ Y'`UhYgh'Xf]j \ Yfg''$ 

### GiddcfhYX 8Yj JWYg UbX : YUhi fYg

 $H\ ]g\ dUW\ U[\ Y\ gi\ ddcfhg\ h\ Y\ Zc\ ck\ ]b[\ bYhk\ cf\ UXUdhYfg.$ 

- =bHY fF = ) \$ ; ][ UV]hBYHk cf\_ 7cbbYVM]cb f&! dcfHz =bHY fF = ) \$ ; ][ UV]hBYHk cf\_ 7cbbYVM]cb f(!dcfHz
- < D9 9h\YfbYh% V (!dcfh6UgYH = ) \$!H(5XUdhYf</li>
- <D9 9h\YfbYh% V (!dcfh6UgYH = ) \$!H( C7D 5XUdhYf
- < D9 9h\YfbYh %; V &! dcfh G. DŽ L + %! 85& C7D 5XUdhYf
  </p>
- < D9 9h\YfbYh%; V &! dcfh'G: DŽ L+%!85&5XUdhYf</li>

A Y``Ubcl : ]fa k UfY DUW\_U[ Y fl K D?; Ł'! A Y``Ubcl A 7L\*' % \$&5G! 585H'9h\YfbYh' \$#&); V &! dcfh'G: D&, '5XUdhYf Zcf < D9 J Yfg]cb. &\* "( &"%\$\$\$ **fF YVt**a a YbXYXŁ : ]`YbUa Y. `&\*S( &S%\$\$! A 7L\*' %%\$&5G! 585S5I "d`Xa "Zk d\_[

### =a dcfhUbh BchY°

**8]gWJ]a Yf**. 7YfHJ]b gcZhk UfY ]bWl X]b[ Xf]j Yfg UbX XcW a Ybhg a UmVY Uj U] UV Y Zfca BJ =8=5" =Z mci gY YWh U I F@h Uh X]fYWhg mci hc \hd. ##k k k "bj ]X]U"\wa #z mci \text{"UfY h\ Yb \text{"YUj }]b[ \cdot \D\"\wa "\D\"\Y\\]y\Uj \BJ =8 =5 \text{ gc Zhk UfY cf \XcW a \Ybh\\Jh\\gir \BJ =8 =5 \text{ h\ Y \text{ }}\gir \XcW a \Ybh\\Jh\\gir \BJ =8 =5 \text{ h\ Y \text{ }}\gir \Xc\\gir \Xc  $\begin{tabular}{l} UbX`WbX]h]cbgz`]bWiX]b[ ``]W'bg]b[ ``hYfa gz`]Z`Ubmz`dfcj ]XYX`cb`]hg`k YVg]hY`cf`ch\Yfk ]gY''' < D9`]g`bch`fYgdcbg]V`Y`Zcf`mci f`i gY`cZ`Ubm gcZhk UfY`cf`XcW'a Ybhg`h\Uh'mci `Xck b`cUX`Zfca `\hd. ##k k k "bj ]X]U"Wta #z`YI Wrdh`h\Uh' < D9`a Umdfcj ]XY`U``]a ]hYX`k UffUbhm`Zcf`BJ =8 =5 \\ \end{tabular} \]$ gcZhk UfY`]b`UVWcfXUbWr'k]h\ h\ Y`hYfa g`UbX`WcbX]h]cbg`cZmci f`di fWk UgY`cZ'h\ Y`< D9`dfcXi Wh`cf`gc`i h]cb"

 $5^{\circ}]ghcZ_bck b^{\circ}]ggi Yg^{\circ}k ]h^{\circ}h^{\circ}g^{\circ}YUgY^{\circ}gUj U]^{\circ}V^{\circ}Y$ Uh \( \frac{1}{htdg. ##XcWg"bj \( \frac{1}{2} \) \( \frac{1}{2} \)

### DfYfYei ]g]hYg

: K D?; `k ]``k cf\_`cb`m]Zh\Y`Z|fa k UfY`j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&\$"&+"%\$%\* `cf``UhYf`UbX`]@C) `Z|fa k UfY`j Yfg]cb`a i gh`VY`&"' \$ cf '\][\Yf"

#### : ]I Yg

H\Y'Zc``ck ]b[ ]ggi Yg'\Uj Y'VYYb'Z]l YX ]b j Yfg]cb &\* "( &"%\$\$\$.

- F89'DcfhAYhf]Wg'dfcdYfhm'HfUbgWl]jYfg"Gidd`mJc`hU[Y'kUg'fYZYWhYX`]b`]bWcffYWh'ib]hg'cZ%\$\$iJ`]bghYUX'cZJ"
- H\Y`"h]a YSg]b\WS`UghSVWUf"\Vci bhYf`g\ck YX`k fcb[`]bX]\Wh]cbg"

#### 9b\UbWa Ybhg

GYWf]lm<UfXYb]b[ '9b\UbWa Yblg. H\]gfY`YUgY`WbHJ]bg']a dcfHJbhfY`]UV]`]lm]a dfcj Ya Yblg UbX'gYWf]lm\UfXYb]b[ 'Yb\UbWa Yblg' < D9 fYWca a YbXg i d[fUX]b[ 'mci f XYj ]Wf6j Z[fa k UfY hc h\]g fY YUgY hc ]a dfcj Y h\Y Z[fa k UfY gYW f]hmUbX fY ]UV] ]hmcZ nci f XYj ]Wf

### BYk ZYUhi fYg'UbX WYUb[ Yg']bWi XYX ]b j Yfg]cb &\* "( &"%\$\$\$.

- DfYj YbhYX´<75S75D´Zfca ´U`ck ]b[ 'fc[i Y`Xf]j Yfg'hc`WfYUhY`a cfY´9E g`h\Ub`h\Y`bi a VYf´U`ck YX´]b`h\Y</li>
   75S75D"a Ul Sbi a SYeq"
- FYa cj YX'h\Y``c[]WU``dcfhfUhY``]a ]hYf'hc`dfYj Ybh'h\Y`]bhYfbU```ccdVUW\_'HfUZZJWZfca 'YI WYYX]b['h\Y'd\mg]WU``dcfh'bYhk cf\_``]b\_ gdYYX'k\Yb'i g]b['h\Y'Ygk 'gW\YXi`]b['ZYUhi fY"
- 5XXYX`U'bYk 'Wta a UbX`]bHYfZUWY'"A Ya cfmg`ck 'fY`YUgY" hc YbUV`Y#X]gUV`Y`\c`X]b[ 'a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZh]a Y"`CbWY'h\Y'h]a Yf`YI d]fYgz'h\Y'Z]fa k UfY'k ]``fYhi fb'h\Y'dU[ Yg`hc'h\Y`Xf]j Yf"
- 5XXYX gi ddcfh Zcf A J HG fY[]ghYf j ]U U a ]gWY ``UbYci g Xf]j Yf i g]b[ h\Y UWWyggSfY[]ghYf DF A 'Wta a UbX"

#### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

< D9	DUfhBi a VYf	AY``Ubcl '9th\YfbYh'Cb`m5XUdhYfg	DG=8
D( &\$(	((!6&%	A Y``Ubcl `A 7L*' % \$&5G! 585H`9h\YfbYh`\$#&); V`&! dcfh`G: D&, `5XUdhYf`Zcf`< D9`	A HS\$\$\$\$\$\$) +)

A Y``Ubcl `: ]fa k UfY`DUW\_U[Y`fl K D?; Ł'! `A Y``Ubcl `A 7L\*' %(' &5G! 585='9h\YfbYh'%\$#&); V`&! dcfh'G: D&, `C 7D' `5XUdhYf`Zcf' < D9 J Yfq]cb. `&\*"( &"%\$\$\$ '**fF YWt**a a YbXYXŁ

: ]`YbUa Y. `&\*S( &S%\$\$\$! A 7L\*' %( ' &5G! 585S5I "d`Xa "Zk d\_[

#### =a dcfhUbhBchY

8]gWU]a Yf. 7YfhJ]b 'gcZhk UfY ']b Wi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY'Uj U]'UV'Y Zfca 'BJ =8 =5" =Z mci 'gY'YWh'U'I F@h\Uh'X]fYWhg'mci hc \hd. ##k k k "bj ]X]U"Wca #z'mci 'UfY'h\Yb 'YUj ]b[ '< D9"Wca "'D'YUgY Zc'`ck 'h\Y']bghfi Wh]cbg'cb \hd. ##k k k "bj ]X]U"Wca # hc Xck b`cUX BJ =8 =5 'gcZhk UfY'cf' XcW a YbhUh]cbz'mci 'a UmVY'gi V'YWh'hc BJ =8 =5 'hYfa g UbX WcbX]h]cbgz']bWi X]b[ ']W'bg]b[ 'h\fa gz']Z'Ubmz'dfcj ]XYX cb ]hg k YVg]hY'cf' XcW a YbhUh]cbz'mci 'a UmVY'gi V'YWh'hc BJ =8 =5 'hYfa g UbX WcbX]h]cbgz']bWi X]b[ ']W'bg]b[ 'h\fa gz']Z'Ubmz'dfcj ]XYX cb ]hg k YVg]hY'cf' ch\Yfk ]gY" < D9']g'bch fYgdcbg]V'Y Zcf' mci f'i gY'cZ'Ubm gcZhk UfY'cf' XcW a Ybhg'h\Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj ]X]U"Wca #z'Yl Wrdh'h\Uh' < D9'a Umdfcj ]XY'U']a ]hYX'k UffUbhm Zcf' BJ =8 =5 gcZhk UfY']b 'UWWcfXUbW' k ]h\ 'h\Y'h\fa g'UbX WcbX]h]cbg'cZ'mci f'di fWl UgY'cZ'h\Y' < D9'dfcXi Wh'cf' gc'i h]cb"

5 ``]gh'cZ'\_bck b']ggi Yg'k ]h\ 'h\]g'fY`YUgY']g'Uj U]`UV`Y

Uh \htdg. ##XcVg"bj ]X]U"Wta #bYhk cf ]b[ #X]qd Um#WtbbYWt \* 1 Z|fa k UfYj &\* ( &%\$\$\$# bck bŽ ]qqi Yg

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m']Zh\Y'Z]fa k UfY'j Yfg]cb'ZUg\YX'cb'h\Y'UXUdhYf']g'&\$"&+"%\$%'`cf``UhYf'UbX']@C) 'Z]fa k UfY'j Yfg]cb'a i gh'VY'&"' \$ cf\\][\Yf"

#### : ]I Yg

### H\Y'Zc``ck ]b[ ']ggi Yg'\Uj Y'VYYb'Z]I YX ]b j Yfg]cb &\* "( &"%\$\$\$.

- F89 DcfhA Yhf]WgidfcdYfhmHfUbgWY] Yfg"GiddimJcihU[Yik UgifYZYWhYXi]bi]bWcffYWhib]hgicZ%\$\$iJi]bghYUXicZJ"
- H\Y`"h]a YSg]bWYS`UghSWYUf"'Wti bhYf'g\ck YX'k fcb[ ]bX]WWh]cbg"

#### 9b\UbWa Ybhg

GYW f]rm < UfXYb]b[ '9b\UbWa Ybrg. 'H\]g fY`YUgY WbhJ]bg ]a dcfhJbhfY`]UV]`]rm]a dfcj Ya Ybrg UbX`gYW f]rm\UfXYb]b[ 'Yb\UbWa Ybrg" < D9`fYWba a YbXg`i d[ fUX]b[ 'mci f`XYj ]Wffg Z]fa k UfY hc h\]g fY`YUgY hc ]a dfcj Y h\Y Z]fa k UfY gYW f]rmUbX`fY`]UV]`]rmcZ mci f`XYj ]Wf"

### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &\* "( &"%\$\$\$.

- DfYj YbhYX'<75S75D'Zfca 'U`ck ]b[ 'fc[i Y'Xf]j Yfg'hc'WfYUhY'a cfY'9E g'h\Ub'h\Y'bi a VYf'U`ck YX']b'h\Y<75S75D"a Ul Sbi a SYeg"</li>
- FYa cj YX'h\Y``c[]WU``dcfhifUhY``]a ]hYf'hc`dfYj Ybh'h\Y`]bhYfbU```ccdVUW\_'hfUZZJWZfca 'YI WYYX]b['h\Y'd\mg]WU``dcfhibYhk cf\_``]b\_ gdYYX'k\Yb'i g]b['h\Y'Ygk 'gW\YXi`]b['ZYUhi fY"
- 5XXYX`U`bYk`WcaaUbX`]bhYfZUWY`"A Yacfmg`ck`fY`YUgY"hc`YbUV`Y#X]gUV`Y`\c`X]b[`aYacfmdU[Yg`Zcf`U`XYZ]bYX`dYf]cX`cZhlaY``CbWY`h\Y`hlaYf`Id]fYgž`h\Y`ZlfakUfY`k]``fYhifb`h\Y`dU[Yg`hc`h\Y`Xf]jYf"
- 5XXYX gi ddcfh Zcf A J HG fY[]ghYf j ]U U a ]gWY ``UbYci g Xf]j Yf i g]b[ 'h\ Y 'UWWYggSfY[]ghYf DF A 'Wa a UbX"

### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

< D9 DUfhBi a VYf	A Y``Ubcl '9h\ YfbYh'Cb`m5XUdhYfg	DG=8
D( &\$( %! 6&%	A Y``Ubcl A 7L*' %(' &5G! 585=9h\YfbYh%\$#&); V &! dcfhG: D&, C7D' 5XUdhYf Zcf < D9	A HS\$\$\$\$\$\$))%

J Yfg]cb. %\* "" ) "( \$' \$ fF YV&a a YbXYXŁ

: ] YbUa Y. '%\* S' ) S(\$' \$! A 7L) %) 5! 775S< D9S5I "d`Xa "Zk d\_[

#### =a dcfhUbhBchY°

: cf`D@8 A `YbUV`YX`J D=`flJ ]fhi U``DfchcWt``=bhYfWtbbYWHL`UXUdhYfg`gi ddcfh]b[ `Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYh'a cXYgž`Yj Yfm Z]fa k UfY`j Yfg]cb`]g`a UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh'<D9"Wta .

