## 



C WW Ub 'Gdf]b[gž'A]gg]gg]dd]ž'I G5 '! '5g'gi a a Yf'hfUj Y``\YUhg i dž'U'XY`][\hZ ``[Ya 'cb'h\Y'; i `Z'7cUgh']g'VUg\_]b[']b'h\Y'gdch`][\h" C WY Ub 'Gdf]b[gž'A]gg]gg]dd]ž'\Ug'VYYb'bUa YX'cbY'cZ'h\Y' + '7i hYgh Ga U``'Hck bg'cb'h\Y'; i `Z'7cUgh 'Vm'K cf`X'5h`Ugž'U'X]gh]bWh]cb'h\Uh fYgcbUhYg'k]h\'Vch\'fYg]XYbhg'UbX'j]g]hcfg'U`]\_Y"'H\]g'W\Ufa ]b[hck bž'fYbck bYX'Zcf']hg'W' `hi fU`'gWYbYž'XY`YWhUV`Y'ZccXž'UbX ZUa]`m!Zf]YbX`m'YbhYfhU]ba Ybhž'hfi `m'Ya VcX]Yg'h\Y'YggYbWY'cZ ga U``!hck b'W\Ufa 'Ua]X'h\Y'\i gh`Y'UbX'Vi gh`Y'cZ'gi a a Yf hci f]ga "

K ]h\`]hg`Zf]YbX`m`Wcaaib]hmj ]VYž'CWYUb`Gdf]b[g`\Ug`V`cggcaYX]bhc`U`WcjYhYX`XYgh]bUh]cb`Zcf`ZUa]`]Yg``cc\_]b[`hc`YgWUdY`h\YaibXUbY"`5WWcfX]b[`hc`Kcf`X`5h`Ugž']h`\Ug`WcbgYW'h]jY`m`aUXY

 $\label{thm:conditions} $$h\Y'IG5'HC85M'\%$'6Ygh'`]gh'Zcf']hg'ga\ U``!hckb'W'`hifU``gWYbY'cjYfh\Y'dUgh'h\fYY'mYUfgž'UbX']b'`&$&&ž']h'W]bWXYX'h\Y'h]h`Y'cZ'6Ygh 7cUghU``Ga\ U```Hckb''H\YgY'UWWc`UXYg'ibXYfgWcfY'h\Y'hckbg Wcaa]haYbh'hc'aU]bhU]b]b[']hg'WXUfUWhYf'k\]`Y'UhhfUWh]b['acfYfyg]XYbhg'UbX'j]g]hcfg''$ 

#### F]WX 5fhg Ub X FY`UI Uh]cb

 $DUfhic ZC WW Ub `Gdf]b[g `U``i fY ``]Yg`]b`]hg'j ]VfUbh'Ufhg'gWWbY"`H\Yhck b`]g`\ca Y`hc'gYj YfU``UhhfUWh]cbg`h\Uh'WUhYf`hc`X]ZZYfYbh ]bhYfYghg"`H\Y`K U`hYf `5b XYfgcb`A i gYi a `cZ'5fh'g\ck WUgYg h\Y`k cf_g`cZ']hg`bUa YgU_Y`Ufh]ghž'k \]`Y`h\Y`A Ufm'7"`C ?YYZY 7i `hi fU``7YbhYf`cZZYfg`Ufh'WUggYg`UbX`k cf_g\cdg": cf`h\cgY ]bhYfYghYX`]b``cWU``WfUZhgž`U'j ]g]h'hc'G\YUfk UhYf`DchhYfm U k cf_]b[`dchhYfm'ghi X]c ]g`U'a i gh"$ 

 $B\ Uhi\ fY\ ``cj\ Yfg`k\ ]```Z]bX`d`Ybhm`hc`Yb\'cmž`hcc"`H\Y`;\ i\ `Z'=g`UbXg\\ B\ Uh]cbU``GYUg\cfY`cZZYfg`df]gh]bY`VYUW\Yg`UbX`\]_]b[``hfU]`gž'k\]`Yh\Y`8 Uj\]g`6Umci\ `5fYU`dfcj\]XYg`gYfYbY`gi\ ffci\ bX]b[\ g`Zcf`Z]g\]b[\ UbX`Yb\'cm]b[\ `h\Y`[\ fYUh`ci\ hXccfg"`<\]_]b[\ `U`cb[\ `h\Y`:\ cbhU]bYV`YUi\ B\ Uhi\ fY`HfU]``]g`Ub`YI\ WY``Ybh`ZUa\]`m!\Zf]YbX`m`U\Wh]j\]hmž`U``ck\]b[\ Yj\YfmcbY`hc`gcU__`]b`h\Y`bUhi\ fU``VYUi\ hm`h\]g`\\cUghU``hck\ b`\Ug`hc\ c\ZYf"$ 