% < D9 g][ bYX D@8 A : ]fa k UfY DUW\_U[ Y fl': K D?; Z]YbUa Y YI hYbg]cbŁ i dXUHUV Y j ]U ]@C "

&":]fakUfY'V]bUfmff'V]b'Z]YbUaY'YI hYbg]cbŁ'idXUfUV'Y'j]U'aghZ]bh'ih]`]hm'Zfca'h\Y'CdYfUh]b['GmghYa"

7\ccgY h\Y Uddfcdf]UhY Z]fa k UfY Z]Y Zcfa UhVUgYX cb mci f dfYZYfYbWr UbX k \Uh gi ]hg mci f Ybj ]fcba Ybh'

8]gWUJa Yf. 7YfhU]b 'gcZhk UfY ']b Wi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY 'Uj U]'UV'Y Zfca 'BJ =8 =5 " =Z mci 'gY'YWh'U'I F@h\ UhX]fYWhg'mci hc \hd. ##k k k "bj ]X]U"Wta #z' mci 'UfY h\ Yb 'YUj ]b[ '< D9"Wta "'D'YUgY Zc``ck 'h\ Y ']bghfi Wh]cbg cb \hd. ##k k k "bj ]X]U"Wta # hc 'Xck b`cUX BJ =8 =5 'gcZhk UfY cf 'XcW a YbhUh]cbz' mci 'a UmVY gi V'YWh'hc 'BJ =8 =5 'hYfa g UbX WtbX]h]cbgz ]bWi X]b[ 'hYfa gz']Z Ubmz dfcj ]XYX cb ]hg k YVg]hY cf 'Ch\ Yfk ]gY" < D9']g bch fYgdcbg]V'Y 'Zcf 'mci f'i gY' cZ Ubm gcZhk UfY cf 'XcW a Ybhg h\ Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj ]X]U"Wta #z'YI Wrdh h\ Uh < D9'a Umdfcj ]XY U'`]a ]hYX k UffUbhm Zcf 'BJ =8 =5 gcZhk UfY '[b UWMtfXUbW' k ]h\ 'h\ YhYfa g'UbX WtbX]h]cbg cZ'mci f'di fWl UgY cZ'h\ Y < D9'dfcXi Wh'cf 'gc'i h]cb"

5 ``]gh'cZ'\_bck b']ggi Yg'k ]h\ 'h\]g'fY`YUgY']g'Uj U]`UV`Y

Uh \hdg. ##XcWg"bj ]X]U"Wta #bYhk cf ]b[ #X]gd\'Um#WtbbYVWl ) Z|fa k UfYj %\*' ) (\$' \$\hg# bck bZ ]ggi Yg

### DfYfYei ]g]hYg

: K D?; 'k j``k cf\_`cb`m]Zh\Y`ZJfa k UfY`j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`%\* "&+"%\$%\* `cf``UhYf`UbX`]@C) `ZJfa k UfY`j Yfg]cb`a i gh`VY`&"' \$ cf`\][\Yf"

#### : ]I Yg

### H\Y'Zc``ck ]b[ ']ggi Yg\Uj Y'VYYb'Z]I YX ]b 'j Yfg]cb '%' " ) "(\$' \$.

- J:: @Fkci`X [YhghiW\_k\Yb]hgD:hf][[YfYXh\Y:@FUgkY``"
- I bYI dYWhYX 'gci fWr I 8D'dcfh'UddYUfYX']b Fc79'dUW\_Yhg'k \Yb'h\Y'Z]fa k UfY'][ bcfYX'U'bcb!D: 'Xf]j Yf'WcbZ][ i fUh]cb'Zcf'Fc79 gci fWrI 8D'dcfh'Wcbhfc''fUg'gYh']b 'G9HS<75S75D"gk SfSfcWrSgfWsi XdSdcfht"</li>

#### 9b\UbWa Ybhg

=a dcfhUbh'. 'GYW f]mm< UfXYb]b[ '9b\UbWa Ybhg'! 'H\]g'fY`YUgY`WbhU]bg']a dcfhUbh'fY`]UV]`]mm]a dfcj Ya Ybhg'UbX'gYW f]mm\UfXYb]b[ Yb\UbWa Ybhg"< D9`fYWa a YbXg'i d[fUX]b[ 'mci f`XYj ]WY'Z]fa k UfY'hc'h\]g'j Yfg]cb'hc']a dfcj Y'h\Y'Z]fa k UfY'gYW f]mmUbX`fY`]UV]`]mmcZ mci f`XYj ]WY"

#### BYk ZYUhi fYg UbX W(Ub[ Yg ]bWi XYX ]b j Yfg]cb %\* " ) "( \$' \$.

5XXYX`gi ddcfh'Zcf`dcghdcb]b[ `E D`h]a Yci h`"fYhfmYI WYYXYX" Yffcfg`Zcf`hfUZZ]WX]fYVWYX`Uh`gdYVJZ]WXYgh]bUh]cbg":H\]g`bYk
 VWdUV]`]hmdfYj Ybhq`Vfc\_Yb`WcbbYVM]cbq`Zcf`XYqh]bUh]cbq`]b`Xck bh]a Y`VYVWi qY`cZ``]j Y`a ][ fUh]cb"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ ]g\ gc\ Zhk\ UfY\ dUW\ U[\ Y\ WbhU]bg\ h\ Y\ Zc\ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

MAY UDGI 9N YIDYNGD M5XUDNYID	: ]fa k UfY J Yfg]cb	DG=8
< D9 '9h\ YfbYh'%\$\$; V '%  dcfh'E G: D&, 'D7=Y' 'I %* 'A 7L) %  5! 775H'5XUdhYffD' '&\( * ! 6&\%'UbX D' '&\( * ! < &\%\L	%* "' ) "( \$' \$	A HS\$\$\$\$\$\$) - %

JYfglcb. &\$"(&"%\$\$\$ fF YV&a a YbXYXŁ

### <u>=a dcfhUbh'BchY'</u>

cf`D@8A`YbUV`YX`J D=`flJ]fhi U``DfchcWt``=bhYfWtbbYWHL`UXUdhYfg`gi ddcfh]b[`Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYha cXYgž`Yj Yfm Z]fa k UfY`j Yfg]cb`]gʻa UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh'<D9"Wta . % < D9 g][ bYX D@8A : ]fa k UfY DUW\_U[ Y fl': K D?; Z]YbUa Y YI hYbg]cbŁ i dXUHUV Y j ]U ]@C "

&":]fa k UfY V]bUfmff'V]b Z]YbUa Y YI hYbg]cbL'i dXUhUV Y j ]U'a ghZ]bh'i hj`]hmZfca 'h\Y'CdYfUh]b[ 'GnghYa "

7\ccgY h\Y Uddfcdf]UhY Z|fa k UfY Z|Y Zcfa UhVUgYX cb mci f dfYZYfYbW UbX k \Uhgi ]hg mci f Ybj ]fcba Ybh'

8]gWUJa Yf. 7YfhU]b gcZrk UfY ]bWi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY Uj U]'UV'Y Zfca 'BJ =8 =5" =Z mci 'gY'YWi'U' I F@h\ UhX]fYWfg'mci hc \hd. ##k k k "bj |X]U"Wta #z'mci 'UfY'h\ Yb "YUj ]b[ < D9"Wta "'D'YUgY Zc``ck 'h\ Y']bghfi Wf]cbg'cb \hd. ##k k k "bj |X]U"Wta # hc Xck b`cUX BJ =8 =5 gcZrk UfY'cf'XcW a YbhUh]cbz'mci 'a UmVY'gi V'YWfi'nc BJ =8 =5 hYfa g UbX WtbX]h]cbgz']bWi X]b[ '`]W'bg]b[ 'h\ Yfa gz']Z'Ubmz'dfcj ]XYX'cb']hg k YVg]hY'cf'Ch\ Yfk ]gY" < D9']g'bch'fYgdcbg]V'Y'Zcf'mci f'i gY'cZ'Ubm gcZrk UfY'cf'XcW'a Ybhg'h\ Uh'mci 'Xck b`cUX'Zfca '\hd. ##k k k "bj |X]U"Wta #z'YI Wfdh'h\ Uh' < D9' a Umdfcj ]XY'U']a ]hYX'k UffUbhm'Zcf'BJ =8 =5 gcZrk UfY']b'UWVtfXUbW'k ]h\ 'h\ Y'hYfa g'UbX'WtbX]h]cbg'cZ'mci f'di fW\ UgY'cZ'h\ Y'< D9'dfcXi Wfvcf'gc'i h]cb"

 $5^{-}]ghcZ_bckb_ggiYg'k]hhh]gfYYUgY]gUjU]UVY$ 

Uh \hdg. ##XcVvj"bj ]X]U"Vvta #bYlk cf ]b[ #X]gd`Um#AvtbbYVvt \* Z]fa k UfYj &\$( &%\$\$\$# bck bZ ]ggi Yg

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y`ZJfa k UfY'j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&\$"&+"%\$%' `cf``UhYf`UbX`]@C) `ZJfa k UfY'j Yfg]cb`a i gh`VY`&"' \$ cf`\][\Yf"

#### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb Z]I YX ]b j Yfg]cb &\$"( &"%\$\$\$.

- F89 DcfhAYhf]WgdfcdYfhmHfUbgWf]jYfg"Gidd`mJc`hU[Y`kUgfYZYWhYX`]b`]bWdffYWfib]hgcZ%\$\$iJ`]bghYUX`cZJ"
- <75S75D'U``ck YX fc[i Y Xf]j Yfg'hc WfYUhY a cfY 9E g'h\Ub h\Y bi a VYf'U``ck YX ]b h\Y <75S75D"a UI Sbi a SYeg"</li>
- $\pm$ bWcffYWhA D@G dUW\_Yhg X]gWUfXg Zck k\Yb h\Y; @C65@dUi gY WUdUV] ]hmk Ug X]gUV YX"

### 9b\UbWa Ybhg

 $GYW f]m < UfXYb]b[ `9b\ UbWa Ybhg. 'H\ ]g fY YUgY WbhJ]bg ]a dcfhJbh fY ]UV]]m ]a dfcj Ya Ybhg UbX gYW f]m \ UfXYb]b[ `Yb\ UbWa Ybhg" < D9 fYWba a YbXg i d[ fUX]b[ `mci f XYj ]Wf fg Z]fa k UfY hc h\ ]g fY YUgY hc ]a dfcj Y h\ Y Z]fa k UfY gYW f]m UbX fY ]UV] ]mcZ mci f XYj ]Wf"$ 

### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &\$"( &"%\$\$\$.

- 5XXYX`U`bYk`Wta a UbX`]bHYfZUM'`"A Ya cfmg`ck `fY`YUgY" hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbW'h\Y`h]a Yf`YI d]fYgž'h\Y`Z[fa k UfY`k ]``fYh fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX giddcfh Zcf A J HG fY[]ghYf j] U U a ]gWY``UbYcig Xf]j Yf i g]b[ 'h\Y UWWyggSfY[]ghYf DF A 'W&a a UbX"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ ]g\cdot gc\ Zhk\ UfY\cdot dUW\ U[\ Y\cdot WcbhU]bg\cdot h\ Y\cdot Zc\cdot ck\ ]b[\ Z]fa\ k\ UfY\cdot j\ Yfg]cbg.$ 

A Y``Ubcl `=bZ]b]6UbX`5XUdHYf	: ]fa k UfY J Yfg]cb	DG=8
<pre><d9`=bz b]6ubx`<8f#9h\yfbyh'&\$\$; %\$)="" %*="" *="" **(!6&%'ubx`d&'="" **(!<&%l<="" 5!="" 5xudhyf`fd&'="" 7l*)'="" 85h="" <="" `a="" `d7="Y(`I" d)="" dcfh'e="" g:="" pre="" v`%!=""></d9`=bz b]6ubx`<8f#9h\yfbyh'&\$\$;></pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$()%

A Y``Ubcl :: ] fa k UfY`DU\\\U[Y`fl K D?; \ \Lambda 'Zcf' < D9 \= \dagger \dagger b \dagger \begin{align\*} \delta \text{Ph\ YfbYh'\&\\$\\$; V'\&\ dcfh'E G: D) \ \dagger D7 \= Y( \lefta \text{W} \cdot C7D' \text{A} \text{7L\ \*})' (') \ 5! < 85 \= 5XUdh\yff \quad \delta \text{V} \text{Ph\ YfbYh'\&\\$\\$\\$}; V'\\ \delta \delta \text{C7D' \text{A} \text{7L\ \*}})' (') \ 5! < 85 \= 5XUdh\yff \quad \delta \text{V} \text{Ph\ YfbYh'\&\\$\\$\\$}; V'\\ \delta \delta \text{C7D' \text{A} \text{7L\ \*}})' (') \ 5! < 85 \= 5XUdh\yff \quad \delta \text{C7D' \text{C7D

. <D9 dUfhbi a VYfg D' % &'!6&%UbX D' % &'!<&%

J Yfg]cb. &\$"( &"%\$\$\$ fF YV&a a YbXYXŁ

: ]`YbUa Y. `&\$S( &S%\$\$! A 7L\*) ' ( ' ) 5! < 85S < D9S5I "d`Xa "**Z**k d\_[

#### =a dcfhUbh BchY°

: cf`D@8 A `YbUV`YX`J D=`flJ ]fhi U``DfchcWt``=bhYfWtbbYWtL`UXUdhYfg`gi ddcfh]b[ `Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYh'a cXYgž`Yj Yfm Z[fa k UfY`j Yfg]cb`]g`a UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh'<D9"Wta .

 $\% < D9 \ "g][ \ bYX \ D@8 \ A \ ": \ ]fa \ k \ UfY \ "DUW \ U[ \ Y \ "fl": \ K \ D? \ ; \ "Z] \ "YbUa \ Y \ "Yl \ hYbg]cbŁ" i \ dXUhUV \ "Y \ j \ ]U \ ]@C \ "$ 

&":]fakUfY'V]bUfmfl'V]b'Z]YbUaY'YI hYbg]cbŁ'i dXUhUV'Y'j ]U'aghZ]bh'i hj`]hm'Zfca'h\Y'CdYfUh]b['GnghYa"

7\ccgY h\Y Uddfcdf]UhY Z]fa k UfY Z]Y Zcfa UhVUgYX cb mci f dfYZYfYbW UbX k \Uhgi ]hg mci f Ybj ]fcba Ybh'

8]gWWJa Yf. 7YfhJ]b gcZhk UfY ]bWi X]b[ Xf]j Yfg UbX XcWa Ybhg a UmVY Uj U] UVY Zfca BJ =8 =5" =Z mci gY YVh U T F@h\Uh X]fYVhg mci

5``]gh'cZ\_bck b`]ggi Yg'k ]h\ 'h\]g'fY`YUgY`]g'Uj U]`UV`Y

Uh \hdg. ##XcVg"bj ]X]U"Wta #bYHk cf ]b[ #X]gd\Um#WtbbYVW \* Z]fa k UfYj &\$( &%\$\$\$# bck bZ ]ggi Yg

### DfYfYei ]g]hYg

: K D?; 'k j```k cf\_ cb`m']Zh\Y`ZJfa k UfY'j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&\$"&+"%\$%'`cf``UhYf`UbX`]@C) `ZJfa k UfY'j Yfg]cb`a i gh\VY`&"' \$ cf\\][\Yf"

#### : ]I Yg

### H\ Y Zc``ck ]b[ ]ggi Yg \ Uj Y VYYb Z]I YX ]b j Yfg]cb &\$"( &"%\$\$\$.

- F89 DcfhA Yhf]Wg dfcdYfhmHfUbgWY]; Yfg"Gi dd`mJ c`HJ[Y`k Ug fYZYVWYX`]b`]bVbffYVWii b]hg cZ%\$\$i J `]bghYUX`cZJ"
- <75S75D'U`ck YX fc[i Y Xf]j Yfg hc WfYUhY a cfY 9E g h\ Ub h\ Y bi a VYf U`ck YX ]b h\ Y <75S75D"a U Sbi a SYeg"</p>
- =bWeffYWhAD@GdUW\_YhgX]gWWfXgZckk\Ybh\Y;@C65@dUigYWWdUV]]hmkUgX]gUVYX"

### 9b\UbWa Ybhg

GYW f]mm<UfXYb]b[ '9b\UbWa Ybhg. 'H\]g fY`YUgY WbhU]bg ]a dcfhUbhfY`]UV]`]mm]a dfcj Ya Ybhg UbX gYW f]mm\UfXYb]b[ 'Yb\UbWa Ybhg' < D9 fYWta a YbXg i d[ fUX]b[ 'mci f`XYj ]Wfta Zlfa k UfY 'nc h\]g fY`YUgY hc ]a dfcj Y h\Y Zlfa k UfY 'gYW f]mmUbX fY`]UV]`]mmcZ mci f`XYj ]Wf"

### BYk ZYUhi fYg'UbX WYUb[ Yg']bWi XYX ]b j Yfg]cb &\$"( &"%\$\$\$.

- 5XXYX`U`bYk`Wta a UbX`]bhYfZUWY`"A Ya cfmg`ck `fY`YUgY" hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbWY h\Y`h]a Yf`YI d]fYgž`h\Y`Z[fa k UfY`k ]``fYh fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX gi ddcfh Zcf A J HG fY[]ghYf j ]U U a ]gWY``UbYci g Xf]j Yf i g]b[ 'h\ Y UWWYgqSfY[]ghYf DF A 'Wca a UbX"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ ]g\ gc\ Zhk\ UfY\ dUW\ U[\ Y\ WcbhU]bg\ h\ Y\ Zc\ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

A Y``Ubcl `=bZ]b]6UbX`5XUdHYf	: ]fa k UfY J Yfg]cb	DG=8
<pre>CD9'=bZ b]6UbX'&lt;8F#9th\YfbYth&amp;\$\$; V'%  dcfthEG: D) * 'D7=Y('  1 %* 'C7D' 'A7L*)' (') 5! &lt;85= 5XUdthYf''fD' % &amp;'!6&amp;%'UbX'D' % &amp;'!&lt;&amp;%L</pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$) - &

J Yfg]cb. %\$"( &"%\$\$\$ f**F YWta a YbXYXŁ** 

: ]`YbUa Y. `&\$S( &S%\$\$\$! A 7L\*) ' %\$\*5! < 85S < D9S5I "d`Xa "Zk d\_[

### =a dcfhUbh BchY°

: cf`D@8A`YbUV`YX`J D=`flJ]fhi U``DfchcWt``=bhYfWtbbYWHL`UXUdhYfg`gi ddcfh]b[ `Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYh'a cXYgž`Yj Yfm Z[fa k UfY`j Yfg]cb`]g`a UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh'<D9"Wta .

% < D9 q] byx D@8A: ]fa k ufy Duwu [ Y fl': K D?; Z] Ybua Y YI hybq]cbŁ i dxuhuv Y j ]u ]@C"

&":]fakufyv]bUfmff'v]bz['YbUay'Yl hYbg]cbŁ'idXUhUv'Y'j ]U'aghz]bh'ih]`]hmzfca'h\Y'CdYfUh]b['GnghYa"

7\ccgY h\Y Uddfcdf]UhY Z[fa k UfY Z]Y Zcfa UhVUgYX cb mci f dfYZYfYbWY UbX k \Uhgi ]hg mci f Ybj ]fcba Ybh'

# 7cbbYWML!\* 'J D='gi ddcfhg'\Uj ]b[ 'cbY'dcfh'Ug'=bZ]b]6UbX'UbX'h\Y'ch\Yf'dcfh'Ug'9h\YfbYh'UWWtfX]b[ 'hc'h\Y'Zc'`ck ]b[ a Uhf]l 'cZ'Wta V]bUh]cbg''

Dcfh &! =bZ b]6UbX					
Dcfh : %Ë 9h\YfbYh	<8F#<8F%\$\$	98F	: 8F	E 8F	
&\$\$; V9#) \$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
%\$\$; V9#&); V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	

(\$; V9#%\$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX gi ddcfhYX
% V9	gi ddcfhYX	bchigi ddcfhYX	bchigi ddcfhYX gi ddcfhYX

Dcfh, & I '9h\ YfbYh					
Dcfh %! =bZ]b]6UbX	&\$\$; V9#) \$; V9	%\$\$; V9#&); V9	(\$; V9#%\$; V9	% <b>V</b> 9	
<8F '# '<8F%\$\$	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
98F	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
: 8F	bchigi ddcfhYX	bchigi ddcfhYX	bch gi ddcfhYX	bchigi ddcfhYX	
E 8F #G8F	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	

**8]gvWJa Yf**.  $^{7}$ YfhJ]b 'gcZhk UfY ']b Wi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY 'Uj U]'UV'Y Zfca 'BJ =8 =5 "'=Z mci 'gY'YWh'U'I F@h\ Uh'X]fYWhg'mci hc \hd. ##k k k "bj ]X]U''Wta #z' mci 'UfY h\ Yb 'YUj ]b[ '< D9"Wta "'D'YUgY Zc'`ck 'h\ Y ']bghfi Wh]cbg'cb \hd. ##k k k "bj ]X]U''Wta # hc 'Xck b`cUX BJ =8 =5 'gcZhk UfY cf' XcW a YbhUh]cbz''nci 'a UmVY'gi V'YWh'nc 'BJ =8 =5 'hYfa g UbX WtbX]h]cbgz']bWi X]b[ 'h\ Yfa gz']Z Ubmz'dfcj ]XYX 'cb']hg k YVg]hY 'cf' XcW a YbhUh]cbz''nci 'a UmVY'gi V'YWh'nc 'BJ =8 =5 'hYfa g UbX WtbX]h]cbgz']bWi X]b[ 'h\ Yfa gz']Z Ubmz'dfcj ]XYX 'cb']hg k YVg]hY 'cf' Ch\ Yfk ]gY" < D9']g bch fYgdcbg]V'Y 'Zcf' mci f'i gY' cZ Ubm gcZhk UfY'cf' XcW a Ybhg'h\ Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj ]X]U''Wta #z' YI Wrdh'h\ Uh' < D9'a Umdfcj ]XY 'U'']a ]hYX 'k UffUbhm Zcf' BJ =8 =5 gcZhk UfY']b 'UWMtfXUbW' k ]h\ 'h\ Yh\ fa g'UbX WtbX]h]cbg'cZ'mci f'di fWl UgY'cZ'h\ Y < D9'dfcXi Wh'cf' gc'i h]cb"

 $\label{eq:continuous} 5\,\widehat{\ \ }]gh\,cZ\_bck\,b\,\widehat{\ \ }]ggi\,Yg^*k\,]h\!\!,\,h\!\!,\,]g^*fY^*YUgY^*]g^*Uj\,\,U]^*UV^*Y$ 

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y`ZJfa k UfY'j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&\$"&+"%\$%' `cf``UhYf`UbX`]@C) `ZJfa k UfY'j Yfg]cb`a i gh`VY`&"' \$ cf`\][\Yf"

### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb Z]I YX ]b j Yfg]cb &\$"( &"%\$\$\$.

- F89 DcfhA Yhf]Wg dfcdYfhmHfUbgWr]j Yfg"Gidd`mJc`hU[Y`k Ug`fYZYVWYX`]b`]bWcffYVWiib]hg`cZ'%\$\$iJ`]bghYUX`cZJ"
- <75S75D'U``ck YX'fc[i Y'Xf]j Yfg'hc".WfYUhY'a cfY'9Eg'h\Ub'h\Y'bi a VYf'U``ck YX']b'h\Y'<75S75D"a Ul Sbi a SYeg"
- $\bullet = b \text{WeffYWhAD@G'dUW} \text{Yhg'X]} \text{gWbfXg'Zck'k'} \text{k'Yb'h'Y'; @C65@dUi gY'WbdUV]']} \text{Imk Ug'X]} \text{gUV'YX''}$

### 9b\UbWa Ybhg

GYW f]lm<UfXYb]b[ '9b\UbWa Yblg. 'H\]g fY`YUgY WbHJ]bg ]a dcfHJbhfY`]UV]`]lm]a dfcj Ya Yblg UbX`gYW f]lm\UfXYb]b[ 'Yb\UbWa Yblg" <D9`fYWa a YbXg`i d[ fUX]b[ 'mci f`XYj ]Wfg Z[fa k UfY 'bc' h\]g fY`YUgY 'bc' ]a dfcj Y h\Y`Z[fa k UfY`gYW f]lmUbX`fY`]UV]`]lmcZ mci f`XYj ]Wf"

### BYk ZYUhi fYg'UbX'WYUb[Yg']bWi XYX']b j Yfg]cb'&\$"(&"%\$\$\$.

- 5XXYX`U`bYk`Wta a UbX`]bhYfZUW'`"A Ya cfmg`ck `fY`YUgY"`hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbWf`h\Y`h]a Yf`YI d]fYgž`h\Y`Z]fa k UfY`k ]```fYh fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX`gi ddcfh`Zcf`AJHG`fY[]ghYf`j]U`U`a]gWY``UbYci g`Xf]jYf`i g]b[`h\Y`UWWYggSfY[]ghYf`DFA`Wta a UbX"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ gcZh UfY dUWU[Y WbhJ]bg h\ Y Zc~ck]b[Z]fa k UfY j Yfg]cbg.$ 

A Y``Ubcl `=bZ]b]6UbX`5XUdHYf	: ]fa k UfY J Yfg]cb	DG=8
<pre> &lt; D9 =bZ b]6UbX &lt; 8 F #9h\ YfbYh'&amp;\$\$; V '&amp;! dcfh'E G: D) * 'D7 =Y( 'I %* 'A 7L *) ' %\$* 5! &lt; 8 5H</pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$) - (

A Y``Ubcl ::]fa k UfY`DUW\_U[Y`fl K D?; Ł Zcf < D9 =b Z]b]6UbX < 8 F #9th\YfbYh&\$\$; V`&!dcfh'E G: D) \* `D7 =Y(`I %\* `C7D' `A 7L\*)' (' \* 5! < 85 = 5 XUdhYf . < D9 'dUfh'bi a VYfg'D' % (,!6&%UbX'D' % (,! < &%

J Yfg]cb. &\$"( &"%\$\$\$ **fF YWta a YbXYXŁ** 

: ] YbUa Y. &\$S( &S%\$\$! A 7L\*) ' (' \* 5! < 85S < D9S5I "d`Xa "Zk d\_[

#### =a dcfhUbhBchY°

: cf`D@8 A `YbUV`YX`J D=`flJ ]fhi U``DfchcWt``=bhYfWtbbYWHL`UXUdhYfg`gi ddcfh]b[ `Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYh`a cXYgž`Yj Yfm Z]fa k UfY`j Yfg]cb`]g'a UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh'<D9"Wta .

- &":]fakUfYV]bUfmff'V]bZjYbUaYYI hYbg]cbŁi dXUhUVYj ]U'aghZ]bhi hj`]hmZfca 'h\Y CdYfUh]b[ 'GnghYa"

7\ccqY h\Y Uddfcdf]UhY Z|fa k UfY Z|Y Zcfa UhVUqYX cb mci f dfYZYfYbW UbX k \Uhqi |hq mci f Ybj |fcba Ybh"

## 7cbbYVML!\* JD=giddcfhg`\Uj]b[`cbY`dcfhUgʻ=bZ]b]6UbX`UbX`h\Y`ch\Yf`dcfhUgʻ9h\YfbYhUVMcfX]b[`hc`h\Y`Zc``ck]b[a Uhf]l `cz'Vta V]bUh]cbg"

Dcfh &! =bZjb]6UbX					
Dcfh % Ë 9h\ YfbYh	<8F#<8F%\$\$	98F	: 8F	E 8F	
&\$\$; V9#) \$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
%\$\$; V9#&) ; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
(\$; V9#%\$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
% V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	

Dcfh, &! '9h\ YfbYh					
Dcfh, %! =bZ]b]6UbX	&\$\$; V9#) \$; V9	%\$\$; V9#&); V9	(\$; V9#%\$; V9	% <b>V9</b>	
<8F '#'<8F%\$\$	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
98F	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
: 8F	bchigi ddcfhYX	bchigi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	
E 8F #G8F	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	

8]gWUJa Yf. 7YfhU]b 'gcZhk UfY ']b Wi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY 'Uj U]'UV'Y Zfca 'BJ =8 =5 "'=Z'mci 'gY'YWh'U'I F@h\ Uh'X]fYWhg'mci hc \hd. ##k k k "bj |X]U"Wta #z'mci 'UfY h\ Yb 'YUj |]b[ '< D9"Wta "'D'YUgY Zc``ck 'h\ Y ']bghfi Wh]cbg cb \hd. ##k k k "bj |X]U"Wta # hc Xck b`cUX BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cb" K \Yb Xck b`cUX]b[ 'h\ Y BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cbz'mci 'a UmVY gi V'YWh'hc BJ =8 =5 'hYfa g UbX WtbX]h]cbgz']bWi X]b[ 'j]W'bg]b[ 'h\fa gz']Z Ubmz'dfcj |XYX cb ']hg k YVg]hY cf 'ch\ Yfk |gY" < D9']g bch fYgdcbg]V'Y Zcf 'mci f'i gY cZ Ubm gcZhk UfY cf XcW a Ybhg h\ Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj |X]U"Wta #z'Yl Wrdh h\ Uh' < D9'a Umdfcj |XY U'`]a |hYX k UffUbhm Zcf 'BJ =8 =5 gcZhk UfY ']b 'UWWtfXUbW' k |h\ h\ Y hYfa g 'UbX WtbX]h]cbg cZ'mci f'di fW\ UgY cZ'h\ Y < D9'dfcXi Wh'cf 'gc'i h]cb"

 $5^{''}]gh^{'}cZ_bck^{'}ggi^{'}Yg^{'}k^{'}h^{'}h^{'}g^{'}fY^{'}YUgY^{'}]g^{'}Uj^{'}UV^{'}Y$ 

Uh `\htdg. ##XcVtj"bj ]X]U"Vta #bYhk cf ]b[ #X]qd`Um#VtbbYVtl \* Zlfa k UfYj &\$( &%\$\$\$# bck bZ ]qqi Yq

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y'Z]fa k UfY'j Yfg]cb'ZUg\YX'cb'h\Y'UXUdhYf']g'&\$"&+"%\$%\* 'cf``UhYf'UbX']@C) 'Z]fa k UfY'j Yfg]cb'a i gh'VY'&"' \$ cf`\][\Yf"

#### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb Z]I YX ]b j Yfg]cb &\$"( &"%\$\$\$.

- F89 DcfhA Yhf]WydfcdYfhmHfUbgWY] Yfg"Gidd`mJc`hU[Y`k Ug`fYZYVMYX`]b`]bWtffYWfib]hg`cZ'%\$\$iJ`]bghYUX`cZJ"
- <75S75D'U`ck YX fc[i Y Xf]j Yfg'hc WfYUhY a cfY '9E g'h\ Ub h\ Y bi a VYf'U`ck YX ]b h\ Y <75S75D"a Ul Sbi a SYeg"</p>
- =bWcffYWhA D@G`dUW\_Yhg`X]gWUfXg`Zck`k\Yb`h\Y`; @C65@dUi gY`WUdUV]`]hmk Ug`X]gUV`YX"

### 9b\UbWa Ybhg

GYW f]lm<UfXYb]b[ '9b\UbWa Ybhg. 'H\]g fY`YUgY WbhU]bg ]a dcfhUbh fY`]UV]`]lm]a dfcj Ya Ybhg UbX gYW f]lm\UfXYb]b[ 'Yb\UbWa Ybhg' < D9 fYWta a YbXg i d[ fUX]b[ 'mci f 'XYj ]Wfg Z[fa k UfY hc h\]g fY`YUgY hc ]a dfcj Y h\Y Z[fa k UfY gYW f]lmUbX fY`]UV]`]lmcZ nci f 'XYj ]Wf"

### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &\$"( &"%\$\$\$.