### < ]ghcf]W@UbXa Uf\_g`UbX`: Ygh]j U`g</pre>

GhYd'VUW\_']b'h]a Y'Vm'YI d`cf]b['CWYUb'Gdf]b[g'f]WX'\]ghcfm'Uh g]hYg'`]\_Y': cfh'A Ui fYdUg'DUf\_ž'k \]WX'WY`YVfUhYg'h\Y'UfYU g VY[]bb]b[g'Ug'h\Y'Z]fgh': fYbWX'gYhh`Ya Ybh']b'h\Y'A ]gg]gg]dd] JU``Ym''5'j ]g]h'hc'h\Y'CWYUb'Gdf]b[g'<]ghcf]W@/'B'8Ydchž'bck'U Vi gh`]b['a i gYi a 'UbX'j ]g]hcf'WYbhYfž'UXXg'U'XcgY'cZ'W'`hi fU`Ybf]WXa Ybh''5XX]h]cbU``mž'h\Y'7\Ufb`Ym'Bcfk ccX'<ci gYž XYg][bYX'Vm'UfWX]hYWh'@ci ]g'Gi ``]j Ubž'ghUbXg'Ug'U'hYghUa Ybh'hc \]ghcf]WU``UfWX]hYWhi fY''

 $C\ WW\ Ub\ Gdf]b[\ g']g'\ U\ gc'\ ZUa\ ci\ g'\ Zcf']hg'`]j\ Y`m'\ ZYgh]j\ U`g'\ Ub\ X'Yj\ Yb\ hgž\ k\ \]W\&\ Vf]b[\ 'h\ Y'\ Wca\ a\ i\ b]hm'\ hc[\ Yh\ Yf']b'\ WY`YVfUh]cb'''\ H\ Y'\ Ubbi\ U`\ DYhYf'\ 5b\ XYfgcb'\ 5fhg'/\ '7fU\ Zhg':\ Ygh]j\ U`']b'\ Bcj\ Ya\ VYf'g\ ck\ WUgYg$ 

`cWU``Ufh]gUbgž'k \]`Y`h\Y`CWYUb`Gdf]b[g`A UfX]; fUg`DUfUXY`]b
: YVfi Ufm`XfUk g`Wfck Xg`YU[Yf`hc`fYj Y``]b`ZYgh]j Y`W\YYf"`H\Y
A ]gg]gg]dd]`Gcb[k f]hYfg`: Ygh]j U``]b`GYdhYa VYf`\][\`][\`][\hg``cWU`
hU`Ybh`UbX`dfca chYg`U``cj Y`Zcf`a i g]Wh\Uh`YW\cYg`h\fci [\`h\Y

## 7i `]bUfm'8Y`][ \ hg'UbX'G\cdd]b[

: ccX]Yg'k]``Z]bX'h\Ya gY'j Yg']b`\YUj Yb"'H\Y'hck b'VcUghg'YUhYf]Yg
`]\_Y'H\Y'G\YX'66E / '6`i Yg'≈]bhž'WY`YVfUhYX'Zcf']hg
a ci h\k UhYf]b['VUfVYW Y'UbX'`]j Y'a i g]W'Z'mci fY']b'h\Y'a ccX
Zcf'gca Yh\]b['i dgWU`Yž'J Ygh][Y'cZZYfg'ZUfa !hc!hUV`Y'XY`][\hgžk\]'Y'D\cYb]W]U'; ci fa Yh'hYa dhg'X]bYfg'k]h\'A YX]hYffUbYUb
ZUj cfg"'5ZhYf'U'gUh]gZm]b['a YU'ž'YI d`cfY'i b]ei Y'g\cdd]b['cdh]cbgžfUb[]b['Zfca 'h\Y\UbXa UXY'dchhYfm'Uh'<]``mYf'<ci gY'hc'h\YYWYWh]WZ]bXg'Uh'A]bYfg'/'D`UbhYfg'Vci h]ei Y"

cfb][\hi]ZYž; cj Yfba Ybh'GhfYYh; fcWfm'dfcj ]XYg'U'Wcnm'VUf Uha cgd\YfY'k]h\'WfUZh'VYYfg'UbX'`]j Y'a i g]Wz'k\]`Y'A i f\_m'K UhYfg 6`i Yg'/ '66E']bj ]hYg'dUhfcbg'hc'Yb'cm'[ccX'ZccX'UbX'[fYUh'hi bYg" H\YfY g'U`k Umg'gca Yh\]b['\UddYb]b[']b'C'W'Ub'Gdf]b[gž'a U\_]b[]h'U'j ]VfUbh'd`UWY'hc'i bk]bX'UbX'WcbbYWh'k]h\'h\Y'Wca a i b]hm"

±b·gi a a Ufmž·C W/Ub·Gdf]b[g·ghf]\_Yg·U·dYfZYWh·VU`UbW/VYhk YYbbUhi fU``VYUi hmž·U·f]W\ W `hi fU``j]VYž·UbX·Zf]YbX`m·ZUW/gž·a U\_]b[·]hUb·]XYU``[YhUk Um·Zcf'h\cgY·YI d`cf]b[·h\Y; i `Z·7cUgh"·K]h\·U``h\YgY·UhhfUWh]cbg·UbX·UWWc`UXYgž·]hg·bc·kcbXYf'h\Uh·h\]g A ]gg]gg]dd]'hfYUgi fY·]g·hi fb]b[ˈ\YUXg·UbX·XfUk]b[ˈj]g]hcfg·YU[Yfhc·YI dYf]YbW/·U```]h·\Ugʻhc·cZZYf"

8 Y hU]`g	
Cfh	CWYUb'Gdf]b[gž'A]gg]gg]dd]ž'lG5
EiY``Yb	• k k k "WUf]cb`YX[Yf"Wca
	<ul><li>k k k "hci f]ghgY WfY hg" Wca</li></ul>

# 6 Ygi WX Yb 'G]Y 'i bg 'Ui Z. 'a Y]b!k ]Yb "bYh