- 5XXYX`U`bYk`Wta a UbX`]bHYfZUW'`"A Ya cfmg`ck `fY`YUgY"`hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbWY`h\Y`h]a Yf`YI d]fYgž`h\Y`Z]fa k UfY`k ]``fYhi fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX giddcfh Zcf A J HG fY[ ]ghYf j ]U U a ]gWY``UbYci g Xf]j Yf i g]b[ h\Y UWWggSfY[ ]ghYf DF A Wta a UbX"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ ]g\ gc\ Zhk\ UfY\ dUW\ U[\ Y\ WbhU]bg\ h\ Y\ Zc\ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

AY UDCI =DZIDJOUDX SXUGNYT	∥J Yfg]cb	DG=8
<pre></pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$) - '

A Y``Ubcl `: ]fa k UfY`DUW\_U[Y`fl K D?; Ł Zcf < D9`=bZ]b]6UbX < 8F %\$\$#9h\YfbYh`%\$\$; V`% dcfh`E G: D) \* `D7=Y(`I %\* `A 7L\*) ' %\$) 5! 975H`5XUdhYf`. < D9`dUfh`bi a VYfg`D&' \*\*)!6&%`UbX`D&' \*\*)!<&%

J Yfg]cb. &\$"( &"%\$\$\$ **fF YWt**a a YbXYXŁ

: ]`YbUa Y. '&\$S( &S%\$\$\$! A 7L\*) ' %\$) 5! 975S<D9S5I "d`Xa "Zk d\_[

#### =a dcfhUbhBchY°

: cf`D@8 A `YbUV`YX`J D=`flJ ]fhi U``DfchcWt``⇒bhYfWtbbYWHL'UXUdhYfg`gi ddcfh]b[ `Vch\`⇒bZ]b]6UbX`a cXY`UbX`9h\YfbYh'a cXYgž`Yj Yfm Z]fa k UfY`j Yfg]cb`]g`a UXY`Uj U]`UV`Y`]b`hk c`X]ZZYfYbh`Zcfa Uhg`Uh<D9"Wta.

%" < D9'g][ bYX'D@8A : ]fa k UfY'DUW\_U[ Y'fl": K D?; 'Z]YbUa Y'Yl hYbg]cbŁ'i dXUhUV'Y'j ]U']@C"

&":]fakufyv]bUfmff'v]bz['YbUay'Yl hYbg]cbŁ'idXUhUv'Y'j ]U'aghz]bh'ih]`]hmzfca'h\Y'CdYfUh]b['GnghYa"

7\ccqY h\Y Uddfcdf]UhY Z|fa k UfY Z|Y Zcfa UhVUqYX cb mci f dfYZYfYbW UbX k \Uh qi ]hq mci f Ybj ]fcba Ybh'

8]gWUJa Yf. 7YfhU]b gcZhk UfY ]bWi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY'Uj U]'UV'Y Zfca 'BJ =8 =5" =Z mci 'gY'YWi'U'I F@h\ UhX]fYWfg'mci hc \hd. ##k k k "bj ]X]U"Wta #z'mci 'UfY'h\ Yb 'YUj ]b[ '< D9"Wta "'D'YUgY Zc'`ck 'h\ Y ]bghfi Wf]cbg'cb \hd. ##k k k "bj ]X]U"Wta # hc Xck b`cUX BJ =8 =5 'gcZhk UfY'cf' XcW a YbhUh]cb" K \Yb Xck b`cUX]b[ 'h\ Y BJ =8 =5 'gcZhk UfY'cf' XcW a YbhUh]cbz'mci 'a UmVY'gi V'YWh'nc 'BJ =8 =5 'h\fa g UbX WtbX]h]cbgz']bWi X]b[ 'i)Wbg]b[ 'h\fa gz']Z Ubmz'dfcj ]XYX cb ]hg k YVg]hY'cf' ch\ Yfk ]gY" < D9']g'bch fYgdcbg]V'Y Zcf' mci f'i gY'cZ Ubm gcZhk UfY'cf' XcW a Ybhg'h\ Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj ]X]U"Wta #z'YI Wfdh'h\ Uh < D9'a Umdfcj ]XY'U'`]a ]hYX k UffUbhmZcf' BJ =8 =5 gcZhk UfY']b UWMtfXUbW' k ]h\ 'h\ Y hYfa g'UbX WtbX]h]cbg'cZ'mci f'di fW\ UgY'cZ'h\ Y < D9'dfcXi Wh'cf'gc'i h]cb"

 $5^{\circ}]ghcZ_bckb]ggiYg'k]hhh]gfYYUgY]gUjU]UVY$ 

Uh `\htdg. ##XcVtg"bj ]X]U"Vta #bYhk cf ]b[ #X]gd`Um#VtbbYVVt \* Zfa k UfYj &\$( &%\$\$\$# bck bZ ]ggi Yg

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_`cb`m]Zh\Y`ZJfa k UfY`j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&\$"&+"%\$%\* `cf``UhYf`UbX`]@C) `ZJfa k UfY`j Yfg]cb`a i gh`VY`&"' \$ cf`\][ \Yf"

### : ]I Yg

#### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb ZJI YX ]b j Yfg]cb &\$"( &"%\$\$\$.

- F89 DcfhA Yhf]Wg dfcdYfhmHfUbgWY]j Yfg"Gi dd'mJ c'hU[Y'k Ug fYZYWYX]b ]bWtffYVWii b]hg cz'%\$\$i J ]bghYUX cz'J "
- <75S75D'U`ck YX fc[i Y Xf]j Yfg hc WfYUhY a cfY 9E g h\ Ub h\ Y bi a VYf U`ck YX ]b h\ Y <75S75D"a UI Sbi a SYeg"</p>
- =bWtffYWnAD@GdUW\_YhgX]gWUfXgZckk\\Ybh\Y;@C65@dUigYWUdUV]`]hmkUgX]gUV`YX"

### 9b\UbWa Ybhg

GYWYf]hm<UfXYb]b[ '9b\UbWYa Ybhg. 'H\]g`fY`YUgY`WtbhU]bg`]a dcfhUbh`fY`]UV]`]hm]a dfcj Ya Ybhg`UbX`gYWYf]hm\UfXYb]b[ 'Yb\UbWYa Ybhg'' < D9`fYWta a YbXg`i d[ fUX]b[ 'mci f`XYj ]WYfg`Z]fa k UfY`bc`h\]g`fY`YUgY`hc`]a dfcj Y`h\Y`Z]fa k UfY`gYW\f]hmUbX`fY`]UV]`]hmcZ`mci f`XYj ]WY''

#### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &\$"( &"%\$\$\$.

- 5XXYX`U'bYk `Wta a UbX`]bhYfZJWY`"A Ya cfmg`ck `fY`YUgY" hc YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZh]a Y"`CbWY'h\Y`h]a Yf`YI d]fYgz'h\Y`Z]fa k UfY'k ]``fYhi fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX giddcfh Zcf A J HG fY[ ]ghYf j ]U U a ]gWY``UbYci g Xf]j Yf i g]b[ h\Y UWWggSfY[ ]ghYf DF A Wta a UbX"

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ ]g\ gc\ Zhk\ UfY\ dUW\ U[\ Y\ WcbhU]bg\ h\ Y\ Zc\ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

MAY UNCLEDIZIDIGUDX SXUGNYT	: ]fa k UfY J Yfg]cb	DG=8
<pre><d9'=bz b]6ubx'<8f%\$\$#9h\yfbyh'%\$\$; %\$)="" %*="" 'a="" 'd7="Y(' 1" *="" **)!6&%'ubx'd&'="" **)!<&%ł<="" 5!="" 7l*)'="" 975h'5xudhyf="" fd&'="" pre="" v'% dcfh'eg:d)=""></d9'=bz b]6ubx'<8f%\$\$#9h\yfbyh'%\$\$;></pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$() &

 $A Y``Ubcl `: ]fa k UfY`DUW\underline{U}[ Y`fl K D?; \ \&`Zcf' < D9' =bZ]b]6UbX' < 8F \%$$#9h\ YfbYh'%$$; V'\&! dcfh'E G: D) * `D7 =Y( `I %* `A 7L*) ' %$* 5! 975H'5XUdhYf'. < D9' dUfh'bi a VYfg'D&' ***! 6&%'UbX'D&' ***! < &%$ 

J Yfg]cb. &\$"( &"%\$\$\$ fF YVta a YbXYXŁ

: ]YbUa Y. %\$S( &S%\$\$\$! A 7L\*) ' %\$\* 5! 97 5S < D9S5I "d`Xa "Zk d\_[

#### =a dcfhUbhBchY°

: cf`D@8A`YbUV`YX`J D=`flJ]fhi U``DfchcWt``=bhYfWtbbYWHL`UXUdhYfg`gi ddcfh]b[`Vch\`=bZ]b]6UbX`a cXY`UbX`9h\YfbYh'a cXYgž'Yj Yfm Z[fa k UfY`j Yfg]cb`]g`a UXY`Uj U]`UV`Y`]b`Hk c`X]ZZYfYbh'Zcfa Uhg`Uh'<D9"Wta .

% < D9 g][ bYX D@8 A : ]fa k UfY DUW\_U[ Y fl': K D?; Z]YbUa Y YI hYbg]cbŁ i dXUhUV Y j ]U ]@C "

 $\&": ]fa\ \bar{k}\ UfY`V]bUfmfl'V]b`Z]YbUa\ Y`Yl\ hYbg]cbŁ`i\ dXUhUV`Y`j\ ]U`a\ ghZ]bh`i\ h]`]hm`Zfca\ `h\ Y`CdYfUh]b[\cdot GmghYa\ "Value of the content of the$ 

7\ccgY h\Y Uddfcdf]UhY Z]fa k UfY Z]Y Zcfa UhVUgYX cb mci f dfYZYfYbWr UbX k \Uhgi ]hg mci f Ybj ]fcba Ybh'

## 7cbbYVML!\* 'J D='giddcfhg'\Uj]b['cbY'dcfh'Ug'=bZ]b]6UbX'UbX'h\Y'ch\Yf'dcfh'Ug'9h\YfbYh'UVMtfX]b['hc'h\Y'Zc``ck]b[a Uhf]l 'cZ'Wta V]bUh]cbg"

Dcfh, &! =bZ]b]6UbX					
Dcfh : %Ë 9h\YfbYh	<8F#<8F%\$\$	98F	: 8F	E 8F	
) \$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
%\$\$; V9#&); V9	gi ddcfhYX	bch gi ddcfhYX	bchigi ddcfhYX	gi ddcfhYX	
(\$; V9#%\$; V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	
% V9	gi ddcfhYX	bch gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX	

Dcfh, &! '9h\ YfbYh						
Dcfh, %! =bZ]b]6UbX	) \$; V9	%\$\$; V9#&); V9	(\$; V9#%\$; V9	% <b>V</b> 9		
< 8F '# '< 8F %\$\$	gi ddcfhYX	gi ddcfhYX	bchigi ddcfhYX	gi ddcfhYX		
98F	gi ddcfhYX	gi ddcfhYX	bch gi ddcfhYX	gi ddcfhYX		
: 8F	bchigi ddcfhYX	bchigi ddcfhYX	bch gi ddcfhYX	bchigi ddcfhYX		
E 8F #G8F	gi ddcfhYX	gi ddcfhYX	bchigi ddcfhYX	gi ddcfhYX		

8]gWUJa Yf. 7YfhU]b 'gcZhk UfY ']b Wi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY 'Uj U]'UV'Y Zfca 'BJ =8 =5 "'=Z'mci 'gY'YWh'U'I F@h\ Uh'X]fYWhg'mci hc \hd. ##k k k "bj |X]U"Wta #z'mci 'UfY h\ Yb 'YUj |]b[ '< D9"Wta "'D'YUgY Zc``ck 'h\ Y ']bghfi Wh]cbg cb \hd. ##k k k "bj |X]U"Wta # hc Xck b`cUX BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cb" K \Yb Xck b`cUX]b[ 'h\ Y BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cbz'mci 'a UmVY gi V'YWh'hc BJ =8 =5 'hYfa g UbX WtbX]h]cbgz']bWi X]b[ 'j]W'bg]b[ 'h\fa gz']Z Ubmz'dfcj |XYX cb ']hg k YVg]hY cf 'ch\ Yfk |gY" < D9']g bch fYgdcbg]V'Y Zcf 'mci f'i gY cZ Ubm gcZhk UfY cf XcW a Ybhg h\ Uh'mci 'Xck b`cUX Zfca '\hd. ##k k k "bj |X]U"Wta #z'Yl Wrdh h\ Uh' < D9'a Umdfcj |XY U'`]a |hYX k UffUbhm Zcf 'BJ =8 =5 gcZhk UfY ']b 'UWWtfXUbW' k |h\ h\ Y hYfa g 'UbX WtbX]h]cbg cZ'mci f'di fW\ UgY cZ'h\ Y < D9'dfcXi Wh'cf 'gc'i h]cb"

5``]gh'cZ\_bck b`]ggi Yg'k ]h\ h\]g'fY`YUgY`]g'Uj U]`UV`Y Uh `\hhdg. ##XcVq''bj ]X]U''Wta #bYhk cf ]b[ #X]qd`Um#WtbbYVW \* Z|fa k UfYj &\$( &%\$\$\$# bck bŽ ]qgi Yg

#### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y'ZJfa k UfY'j Yfg]cb'ZUg\YX'cb'h\Y'UXUdhYf']g'&\$"&+"%\$%\* 'cf'`UhYf'UbX']@C) 'ZJfa k UfY'j Yfg]cb'a i gh'VY'&"' \$ cf'\][ \Yf"

#### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb Z]I YX ]b j Yfg]cb &\$"( &'%\$\$\$.

- $\bullet \quad F89 \cdot DcfhA\ Yhf] Wg'dfcdYfhm'HfUbgWf] yfg''Gi\ dd'mJ\ c'HJ[\ Y'k\ Ug'fYZYWhYX']b']bWcffYWh'i\ b] hg'cZ\%\$\$i\ J'] bghYUX'cZJ''' \\$
- <75S75D'U`ck YX fc[i Y Xf]j Yfg'hc WfYUhY a cfY 9E g'h\Ub h\Y bi a VYf'U`ck YX ]b h\Y <75S75D"a UI Sbi a SYeg"</p>
- =bWtffYWhAD@G'dUW\_Yhg'X]gWUfXg'Zck k\Yb'h\Y'; @C65@dUi gY'WUdUV]`]hmk Ug'X]gUV'YX"

### 9b\UbWa Ybhg

GYW f]rm<UfXYb]b[ '9b\UbWa Ybrg. 'H\]g fY`YUgY WbhJ]bg ]a dcfhJbhfY`]UV]`]rm]a dfcj Ya Ybrg UbX`gYW f]rm\UfXYb]b[ 'Yb\UbWa Ybrg" <D9`fYWa a YbXg`i d[ fUX]b[ 'mci f`XYj ]Wffg`Z]fa k UfY`rc h\]g fY`YUgY`rc ]a dfcj Y`rk\Y`Z]fa k UfY`gYW f]rmUbX`fY`]UV]`]rmcZ rci f`XYj ]Wf"

### BYk ZYUhi fYg'UbX WYUb[ Yg']bWi XYX ]b j Yfg]cb &\$"( &"%\$\$\$.

- 5XXYX`U`bYk`Wta a UbX`]bhYfZJWY`"A Ya cfmg`ck `fY`YUgY" hc YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbWY`h\Y`h]a Yf`YI d]fYgz`h\Y`Z]fa k UfY`k ]``fYhi fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX gi ddcfh Zcf A J HG fY[]ghYf j ]U U a ]gWY``UbYci g Xf]j Yf i g]b[ 'h\ Y 'UWWYggSfY[]ghYf DF A 'Wa a UbX"

### GiddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ gcZh UfY dUWU[Y WbhJ]bg h\ Y Zc~ck]b[Z]fa k UfY j Yfg]cbg.$ 

MAY UDCL =D/IDI6UDX 5XUDDYT	: ]fa k UfY J Yfg]cb	DG=8
<pre>CD9 =bZ b]6UbX &lt; 8F %\$\$#9th YfbYth %\$\$; V &amp;! dcfh E G: D) * D7=Y( I %* A 7L*) ' %\$* 5! 975H SXUdhYf fD&amp;' ***! 6&amp;% UbX D&amp;' ***! &lt; &amp;%</pre>	&\$"( &"%\$\$\$	A HS\$\$\$\$\$\$()'

A Y``Ubcl `: ]fa k UfY`DUW\_U[ Y`fl K D?; L'Zcf`A Y``Ubcl `A 7L\*&' %\$) 5G! J 85H`9h\YfbYh`&\$\$; V`%l dcfh`E G: D) \* `5XUdhYf`Zcf` < D9 J Yfg]cb. `&&"( &"%\$\$ **`fF YWa a YbXYXL** 

: ] YbUa Y. '&&S( &S%\$\$! A 7L \* &' %\$) 5G! J 85S5I "d`Xa "Zk d\_[

### =a dcfhUbhBchY°

 $8 ] gWUJa Yf. 7YfhUJb 'gcZhk UfY ']bWi XJb[ 'Xf]j Yfg'UbX 'XcW a Ybhg'a UmVY'Uj U]'UV'Y'Zfca 'BJ = 8 = 5 "'=Zmci 'gY'YWh'U'I F@h\ Uh'XJfYWfg'mci hc '\hd. ##k k k "bj ]X]U''Wca #z'mci 'UfY'h\ Yb 'YUj ]b[ '< D9"Wca "'D'YUgY'Zc'`ck 'h\ Y']bghfi Wh]cbg'cb '\hd. ##k k k "bj ]X]U''Wca # hc 'Xck b`cUX BJ = 8 = 5 'gcZhk UfY'cf' XcW a YbhUh]cbz''mci 'a UmVY'gi V'YWh'nc 'BJ = 8 = 5 'hYfa g UbX'WcbX]h]cbgz']bWi X]b[ 'h\ Ya gz']Z'Ubmz'dfcj ]XYX'cb']hg'k YVg]hY'cf' XcW a YbhUh]cbz''mci 'a UmVY'gi V'YWh'nc 'BJ = 8 = 5 'hYfa g UbX'WcbX]h]cbgz']bWi X]b[ 'h\ Ya gz']Z'Ubmz'dfcj ]XYX'cb']hg'k YVg]hY'cf' Ch\ Yfk ]gY'' < D9']g'bch'fYgdcbg]V'Y'Zcf' mci f'i gY'cZ'Ubm gcZhk UfY'cf' XcW a Ybhg'h\ Uh'mci 'Xck b`cUX'Zfca '\hd. ##k k k "bj ]X]U''Wca #z'YI Wrdh'h\ Uh' < D9'a Umdfcj ]XY'U'']a ]hYX'k UffUbhmZcf' BJ = 8 = 5 'gcZhk UfY']b'UWMcfXUbW' k ]h\ 'h\ Yh\ fa g'UbX'WcbX]h]cbg'cZ'mci f'di fWl UgY'cZ'h\ Y' < D9'dfcXi Wh'cf' gc'i h]cb"$ 

5 ``]gh'cZ'\_bck b `]ggi Yg'k ]h\ 'h\]g'fY`YUgY ]g'Uj U]`UV`Y

Uh \htdg. ##XcVg"bj ]X]U"V&a #bYhk cf ]b[ #X]qd`Um#V&bbYVM \* XI Z|fa k UfYj &&( &%\$\$\$# bck bž ]qqi Yq

### DfYfYei ]g]hYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y`Z]fa k UfY'j Yfg]cb`ZUg\YX`cb'h\Y`UXUdhYf`]g`&&"&+"%\$%' `cf``UhYf`UbX`]@C) `Z]fa k UfY'j Yfg]cb`a i gh\VY`&"' \$ cf\\][\Yf"

#### : ]I Yg

### H\Y Zc``ck ]b[ ]ggi Yg \Uj Y VYYb Z]I YX ]b j Yfg]cb &&"( &"%\$\$\$.

- F89 DcfhA Yhf]Wg dfcdYfhmHfUbgWf]j Yfg"Gi dd`mJ c`HU[ Y k Ug fYZYWYX ]b ]bWcffYVWri b]rg cZ%\$\$i J ]bghYUX cZJ"
- G:: 'a cXi 'Y 'Wti 'X' bch'UWWygg h\Y'99DFCA 'XUHU'k\Yb fYa cj]b['h\Y'7A =G'a cXi 'Y'UbX']bgYfh]b['h\Y'G:: 'a cXi 'Y']bghYUX'cZ']h'

#### 9b\UbWa Ybhg

GYW f]rm < UfXYb]b[ '9b\UbWa Ybrg. 'H\]g fY`YUgY WtbhJ]bg ]a dcfhJbhfY`]UV]`]rm]a dfcj Ya Ybrg UbX`gYW f]rm\UfXYb]b[ 'Yb\UbWa Ybrg" < D9`fYWta a YbXg`i d[ fUX]b[ 'mci f`XYj ]Wftg Z]fa k UfY 'bc h\]g fY`YUgY hc ]a dfcj Y h\Y Z]fa k UfY`gYW f]rmUbX`fY`]UV]`]rmcZ rci f`XYj ]Wf"

### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &&"( &"%\$\$\$.

- DfYj YbhYX´<75S75D´Zfca ´U`ck ]b[´fc[i Y`Xf]j Yfg`hc`WfYUhY`a cfY´9E g`h\Ub`h\Y`bi a VYf`U`ck YX´]b`h\Y <75S75D"a UI Sbi a SYed"</li>
- 5XXYX`U`bYk`Wta a UbX`]bhYfZUWY``A Ya cfmg`ck `fY`YUgY``hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZh]a Y"`CbWY`h\Y`h]a Yf`YI d]fYgz`h\Y`Z]fa k UfY`k ]``fYhi fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX`gi ddcfh'Zcf'A J HG`fY[ ]ghYf'j ]U'U'a ]gWY``UbYci g`Xf]j Yf'i g]b[ 'h\Y'UWWfggSfY[ ]ghYf'DFA 'W¢a a UbX"
- AG⇒LcbG: WUbVYfYWY]jYXbckh\fci[\h\YD:fojAG⇒LjYWhcf"

#### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

< D9 DUfh'Bi a VYf A Y``Ubcl '9th YfbYh'Cb`m5XUdthYfg		DG=8
D%\$% \$! 6&%	A Y``Ubcl `A 7L*&' %\$) 5G!J85H'9h\YfbYh&\$\$; V'%!dcfh'EG:D) * '5XUdhYf'Zcf < D9	A HS\$\$\$\$\$\$(')

A Y``Ubcl `: ]fa k UfY DUW\_U[ Y`fl K D?; L'Zcf`A Y``Ubcl `A 7L\*&' \%\*5G! 785H`9h\YfbYh'\%\$\$; V`&! dcfh`E G: D) \* `5XUdhYf`Zcf`<D9 J Yfg]cb. `&&"( &"\%\$\$\$ '**fF YWa a YbXYXL** 

: ]YbUa Y. '&&S( &S%\$\$\$! A 7L \* &' \%\* 5G! 785S5I "d`Xa "Zk d\_[

#### =a dcfhUbh BchY°

8]gWUJa Yf. 7YfhU]b gcZhk UfY ]bWi X]b[ 'Xf]j Yfg'UbX XcW a Ybhg'a UmVY Uj U]'UV'Y Zfca 'BJ =8 =5 "=Zmci 'gY'YWh'U'I F@h\ UhX]fYWhg'mci hc \hd.#k k k "bj ]X]U"Wta #z'mci 'UfY'h\ Yb 'YUj ]b[ '< D9"Wta "'D'YUgY Zc'`ck 'h\ Y ]bghfi Wh]cbg'cb \hd.#k k k "bj ]X]U"Wta # hc Xck b`cUX BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cb" K \Yb Xck b`cUX]b[ 'h\ Y BJ =8 =5 'gcZhk UfY cf XcW a YbhUh]cbz'mci 'a UmVY'gi V'YWh'nc BJ =8 =5 'hYfa g UbX WtbX]h]cbgz']bWi X]b[ 'i]Wbg]b[ 'h\fa gz']Z Ubmz'dfcj ]XYX cb ]hg k YVg]hY cf 'ch\ Yfk ]gY" < D9']g'bch fYgdcbg]V'Y Zcf 'mci f'i gY'cZ Ubm gcZhk UfY cf XcW a Ybhg'h\ Uh'mci 'Xck b`cUX Zfca '\hd.#k k k "bj ]X]U"Wta #z'Yl Wrdh'h\ Uh' < D9'a Umdfcj ]XY'U'`]a ]hYX k UffUbhm Zcf 'BJ =8 =5 gcZhk UfY']b UWWtfXUbW' k ]h\ 'h\ YhYfa g'UbX WtbX]h]cbg'cZ'mci f'di fW\ UgY'cZ'h\ Y < D9'dfcXi Wh'cf'gc'i h]cb"

 $5^{-}]ghcZ_bck b^{-}]ggi Yg^{-}k^{-}h^{-}h^{-}g^{-}fY^{-}YUgY^{-}]g^{-}Uj^{-}UV^{-}Y$ 

Uh \hdg. ##XcWg"bj ]X]U"Wta #bYhk cf ]b[ #X]gd\Um#WtbbYVWI \* XI Z[fa k UfYj &&( &%\$\$\$# bck bZ ]ggi Yg

### DfYfYei ]g]hYg

: K D?; 'k j```k cf\_'cb`m']Zh\Y`ZJfa k UfY'j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&&"&+"%\$%'`cf``UhYf`UbX`]@C) `ZJfa k UfY'j Yfg]cb`a i gh\VY`&"' \$ cf\\][\Yf"

### : ]I Yg

### H\Y'Zc``ck ]b[ ]ggi Yg'\Uj Y'VYYb'Z]I YX ]b j Yfg]cb &&"( &"%\$\$\$.

- F89 DcfhA Yhf]Vvy dfcdYfhmHfUbgWr]j Yfg"Gi dd'mJ c'hU[Y'k Ug fYZYVWYX ]b ]bVvfffYVWni b]hg cZ'%\$\$i J ]bghYUX cZJ "
- G:: a cXi Y Wti X bch UWV qq h Y 99DF CA XUHU k \Yb fYa cj |b| h\Y 7A = G a cXi Y UbX |bqYfh|b| h\Y G:: a cXi Y |bqhYUX cZ|h'

### 9b\UbWa Ybhg

GYW f]lm<UfXYb]b[ '9b\UbWa Ybhg. 'H\]g'fY`YUgY WbhJ]bg ]a dcfhJbhfY`]UV]`]lm]a dfcj Ya Ybhg'UbX`gYW f]lm\UfXYb]b[ 'Yb\UbWa Ybhg' < D9`fYWa a YbXg'i d[fUX]b[ 'mci f`XYj ]Wfig'Z[fa k UfY 'hc h\]g'fY`YUgY 'hc ]a dfcj Y`h\Y`Z[fa k UfY gYW f]lmUbX`fY`]UV]`]lmcZ'mci f`XYj ]Wf"

### BYk ZYUhi fYg UbX WYUb[ Yg ]bWi XYX ]b j Yfg]cb &&"( &"%\$\$\$.

- DfYj YbhYX'<75S75D'Zfca 'U`ck ]b[ 'fc[i Y'Xf]j Yfg'hc'WfYUhY'a cfY'9E g'h\Ub'h\Y'bi a VYf'U`ck YX']b'h\Y<75S75D"a Ul Sbi a SYeg"</li>
- 5XXYX`U`bYk`Wta a UbX`]bhYfZUWY`"A Ya cfmg`ck `fY`YUgY" hc`YbUV`Y#X]gUV`Y`\c`X]b[ `a Ya cfmdU[ Yg`Zcf`U`XYZ]bYX`dYf]cX`cZ h]a Y"`CbWY`h\Y`h]a Yf`YI d]fYgz`h\Y`Z]fa k UfY`k ]``fYh fb`h\Y`dU[ Yg`hc`h\Y`Xf]j Yf"
- 5XXYX giddcfh ZcfA JHGfY[]ghYfj]UUa]gWY``UbYcigXf]jYfig]b[h\YUWWYggSfY[]ghYfDFA Wcaa UbX"
- AG∃LcbG: WUbVYfYWY]jYXbckh\fci[\h\YD:fogAG∃LjYWhcf"

#### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

< D9 DUfhBi a VYf	A Y``Ubcl '9h\ YfbYh'Cb`m5XUdhYfg	DG=8
D&) - * \$! 6&%	A Y``Ubcl `A 7L*&' %\$*5G!785H`9h\YfbYh`%\$\$; V`&!dcfh'EG:D) * `5XUdhYf`Zcf` <d9`< td=""><td>A HS\$\$\$\$\$('+</td></d9`<>	A HS\$\$\$\$\$('+

A Y``Ubcl `: ]fa k UfY`DUW\_U[ Yfl K D?; k Zcf < D9`BJ \* \$\$&) A '9h\YfbYh'%\$#&); V &! dcfh'GYW fY BYhk cf\_ 5XUdhYf

J Yfg]cb. &\* "( %"%\$\$\$ fF YV&a a YbXYXŁ

: ]`YbUa Y. `&\* S( %S%\$\$! G&5\* - ! \* ' \$\$%\$5| S\ YUXYf"d`Xa "**Z**k d\_[

### DfYfYei ]g]hYg

:K D?; 'k ]``k cf\_`cb`m]Z'h\Y`Z]fa k UfY`j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&&"&+"%\$%\* `cf``UhYf`UbX`]@C) `Z]fa k UfY`j Yfg]cb`a i gh`VY`&"' \$ cf`\][\Yf"

### 9b\UbWa Ybhg

I d[fUXYX'hc'j Yfg]cb'&\*"(%"%\$\$\$

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

< D9 DUfhBi a VYf	A Y``Ubcl '9h\ YfbYh'Cb`m5XUdhYfg	DG=8
D( * * \$' ! 6&%	< D9 BJ * \$\$&) A '9h\YfbYh'%\$#&); V &! dcfh'GYW fY BYhk cf_'5XUdhYf	< D9\$\$\$\$\$\$\$* &

 $A\ Y``Ubcl \ : \ ] fa\ k\ UfY\ DUW\underline{U}[\ Yfl\ K\ D?\ ;\ k'Zcf' < D9\ BJ \ * \$\%\$A \ '\%\$\$;\ V'\&!\ dcfh'GhcfU[\ Y'C\ ZZcUX'5XUdhYf']$ 

J Yfg]cb. &&"( %"%\$\$\$ **fF YWta a YbXYXŁ** 

: ]`YbUa Y. &&S( %S%\$\$\$! F, A ( %! \* ' \$\$%S5! S\ YUXYf"d`Xa "Zk d\_[

### DfYfYei lglhYg

: K D?; 'k ]``k cf\_'cb`m]Zh\Y`ZJfa k UfY'j Yfg]cb`ZUg\YX`cb`h\Y`UXUdhYf`]g`&&"&+"%\$%' `cf``UhYf`UbX`]@C) `ZJfa k UfY'j Yfg]cb`a i gh`VY`&"' \$ cf`\][\Yf"

#### 9b\UbWa Ybhg

I d[fUXYX'hc'j Yfg]cb'&&"(%"\$\$\$

### GiddcfhYX 8Yj JWYg UbX : YUhi fYg

< D9 DUfhBi a VYf	A Y``Ubcl '9h\ YfbYh'Cb`m5XUdhYfg	DG=8
D( * * \$' ! 6&%	<pre><d9 \$%\$\$a="" &!="" '\%\$\$;="" *="" 5xudhyf]<="" bj="" c="" dcfh'ghcfu[="" pre="" v="" y="" zzcux=""></d9></pre>	< D9\$\$\$\$\$\$\$ &

### : ]fa k UfY ! GhcfU[ Y 7cbhfc``Yf

<u>Hcd</u>

7cbhfc``Yf`: ]fa k UfY`: `Ug\ `Zcf`9GL ]+"\$`UbX`, "\$`!`<D9`A F &%\* ]! c`; Yb\%`Hf]`A cXY`7cbhfc``Yf J Yfq]cb. `) &"&\*"' ") (, + **fF Y\\dagger**a **YbXYXŁ** 

: ]'YbUa Y. '7D\$\* \$\* &%"Wta dg][ / '7D\$\* \$\* &%"n]d

#### : ]I Yg

• :]I 'Ub']ggi Y'h\Uh'D@8A'Z]fa k UfY'i dXUhY'a Um'ZU]'"'H\Y']ggi Y'a Um\UddYb'cb'Wcbhfc``Yfz'VUW\_d'UbY'UbX'Xf]j Y'UhhUW\YX'hc

7cbhfc``Yf`: ]fa k UfY`: `Ug\ `Zcf`9GL]+"\$`UbX`, "\$`! `< D9`A F &%\* ]! d`; Yb%%`Hf]`A cXY`7cbhfc``Yf J Yfg]cb. `) &"&\* "' ") (, + **'fF YVta a YbXYXŁ** : ]`YbUa Y. `7D\$\* \$\* &&"Wta dq][ /`7D\$\* \$\* &&"n]d

#### : ]I Yg

• :]I 'Ub']ggi Y'h\Uh'D@8A 'Z]fa k UfY'i dXUhY'a Um'ZU]""H\Y']ggi Y'a Um\UddYb'cb'Wcbhfc``Yfž'VUW\_d`UbY'UbX'Xf]j Y'UhhUW\YX'hc Wcbhfc``Yf"

7cbhfc``Yf: ]fa k UfY: `Ug\ 'Zcf'9GL]+"\$`UbX', "\$'! '< D9'A F (\$, ]!c'; Yb\%'Hf]'A cXY'7cbhfc``Yf J Yfg]cb. ') &"&\*"' ") (, +'**fF Y\\dagger**a **Y bXYX\L**: ]'YbUa Y. '7D\$\* \$\* &' "\\dagger a dg][ /'7D\$\* \$\* &' "n]d

### : ]I Yg

 :]I 'Ub']ggi Y'h\Uh'D@8A 'Z]fa k UfY'i dXUhY'a Um'ZU]""H\Y']ggi Y'a Um\UddYb'cb'Wtbhfc``Yfž'VUW\_d`UbY'UbX'Xf]j Y'UhhUW\YX'hc Wtbhfc``Yf"

7cbhfc``Yf`: ]fa k UfY`: `Ug\ 'Zcf`9GL]+"\$`UbX`, "\$`!`<D9`A F ( %\* ]! c'; Yb\%'Hf]`A cXY`7cbhfc``Yf J Yfg]cb. `) &"&\* "' ") ( , + '**fF Y\/da a YbXYXL** : ]'YbUa Y. `7D\$\* \$\* &\$"\\dag{[ /`7D\$\* \$\* &\$"n]d

### : ]I Yg

• : ]I `Ub`]ggi Y`h\Uh`D@8A `Z]fa k UfY`i dXUhY`a Um`ZU]""H\Y`]ggi Y`a Um\UddYb`cb`Wtbhfc``Yfž`VUW\_d`UbY`UbX`Xf]j Y`UhhUW\YX`hc Wtbhfc``Yf"

7cbhfc``Yf`: ]fa k UfY`: `Ug\ `Zcf`9GL ]+"\$`UbX`, "\$`! `< D9`A F ( %\* ]! d`; Yb\%'Hf]`A cXY`7cbhfc``Yf J Yfg]cb. `) &"&\* "' ") (, + '**fF Y\\dagger**a **YbXYX\L** : ]`YbUa Y. `7D\$\* \$\* \% "\\dagger m'\dagger a dq][ / `7D\$\* \$\* \% "n]d

### : ]I Yg

• :]I `Ub`]ggi Y`h\Uh`D@8A `Z]fa k UfY`i dXUhY`a Um`ZU]""H\Y`]ggi Y`a Um\UddYb`cb`Wtbhfc``Yfž`VUW\_d`UbY`UbX`Xf]j Y`UhhUW\YX`hc Wtbhfc``Yf"

: ]fa k UfY`DUW\_U[ Y`! < D9`9l dUbXYf`6UW\_d`UbY`: ]fa k UfY`Zcf` < D9`5``YhfU`( %( \$`gYfj Yfg J Yfg]cb. `%') - `f**F** YW£a a YbXYX£ : ]YbUa Y. ` < D9S5``YhfU( %( \$S6DS9L DS; Yb%%S%') - S5"Zk d\_[

#### =a dcfhUbh BchY

%"&( ]g U ]b]h]U j Yfg]cb"

### : ]I Yg

。:]IYX`Ub`]ggiY`h\Uh'h\Y`\YU`h\`@98``][\hg`a Um'hifb`cb`UZhYf`\ch'd`i[[]b[`G5H5`Xf]jYg

#### 9b\UbWa Ybhg

• GiddcfhZffakUfYidXUhYZcfh\YI6AUhHUWXYXhch\YYIdUbXYf

: ]fa k UfY`DUW\_U[Y`!`<D9`Ga Ufh`5ffUmD(\$, ]! dž`D(\$, Y! dž`D(\$, ]! Wž`9&\$, ]! dž`9&\$, Y! dž`9&\$, ]! Wž`9&\$, ]! Wž`9&\$, ]! Už`D&\$(]! Wž`D(\$\*]Y! a `UbX`D, %\*]! U`GF`; Yb%\$`UbX`GF`\$, ]! cžGF`\$, ]! d`; Yb%%`Wtbhfc``Yfg
J Yfg]cb. `+"%% **fF YWta a YbXYXŁ** 

:]YbUa Y. < D9SGFS; Yb%\$S+"%%\$5"**Z**k d\_[

#### : ]I Yg

- :]I YX`Ub`]ggi Y`k \YfY`h\Y`\cgh'YI dYf]YbWfX`6GC8`k \]`Y`WYUf]b[ `f\Y`WtbHfc``Yf`WtbZ][ i fUh]cb"
- :]I YX`Wcblrfc``Yf``cWi dg`VWi gYX`Vm]bWcffYVWrUXXfYgg`fYUXg`UbX`dUfh]U``F5A`]b]h]U`]nUh]cb`Zcf`D7=Y`Zl bVM]cbgž``YUX]b[`hc`977 Yffcfg"
- : ]I YX ]ggi Yg k ]h\ YI hYfbU`ghcfU[ Y"

- : ]I YX ]ggi Yg k ]h\ h\ Y G5H5 Xf]j Y"
- : ]I YX ]ggi Yg k ]h\ h\ Y G98 Xf]j Y"
- : ]I YX ]ggi Yg k ]h\ h\Y gdUfY Xf]j Y"
- 7cffYVMYX A 7HD! fY UhYX ]ggi Yg"
- :]IYX gi fZUWY gWUb ]ggi Yg cb h\Y F5=8 ) \$"
- : ]I YX ]ggi Yg YbWti bhYfYX Xi f]b[ \YUj m=#C cdYfUh]cbg"
- : ]I YX j c`i a Y ]ggi Yg cb h\ Y ZU] YX Xf]j Y"
- : ]I YX ]ggi Yg Zcf ]bWcffYVWGYj Yf]hmfYdcfhYX ]b FYXZ]g\ Yj Ybhg"
- : ]I YX ]ggi Yg Zcf ]bWcffYWnGhUhi g fYdcfhYX ]b FYXZ]g\ fYgci fWrg"
- : ]I YX Ub ]ggi Y k ]h\ ]a dfcdYf WUdUWJrm]bZcfa Uh]cb ]b FYXZ[g\ Xf]j Y BUa Y"
- :]I YX Ub ]ggi Y k \YfY F YXZ]g\ ``cb[ 'fi bb]b[ 'HJg\_ 'ghJhi g']g bch fYdcfhYX"
- :]I YX`Ub`]ggi Y`k \YfY`8i fUV`YBUa Y: cfa Uh'Zcf`F5=8`j c`i a Yg`UfY`fYdcfhYX`Ug`I I =8`]b`F89`F958`cdYfUh]cbgž`Vi h'g\ci `X`VY B55"
- :]IYX'Ub']ggi Y'k\YfY'ZU]'YX'hc'hU\_Y'ck bYfg\]d cZz'cf'hc'fYj Yfhz'U'G98 h\fci [\FYXZ]g\"
- •:]IYX Ub ]ggi Y k \Yb U Xf]j Y \cgh]b[ U F 5=8 \$ J c i a Y ]g fYa cj YX UbX fY]bgYfhYXž U J c i a YC? Yj Ybh]g bch [YbYfUhYX"
- :]IYX`Ub`]ggiY`k\YfY`=@CFYgh`fYhifb`"5WMY`YfUh]cbAYh\cX"`Ug`"7cbHfc``Yf7UW\Y"`]bghYUX`cZ`(bcbYÎ`k\Yb`WcbHfc``Yf`WW\XY`]gbch`YbUV`Y`cf`dfYgYh"

### 9b\UbWa Ybhg

- 5XXYX gi ddcfh Zcf gUj ]b[ 'A UbU[ YX G98 'a UghYf \_YmUbX fYgYh \_Ym]b 'WJd\Yf hYI h']b 'Wzbhfc "Yf BJ F5A ']bghYUX 'cZ WYUf hYI h'
- 7\Ub[YX\hYa dYfUh]fY\dc``]b[\dYf]cX\Zfca\%a]bi hY\bc\) a]bi hYg\Zcf<65\acxy\Xf]j\yg\h\Uh\UfY]b\ck\dck\Yf\ghUh\"
- 5XXYX gi ddcfh Zcf WYUf]b[ 'I F 9g ]b i ba UddYX @65 fUb[ Y cZ ZUi hhc YfUbh c[ ]WV Xf]j Yg"
- =a dfcj YX fUbXca k f]hY UbX a ]I YX fYUX! k f]hY dYfZcfa UbW"
- 5XXYX gi ddcfh Zcf G98 YbWfmdh]cb WcbZ][i fUh]cb h\fci [\FYXZ]g\]bhYfZUW"
- 5XXYX gi ddcfhcZFYXZ]g\ 7\Ugg]g ]a d`Ya YbHJh]cb Zcf I 6A 6UW\_d`UbYg"
- 5XXYX FYXZ]g\ 57H=CB.
  - GhcfU[Y"GYh9bWfmdh]cb?Ym
- 5XXYX gi ddcfh Zcf F YXZ]g\ dfcdYfhmD5H7<.
  - GhcfU[Y"9bWfmdh]cbAcXY
  - GhcfU[Y"<chqdUfY5Wh]j Uh]cbDc`]Wh
  - 8f]j Y"<cghgdUfYFYd`UWYa YbhAcXY</li>
  - 8f]j Y"<chgdUfYHmdY
  - Jcia Y"9bWfmdhYX
- 5XXYX gi ddcfh Zcf F YXZ]g\ GhUhi g"7cbX]h]cbg dfcdYfhmhc fYgci fWfg.
  - 8f]j Y
  - Dcfh
  - GhcfU[Y7cbhfc"Yf
  - GhcfU[Y7cbhfc``Yf"7UVXYGi a a Ufm
  - JciaY
- 5XXYX gi ddcfh Zcf F YXZ]g\ dfcdYfh]Yg.
  - 8f]j Y"8f]j Y: cfa : UVVcf
  - 8f]j Y": ]fa k UfYJ Yfg]cb
  - 8f]j Y"A Ubi ZUWhi fY fG5G cb`mŁ
  - 8f]j Y"G`ch7UdUV`YDfchcWt`g
  - GhcfU[Y7cbhfc``Yf"5ggYhHU[
  - GhcfU[Y7cbhfc``Yf"@]b\_g"D7=Y: i bVh]cb
  - Jcia Y"6'cWG]nY6mhYg
  - Jc`iaY"@c[]WU`lb]hBiaVYf
- 5XXYX gi ddcfh'Zcf'D@8A 'HmdY) 'I 6A 'D=7 'Z]fa k UfY 'ZUg\]b[ 'VY\]bX'YI dUbXYf"
- $: ]fa \ k \ UfY' \ DUW \ U[\ Y'!' < D9'GF-' \&]! \ d'; \ Yb\% \ D'i \ g'\#GF(\%')! \ U'; \ Yb\%' \ D'i \ g\#GF-' \&]! \ d'; \ Yb\%\#GF(\%')! \ a'; \ Yb\%\%' \ 7cbhfc``Yfg'' \ A'' \ A''$

J Yfg]cb. \$' "\$\"" \$"\\\$\* fF YV\ta a YbXYX\ta \)

:]YbUa Y. <D9SGF(%\*SGF-'&S; Yb%\$DS; Yb%%\$\$' "\$%" \$"%\$\*S5"7k d\_[

### : ]I Yg

- 。:]| YX`Ub`]ggi Y`k\YfY`h\Y`\cghYl dYf]YbWfX`6GC8`k\]Y`WYUf]b[ `h\Y`WtbHfc``Yf`WtbZ][ i fUh]cb"
- :]I YX`Wtbhfc``Yf``cWi dg'WUi gYX`Vm]bWtffYVMiUXXfYgg'fYUXg'UbX`dUfh]U``F5A `]b]h]U`]nUh]cb'Zcf'D7=Y`ZI bVM]cbgz``YUX]b[ 'hc'977 Yffcfa"
- :]IYX'Ub`]ggiY'k\YfY'U'dcgg]VY'Wtbhfc``Yf``cWidk Ug'cVgYfjYX'UZhYf'U'ZUWtcfmfYgYh"
- · : ]I YX ]ggi Yg k ]h\ YI hYfbU ghcfU[ Y"
- : ]I YX ]ggi Yg k ]h\ h\ Y G5H5 Xf]i Y"
- : ]| YX ]gqi Yg k ]h\ h\ Y G98 Xf]j Y"
- : ]I YX ]ggi Yg k ]h\ h\ Y gdUfY Xf]j Y"
- 7cffYWWX A 7HD! fY UhYX ]ggi Yg"
- : ]I YX GD8 A ! fY UhYX ]ggi Yg'
- : ]I YX ]ggi Yg fY UhYX hc j c i a Y WfYUh]cb UbX fYVi ] X]b[ "
- : ]I YX j c`i a Y ]ggi Yg cb h\ Y ZU] YX Xf]j Y"
- :]I YX gi fZUWY gWUb ]ggi Yg cb h\Y F 5=8 ) \$"
- :]I YX ]ggi Yg YbWti bhYfYX Xi f]b[ \YUj m #C cdYfUh]cbg"
- :]I YX ]ggi Yg Zcf ]bWcffYVWrGYj Yf]hmfYdcfhYX ]b FYXZJg\ Yj Ybhg"

- :] I YX ]ggi Yg Zcf ]bWcffYWnGhUhi g fYdcfhYX ]b FYXZ]g\ fYgci fWrg"
- : ]I YX Üb ]qqi Y k ]h\ ]a dfcdYf WUdUW|hm ]b Zcfa Uh|cb ]b F YXZ|q\ Xf]j Y BUa Y"
- : ]I YX Ub ]ggi Y k \YfY F YXZ]g\ ``cb[ fi bb]b[ 'HUg\_ 'ghUhi g ]g bch fYdcfhYX"
- :]I YX`Ub`]ggi Y`k \YfY`8i fUV`YBUa Y: cfa Uh`Zcf`F5=8`j c`i a Yg`UfY`fYdcfhYX`Ug`I I =8`]b`F89`F958`cdYfUh]cbgž`Vi h`g\ci `X`VY B55"
- : ]I YX Ub ]ggi Y k \YfY ZU] YX hc hu\_Y ck bYfg\]d cZz cf hc fYj Yfhz U G98 h\fci [ \ F YXZ]q\"
- : ]| YX Ub || ]qqi Y k \Yb U Xf]| Y \cqh|b| | U F 5=8 \$ J c i a Y || q f Ya c j YX UbX f Y || bqYfhYXž U J c i a YC? Y j Ybh || q bch | YbYfUhYX"

### 9b\UbWa Ybhg

- 5XXYX gi ddcfh'Zcf'gUj ]b[ 'A UbU[ YX G98 'a UghYf'\_Ym'UbX fYgYh'\_Ym']b 'WJd\Yf'hYI h']b 'Wbhfc"Yf 'BJ F5A ']bghYUX 'cZ'WYUf'hYI h'
- 7\Ub[YX\hYa dYfUh]fY\dc``]b[\dYf]cX\Zfca\%a]bi hY\c)\a]bi hYg\Zcf<65\acxy\Xf]j Yg\h\Uh\UfY]b\ck\dck\Yf\ghUh\"
- 5XXYX gi ddcfh Zcf WYUf]b[ 'I F 9g ]b i ba UddYX @65 fUb[ Y cZ ZUi hc YfUbh c[ ]WV Xf]j Yg"
- =a dfcj YX F5=8 "% k f]hY 'qYei Ybh]U 'dYfZcfa UbW"
- 5XXYX gi ddcfh Zcf G98 YbWfmdh]cb WcbZ][i fUh]cb h\fci [\FYXZ]g\]bhYfZUWf"
- 5XXYX gi ddcfhcZFYXZ]g\ 7\Ugg]g ]a d`Ya YbHJh]cb Zcf I 6A 6UW\_d`UbYg"
- 5XXYX FYXZ]g\ 57H=CB.
  - GhcfU[Y"GYh9bWfmdh]cb?Ym
- 5XXYX gi ddcfh Zcf F YXZ]g\ dfcdYfhmD5H7<.
  - GhcfU[Y"9bWfmdh]cbAcXY
  - GhcfU[Y"<chgdUfY5VMjjUh]cbDc`]VMn
  - 8f]j Y"<cghgdUfYFYd`UWYa YbhAcXY</li>
  - 8f]j Y"<chgdUfYHmdY</li>
  - Jcia Y"9bWfmdhYX
- 5XXYX gi ddcfh Zcf F YXZ]g\ GHUH g"7cbX]h]cbg dfcdYfhmhc fYgci fWfg.
  - 8f]i Y
  - Dcfh
  - GhcfU[Y7cbhfc"Yf
  - GhcfU[Y7cbhfc``Yf"7UVXYGi a a Ufm
  - JciaY
- 5XXYX gi ddcfh Zcf FYXZ]g\ dfcdYfh]Yg.
  - 8f]j Y"8f]j Y: cfa : UWfcf
  - 8f]i Y": ]fa k UfYJ Yfq]cb
  - 8f]j Y"A Ubi ZUWHi fY fG5G cb`mŁ
  - 8f]j Y"G`ch7UdUV`YDfchcWt`g
  - GhcfU[Y7cbhfc``Yf"5ggYhHU[
  - GhcfU[Y7cbhfc``Yf"@|b\_g"D7=Y: i bWh]cb
  - Jcia Y"6'cWG]nY6mhYg
  - Jc`ia Y"@c[]WU`l b]hBia VYf
- 5XXYX gi ddcfhZcfD@8A HmdY) I 6A D=7 ZJfa k UfY ZUg\]b[ VY\]bX YI dUbXYf"

Cb`]bY`FCA: `Ug\`7ca dcbYbhZcfJAkUfY`9GL]'! < D9`Ga Ufh5ffUmD(\$, ]! dž'D(\$, Y! dž'D(\$, ]! Už'9&\$, ]! dž'9&\$, Y! dž'9&\$, Y! dž'9&\$, ]! Už'D, %\*]! U`GF

Yb%\$

J Yfg]cb. ) "\* % f8Ł fF YWta a YbXYXŁ

: ]YbUa Y. 7D\$) +( +) "Vta dg][ / 7D\$) +( +) "n]d

#### 9b\UbWa Ybhg

Gi ddcfh; Yb%\$ž; Yb% Di g'UbX; Yb% gYfj Yfg

### : ]fa k UfY ! 'GhcfU[ Y : ]VfY 7\ UbbY `

<u>Hcd</u>

< D9 : ]fa k UfY : 'Ug\ Zcf '9a i 'Yl ' &; V 'UbX '\* (; V : ]VfY '7\UbbY `< cgh'6i g '5XUdhYfg</p>

J Yfg]cb. %("(" &- "% fF YWta a YbXYXŁ

: ]`YbUa Y. `D%( "( "' &- "%\$\$\YUXYf"d`Xa "**7**k d\_[

### =a dcfhUbh BchY°

 $H\ g \ W \ a \ dcbYbh \ g \ gi \ ddcfhYX \ cb \ mcb \ ; \ Yb\% \ Dfc@ \ Ubh \ gYfj \ Yfg''$ 

#### FY'YUgY bchYg.

### 6fcUXWta FYYUgY bchYg

 $H\ \ ]g:\ ]fa\ k\ UfY'\ dUW\underline{U}[\ Y'WcbHJ]bg'\ Zc``ck\ ]b[\ Z]fa\ k\ UfY'\ j\ Yfg]cbg.$ 

5XUdh/f	GdYYX	I b]j YfgU`6cch =a U[ Y	: ]fa k UfY	I 9: =	6cch 6]cg
<pre><d9`gb%* %\$9'\="" &;="" 5xudhyf<="" ]vfy`7\ubby``<cgh'6i="" g="" pre="" v`g]b[`y`dcfh':=""></d9`gb%*></pre>	' &; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$
<pre><d9'gb%* %\$9''="" &;="" ]vfy'7\ubby`<cgh6i="" g'5xudhyf<="" pre="" u`dcfh:="" v'8i=""></d9'gb%*></pre>	' &; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$

<pre><d9`gb%+\$\$9`*(; 5xudhyf<="" g="" pre="" v`g]b[`y`dcfh:]vfy`7\ubby``<cgh'6i=""></d9`gb%+\$\$9`*(;></pre>	*(; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$
<pre><d9'gb%+\$\$9'*(; g'5xudhyf<="" pre="" u'dcfh:]vfy'7\ubby'<cgh'6i="" v'8i=""></d9'gb%+\$\$9'*(;></pre>	*(; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$

### DfYfYei ]g]hYg

 $H\Y$  a ]b]a i a j Yfg]cb Zcf UXUdhYf hc gi ddcfh D@8 A ]g %( "\$"( - - "&)

### 9b\UbWa Ybhg

 $H\ \ ]g:\ ]fa\ k\ UfY\ dUW\underline{}\ U[\ Y\ WcbHJ]bg\ Zc\ \ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

5XUdh/f	GdYYX	I b]j YfgU`6cch =a U[ Y	: ]fa k UfY	I 9: =	6cch 6]cg
<d9`gb%* %\$9'\="" &;="" ]vfy`7\ubby``<cgh'6i="" g<br="" v`g]b[`y`dcfh`:="">5XUdhYf</d9`gb%*>	' &; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$
<pre>c D9 GB%* %\$9'' &amp;; V 8i U Dcfh: ]VfY 7 \ UbbY &lt; cgh6i g 5 X UdhYf</pre>	' &; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$
<pre><d9`gb%+\$\$9`*(; 5xudhyf<="" ]vfy`7\ubby``<cgh'6i="" g="" pre="" v`g]b[`y`dcfh':=""></d9`gb%+\$\$9`*(;></pre>	*(; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$
<pre><d9'gb%+\$\$9'*(; g'5xudhyf<="" pre="" u'dcfh:]vfy'7\ubby'<cgh6i="" v'8i=""></d9'gb%+\$\$9'*(;></pre>	* ( ; V	%( "( "' &- "%\$	%( "( "' &- "%\$	%( "( "' &- "-	%( "( "&- \$"\$

### Gi ddcfhYX 8Yj ]WYg UbX : YUhi fYg

 $H\ [g\ Wa\ dcbYbh\ ]g\ gi\ ddcfhYX\ cb\ Zc\ ch\ ]b[\ \ 9a\ i\ YI\ :\ ]VfY\ 7\ UbbY\ < cgh\ 6i\ g\ UXUdhYfg.$ 

- ' &; V : ]VfY 7\ UbbY` < cgh 6i g 5XUdhYf.
  - <D9.GB%\* %\$9.4 &; V.G]b[.Y.Dcfh:]VfY.7\UbbY..<cgh6i g.5XUdhYf
  - <D9`GB%\*%\$9`' &; V`8i U``Dcfh: ]VfY`7\UbbY``<cgh6i g`5XUdhYf
- \*(; V:]VfY 7\UbbY`<cgh6i g 5XUdhYf.
  - < D9 GB%+\$\$9 \* (; V 8i U dcfh: ]VfY 7 \ UbbY < cgh6i g 5 XUdhYf</pre>
  - < D9 GB%+\$\$9\*(; V\*G]b[ Y\*dcfh: ]VfY\*7\UbbY\*\*<cgh'6i g\*5XUdhYf</pre>

J Yfg]cb. &\$&&"\$, "\$%fF YV&a a YbXYXŁ

: ]YbUa Y. 7D\$) \$\$\*%"Wta dg][ / 7D\$) \$\$\*%"n]d

### =a dcfhUbhBchY°

 $\label{eq:hu} \mbox{H\sc in $\sc M$ bhu]bg $\sc C^{\sc M}$ b[\sc M$] fa k $\sc M$ fy $\sc M$ bhu]bg $\sc M$ as $\sc M$ bfor $\sc M$ bhu]bg $\sc M$ as $\sc M$ bfor $\sc M$ bhu]bg $\sc M$ as $\sc M$ bhu]bg $\sc M$ bhu]bg $\sc M$ as $\sc M$ bhu]bg $\sc M$ bhu$ 

5XUdhYf	GdYYX	I b]j YfgU`6cch =a U[ Y	: ]fa k UfY	I 9: =	6cch'6]cg
<d9'gb%*%\$9'\ &;="" ]vfy'7\ubby`'<cgh'6i="" g<br="" v'g]b[`y'dcfh':="">5XUdhYf</d9'gb%*%\$9'\>	' &; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<pre><d9'gb%*%\$9" &;="" ]vfy'7\ubby''<cgh'6i="" g'5xudhyf<="" pre="" u'dcfh':="" v'8i=""></d9'gb%*%\$9"></pre>	' &; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<d9'gb%+\$\$9'*(; g<br="" v'g]b['y'dcfh:]vfy'7\ubby''<cgh'6i="">5XUdhYf</d9'gb%+\$\$9'*(;>	*(; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<pre><d9`gb%+\$\$9`*(; ]vfy`7\ubby``<cgh'6i="" g`5xudhyf<="" pre="" u``dcfh':="" v`8i=""></d9`gb%+\$\$9`*(;></pre>	*(; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$

### <u>DfYfYei ]g]hYg</u>

 $DYUgY Wbgi `hGDC 7? 'Zcf' U'`]ghcZ'gi ddcfhYX WbZ[[ifUh]cbg' Uj U]`UV'Y 'Uh'h\ Y'Zc``ck ]b[ ``]b\_. \\$ 

\hhd.##kkk"\dY"Wta #ghcfU[Y#gdcW#

### 9b\UbWa Ybhg

 $H\ \ ]g:\ ]fa\ k\ UfY\ dUW\underline{}\ U[\ Y\ WcbHJ]bg\ Zc\ \ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

5XUdhYf	GdYYX   b]j YfgU`6cch =a U[Y	: ]fa k UfY	I 9: =	6cch 6]cg
<pre><d9 %\$9="" &;="" '="" 6i="" 7\ubby`="" <="" ]vfy="" cgh="" dcfh:="" g<="" g]b[="" gb%*="" pre="" v="" y=""></d9></pre>				

5XUdhYf	' &; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<pre><d9`gb%* %\$9''="" &;="" ]vfy`7\ubby``<cgh'6i="" g'5xudhyf<="" pre="" u``dcfh':="" v`8i=""></d9`gb%*></pre>	' &; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<d9'gb%+\$\$9'*(; ]vfy'7\ubby`'<cgh'6i="" g<br="" v'g]b['y'dcfh':="">5XUdhYf</d9'gb%+\$\$9'*(;>	*(; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$
<pre>c D9 GB%+\$\$9 * (; V 8i U Dcfh: ]VfY 7 \ UbbY &lt; cgh 6i g 5 X UdhYf</pre>	*(; V	%( "\$"( "&)	%( "\$"( "&)	%( "\$"( "&	%( "\$"( - \$"\$

### GiddcfhYX 8Yj ]Wfg UbX : YUhi fYg

H\]g'Wta dcbYbh']g'gi ddcfhYX cb'Zc``ck ]b[ '9a i 'YI ': ]VfY'7\UbbY`'<cgh'6i g'UXUdhYfg.

### ' &; V: 7.5XUdhYf.

- <D9'GB%\* %\$9'' &; V'8i U`'dcfh': ]VfY'7\UbbY`'<cgh'6i g'5XUdhYf</p>
- <D9 GB% %\$9" &; V'G]b[ Y'dcfh: ]VfY 7\UbbY` < cgh6i g'5XUdhYf</p>

#### \* (; V: 7.5XUdhYf.

- < D9 GB%+\$\$9\*\*(; V\*8i U``Dcfh': ]VfY\*7\UbbY``<cgh'6i g\*5XUdhYf</pre>
- < C9 GB%+\$\$9\*\*(; V\*G]b[\*Y\*Dcfh\*: ]VfY\*7\UbbY\*\*<cgh\*6i g\*5XUdhYf</pre>

< D9`: ]fa k UfY`: `Ug\ `Zcf`E @c[ ]W: ]VfY`7\UbbY`` < cgh'6i g`5XUdhYfg`Zcf`J A k UfY`j Gd\YfY`+"\$
J Yfg]cb. `&\$&( "\$- "\$%' **fF YWta a YbXYX\!**: ]YbUa Y. `7D\$) - , ' ' "Wta dg][ / `7D\$) - , ' ' "n]d

#### =a dcfhUbhBchY°

H\]g Wta dcbYbh]g gi ddcfhYX cb`mcb; Yb\% Dfc@]UbhgYfj Yfg"

 $FY`YUgY`Bch\!Yg.$ 

< D9 E @c[]W5XUdhYfg FY YUgY BchYg

 $H\ ]g: ]fa\ k\ UfY\ dUW\ U[\ Y\ Wb\ D]bg\ Zc\ ck\ ]b[\ Z]fa\ k\ UfY\ j\ Yfg]cbg.$ 

5XUdH/f	GdYYX	A 6=	: ]fa k UfY	I 9: =	6cch 6]cg
<pre><d9 %\$e="" &;="" ''="" 7\ubby``<="" ]vfy="" cgh'6i="" g'5xudhyf<="" gb%*="" pre="" u`dcfh':="" v'8i=""></d9></pre>	' &; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9 %\$e="" &;="" ''="" 5xudhyf<="" 7\ubby`="" <="" ]vfy="" cgh6i="" dcfh:="" g="" g]b[="" gb%*="" pre="" v="" y=""></d9></pre>	' &; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9 '*(;="" 7\ubby`<cgh'6i="" ]vfy="" g'5xudhyf<="" gb%+\$\$e="" pre="" u`dcfh':="" v'8i=""></d9></pre>	*(; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9 %+\$\$e="" *(;="" 5xudhyf<="" 7\ubby`="" <="" ]vfy="" cgh6i="" dcfh:="" g="" g]b[="" gb="" pre="" v="" y=""></d9></pre>	*(; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$

#### DfYfYei ]g]hYg

 $D'YUgY'Wcbgi `h'GDC7?'Zcf'U``]gh'cZ'gi ddcfhYX'WcbZ][i fUh]cbg'Uj U]`UV'Y'Uh'h\ Y'Zc``ck ]b[ \ ``]b\_. \\$ 

\hd. ##k k k "\dY"Vta #ghcfU[ Y#gdcW#

### 9b\UbWa Ybhg

 $H\setminus g$ : ]fa k UfY dUW\_U[Y WcbhU]bg Zc "ck ]b[ Z]fa k UfY j Yfg]cbg.

5XUdH/f	GdYYX	A 6=	: ]fa k UfY	I 9: =	6cch 6]cg
<pre><d9'gb%*%\$e'' &;="" ]vfy'7\ubby``<cgh'6i="" g'5xudhyf<="" pre="" u`dcfh':="" v'8i=""></d9'gb%*%\$e''></pre>	' &; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9 %\$e="" &;="" ''="" 5xudhyf<="" 7\ubby`="" <="" ]vfy="" `y="" cgh'6i="" dcfh':="" g="" g]b[="" gb%*="" pre="" v=""></d9></pre>	' &; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9'gb%+\$\$e '*(;="" ]vfy'7\ubby``<cgh'6i="" g'5xudhyf<="" pre="" u`dcfh':="" v'8i=""></d9'gb%+\$\$e></pre>	*(; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$
<pre><d9`gb%+\$\$e '*(;="" ]vfy`7\ubby``<cgh'6i="" g`5xudhyf<="" pre="" v`g]b[`y`dcfh':=""></d9`gb%+\$\$e></pre>	*(; V	\$&"%\$"\$\$	\$- "%) "\$\$	+"' *	\$"\$

### GiddcfhYX 8Yj ]Wfg UbX : YUhi fYg

### ' &; V: ]VfY 7\UbbY` < cgh 6i g 5XUdhYf.

- < D9 GB%\* %\$E '' &; V'8i U`Dcfh': ]VfY'7\UbbY`'< cgh'6i g'5XUdhYf</p>
- < D9 GB%\* %\$E ' &; V G]b[ `Y Dcfh': ]VfY 7\UbbY` < cgh'6i g 5XUdhYf
  </p>

### \*(; V:]VfY 7\UbbY` < cgh6i g 5XUdhYf.

- < D9 GB%+\$\$E \*(; V8i U Dcfh: ]VfY 7\UbbY < cgh 6i g 5XUdhYf
  </p>

#### GcZhk UfY! A UbU[ Ya Ybh

Hod

Ga Ufh'GrcfU[ Y'5Xa ]b]ghfUrcf'fGG5Ł'7@='Ga Ufh'7ca dcbYbh'Zcf'9GL]'+"\$'Zcf'; Yb%\$#, Yb%\$'D'i g#, Yb%%'7cbhfc``Yfg J Yfg]cb. '&\$&( "%\$"\$% **fF YWta a YbXYXŁ** : ]'YbUa Y. 'Wd\$) - &%( "Wta dg][ / 'Wd\$) - &%( "n]d

### =a dcfhUbh BchY°

5Wfi U`9GL]'JYfg]cb']g'\*"(\$"\*"\$

### : ]I Yg

- $\bullet : ]I \ YX ` Ub `] ggi \ Y `k \ YfY ` ZU] ` YX ` Xf] j \ Y ` XYhU] `g `k \ YfY ` X] gd ` UmY X `a \ i \ `h] d `Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' | Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Wtb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yg `] b `h \ Y `fig\ ck ` Ytb Z] [ fici hdi h' Y `h] a \ Yb \ Yb Z ` Yb Z$
- : ]I YX`]b\/cffY\/h`Yffcf`a YggU[ YgʻX]gd`UmYX`]b`GG57@=k\\b`h\Y`a cX]Zm\vca a Ub\X`h\fYk `Ub`Yffcf`]Z`h\Y`fXf]j YfiUbX`fXf]j YhmdYfi dUfUa YhYfg`\vcYl ]ghYX"
- :]I YX`Ub`]ggi Y`k \YfY`h\Y`UffUmWfYUh]cb`Wca a UbX`ZU]`YX`k \Yb`YI YW hYX`k ]h\`h\Y`Xf]j Yg1 U```UbX`Xf]j YhmdY1 gUhUS\XX dUfUa YhYfg"
- :]IYX'Ub']ggiY'k\YfY'h\Y'Xf]jYg'VY\]bX'h\Y'YbWcgifYg'kYfY'a ]gg]b[']b'h\Y'GG57@=cihdih'
- : ]I YX`Ub`]ggi Y`k \YfY`i gYfg`YbVti bhYfYX`U`ZU]`i fY`k \Yb``Ui bVX]b[`h\Y`GG5G7F=DH=B; `hcc``hc`fYghcfY`U`F5=8`WtbZ][i fUh]cb k]h\`Ub`i bgi ddcfhYX`dUfUa YhYf`Zcf`DfYVcch<YU`h\FYdcfh]b["

#### 9b\UbWa Ybhg

Hc ]a dfcj Y h\Y ci hdi h Zcfa Uh cZh\Y BJ A Y Xf]j Y \YU h\ `c[ Zcf h\Y g\ck Wta a UbX"

### GcZhk UfY! GhcfU[Y'7cbhfc"Yf

Hcd

< D9 A Y[ UF 5=8 'GhcfU[ Y'5Xa ]b]ghfUhcf'Ghcf7@=Zcf'JAk UfY+"\$ fl cf'; Yb%\$D'UbX'; Yb%%7cbhfc``YfgL
J Yfg]cb. '&\$&( "%\$"\$%'fF YWta a YbXYXL
: ]'YbUa Y. 'Wta\*\$, ) \* "Wta dg][ / 'Wt\\$\*\$, ) \* "n]d</pre>

### =a dcfhUbhBchY°

 $5 \label{eq:cb_gradient} 5 \label{eq:cb_gradient} 5 \label{eq:cb_gradient} $$ W = 1.7 \ Y = 1.0 \ Y = 1.$ 

### 9b\UbWa Ybhg

- GiddcfhBcb!<chd`i[ 'WcbZ][ifUh]cbg
- 5XX HfUbgdcfh@Yj Y`FYhf]Yg`fH@FŁ@HC HUdY 8f]j Y gi ddcfh
- Gi ddcfh'i d[fUX]b[ 'Zfca 'J A k UfY '9GL]' + 'hc' J A k UfY '9GL]',
- - ghcfW]#W g\ck WUdhifYGcXD`@c[g
  - ghcfW] #W gYh WUdhi fYGcXD@c[g1OcbpcZZ2

### GcZhk UfY'! 'GhcfU[Y': ]VfY'7\UbbY'

<u>Hcd</u>

< D9`E @c[ ]W: ]VfY`7\UbbY``Xf]j Yf`Wta dcbYbh'Zcf`J A k UfY`j Gd\YfY`+"\$
J Yfg]cb. `&\$&( "\$- "\$%'fF YWta a YbXYXL
: ]'YbUa Y. `Wt\$) - , ' &"Wta dg][ / `Wt\$) - , ' &"n]d</pre>

### <u>=a dcfhUbh'BchY°</u>

H\]g Wta dcbYbh]g gi ddcfhYX cb`mcb; Yb\% Dfc@]UbhgYfj Yfg"

 $FY`YUgY`Bch\!Yg.$ 

< D9 E @c[]W5XUdhYfg:FY`YUgY BchYg

H\]g`Wta dcbYbh`]g`]bHYbXYX`hc`VY`i gYX`Vm<D9`Udd`]WUh]cbg"``=h`]g`U`n]d`h\Uh`WtbHJ]bg`h\Y`gUa Y`Xf]j Yf`XY`]j YfUV`Y`Uj U]`UV`Y`Zfca `h\Y jakUfY"Wta `UbX`h\Y`<D9`j ]VgXYdch"\dY"Wta kYVdU[Ygz`d`i g`Ub`<D9`gdYW]Z]W7DLLLL"I a``Z]`Y"

 $H\ ]g\ 8f]j\ Yf\ ]g\ gi\ ddcfhYX\ cb\ J\ A\ k\ UfY\ +"$I'\ cb\ m$ 

#### DfYfYei ]g]hYg

 $DYUgY Wbgi `hGDC 7? 'Zcf'U`]gh'cZ'gi ddcfhYX WbZ[[ifUh]cbg'Uj U]`UV`Y `Uh'h\ Y'Zc``ck ]b[ ``]b\_.$ 

\hhd. ##k k k "\dY"Wta #ghcfU[Y#gdcW#

### 9b\UbWa Ybhg

8f]j Yf j Yfg]cb ) "" ", ' "%

 $H\ ]g.8f]j.Yf.]g.gi.ddcfhYX.cb.J.Ak.UfY.+"$I.'.cb.m$ 

#### GiddcfhYX 8Yj JWYq UbX : YUhi fYq

H\]g Wta dcbYbh]g gi ddcfhYX cb Zc``ck ]b[ 'E `c[ ]W: ]VfY 7\UbbY`` < cgh 6i g UXUdhYfg.

- ' &; V : ]VfY 7\UbbY` < cgh 6i g 5XUdhYf.
  - < D9 GB%\* %\$E " &; V 8i U Dcfh: ]VfY 7\UbbY < cgh 6i g 5XUdhYf
    </p>
  - <br/>
     <br/>
- \*(; V:]VfY 7\UbbY`<cgh6i g 5XUdhYf.
  - <br/>
     <br/>
  - < D9 GB%+\$\$E '\*(; V'G]b[ `Y'Dcfh': ]VfY'7\UbbY`'<cqh'6i q'5XUdhYf
    </p>

< D9`GhcfU[ Y´9a i `YI `: ]VfY`7\UbbY``Xf]j Yf`Wta dcbYbh'Zcf`J A k UfY`j Gd\YfY`+"\$
J Yfg]cb. `&\$&( "%%"\$% f**F YWta a YbXYXL**: ]'YbUa Y. `Wt\$\*' ( \$&"Wta dg][ / 'Wt\$\*' ( \$&"n]d

#### =a dcfhUbhBchY°

H\]g'Wta dcbYbh']g'qi ddcfhYX'cb'mcb'; Yb\%'Dfc@]Ubh'qYfj Yfg"

#### FY`YUgY bchYg.

6fcUXWta 'FY'YUqY'bchYq

H\]g`Wta dcbYbh`]g`]bhYbXYX`hc`VY`i gYX`Vm<D9`Udd`]WUh]cbg"``=h`]g`U`n]d`h\Uh`WtbhU]bg`h\Y`gUa Y`Xf]j Yf`XY`]j YfUV`Y`Uj U]`UV`Y`Zfca `h\Y ja k UfY"Wta `UbX`h\Y`<D9`j ]VgXYdch"\dY"Wta `k YVdU[ Ygž'd`i g`Ub`<D9`gdYWJZ]W7DLLLL"I a ``Z]`Y"

I dXUhYX hc 8f]; Yf i Yfq]cb %( "&"\* +' "( +

#### DfYfYei lalhYa

 $DYUgY Wbgi `h`GDC 7? `Zcf`U``]gh`cZ'gi ddcfhYX`WbZ][i fUh]cbg`Uj U]`UV`Y`Uh'h\Y`Zc``ck ]b[ ``]b\_. \\$ 

\hhd.##k k k "\dY"Wta #ghcfU[Y#gdcW#

### : ]I Yg

: ]I YX h\ Y Zc `ck ]b[ '.

H Y H J H Y H J

### 9b\UbWa Ybhg

I dXUhYX hc 8f]; Yf i Yfg]cb %( "&"\* +' "( +

#### Gi ddcfhYX 8Yj JWYg UbX : YUhi fYg

H\]g'Vta dcbYbh']g'gi ddcfhYX'cb'Zc``ck]b[ '9a i `YI ': ]VfY'7\UbbY``<cgh'6i g'UXUdhYfg.

- ' &; V: 7 5XUdhYf.
  - <br/>
     <br/>
  - <D9`GB%\* %\$9`' &; V`G]b[`Y`dcfh: ]VfY`7\UbbY``<cgh'6i g`5XUdhYf
- \* (; V: 7.5XUdhYf.
  - < D9 GB %+\$\$9 \* (; V 8i U Dcfh: ]VfY 7 \ UbbY < cgh 6i g 5 X UdhYf
    </p>
  - < D9 GB%+\$\$9\*\*(; V\*G]b[ `Y\*Dcfh': ]VfY\*7\UbbY` < cqh'6i q\*5XUdhYf
    </p>

### GcZhk UfY! GmghYa A UbU[Ya Ybh

<u>Hcd</u>

<D9 5[YbhYgg A UbU[Ya Ybh6i bX Y Zcf 9GL]cb; Yb%%

J Yfg]cb. +\$%"%"+"\$ **fF YVt**a a YbXYXŁ

: ] YbUa Y. 'Ua gXj 7ca dcbYbhS+\$%"%"+"\$"&! %S&( &' +\$\* \$"n]d

### <u>: ]l Yg</u>

GYY h\Y 5AGFYYUgY BchYg Zcf ]bZcfa Uh]cb UVci hh\Y ]ggi Yg fYgc j YX ]b h\ ]g fY YUgY"

### 9b\UbWa Ybhg

 $GYY'h \ Y' \underline{5AG'FY'YUgY'BchYg'} Zcf'] b Zcfa\ Uh] cb'UVci\ h'h \ Y'Yb \ UbW'a\ Ybhg'] b'h \ ]g'fY'YUgY''$ 

< D9': ]VYf'7\UbbY``UbX'GhcfU[ Y'9bUV`Ya Ybh'7ca dcbYbh'Zcf'9GL]'+"\$
J Yfq]cb. '' "- "\$'**fF YWta a YbXYXt** 

: ]'YbUa Y. ZWYbUV'Ya YbH Wta dcbYbhS+\$\$" "- "\$"(!%S&\$&\* \* \$' &"n]d

#### 9b\UbWa Ybhg

Gi ddcfhg'J A k UfY'9GL]'+"\$'I &'UbX'9GL]'+"\$'I'

=bhY[fUhYX:Ga Ufh:I dXUhY:Hcc`g'Zcf'JAkUfY:9GL]:+"\$

J Yfg]cb. +\$%") "" "\$ **fF YVta a YbXYXŁ** 

: ] YbUa Y. gi h7ca dcbYbh6+\$%") "" "\$"(!\$!g][ bYXSWta dcbYbh &(', %\*' %"n]d

#### =a dcfhUbhBchY°

=bhY[fUhYX`Ga Ufh`I dXUhY`Hcc`g`Zcf`9GL]`+"\$`dfcj ]XYg`gi ddcfh`Zcf`Z|fa k UfY`UbX`Xf]j Yf`i dXUhY`g`j ]U`]@C`FYdcg]lcfm

### : ]I Yg

GYY h\Y ]GI H FY YUQY BchYq Zef ]bZcfa Uh]cb UVci hh\Y ]ggi Yg fYgc j YX ]b h\]g fY YUgY

### 9b\UbWa Ybhg

GYY'h\Y']GI H'FY'YUgY'Bch'Yg'Zcf']bZcfa Uh]cb'UVci h'h\Y'Yb\UbWfa Ybhg']b'h\]g'fY'YUgY"

; Yh'WebbYWWYX'
\dY"V¢a #]bZc#[ YhW¢bbYVMYX ·
7i ffYbh' <d9'xf]j ddcfhž'ubx'gywf]hmu'yfhg'xy']j="" f'xyg_hcd'<="" th="" yfyx'x]fywhmhc'mci="" yfž'gi=""></d9'xf]j>
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