BUh]cbk]XY``Bc'?]b[g``8Um`A]``]cbg I b]hY`5[U]bgh`Hfi a d g`Dc`]W]Yg

A]``]cbg'UfY'gYhihc'dfchYgh'U[U]bghih\Y'Hfiad'UXa]b]ghfUh]cb cbi/eich/Bc'?]b[g/eich/'8Umž'\][\`][\h]b[']aa][fUbh f][\hg'UbX'XYacWfUWmbUh]cbk]XY"



K Ug\]b[hcb'7cibhmžil G5'!'5Wfcgg'h\Y'I b]hYX'GhUhYgža]``]cbg cZ'5aYf]WUbg'UfY'fU``m]b['hcXUm']b'U'XUm'cZ'dfchYghg'XiVVYX' Bc ?]b[g'8Umžjc]W]b['h\Y]f'X]ggUh]gZUWh]cb'k]h\'h\Y'Hfiad UXa]b]ghfUh]cb"'5ddfcl]aUhY`m'&ž\$\$\$'gYdUfUhY'YjYbhg'\UjY'VYYb cf[Ub]nYX'Zfca'WcUgh'hc'WcUghž'k]h\'XYacbghfUhcfg'UXjcWUh]b[Zcf']aa][fUbh'f][\hg'UbX'fU]g]b['h\Y]f'jc]WYg'U[U]bgh'h\Y UXa]b]ghfUh]cbg'dc`]W]Yg"'9jYbhg'UfY'bch'k]h\cih'hYbg]cb/ U`hYfWUh]cbg'\UjY'cWWiffYXž'bchUV`m']bWiX]b['WcbZfcbhUh]cbg'k]h\ WcibhYf!dfchYghYfg'Zfca'h\Y'DfciX'6cmg']b'5h`UbhU"'=b'`][\h'cZ WcbWifbg'giffcibX]b['gUZYhmž'dfchYghg']b'A]bbYgchU'kYfY'bchUV`m

=b[·]: `cf]XUž[·]h\Y[·]g₩[·]bY[·]kUg[·]bchUV`m[·]]jY`m[·]Ug[·]dfchYghYfg[·]UddfcUW\YX

A Uf!U!@U[cžYbWci bhYf]b['U'[fci d'cZ'Hfi a d'gi ddcfhYfg'U`cb[h Y k Um'' D (Y d Q h) = 0h\Y`XUmžk]h\`hYbg`cZ`h\cigUbXg`YIdYWhYX`hc`[Uh\YfžWc]bW]X]b[k]h\ h\Y`I "G"`5fa mg`&) \$h\ Ubb]j YfgUfm'WY`YVfUh]cb"`G]a]`Uf`m]a dfYqq]j Y [Uh\Yf]b[g UfY c \\ ff]b['Y gYk \YfYž k]h\ c j Yf %ž\$\$\$ dUfh]W]dUbhg; gdchhYX']b'BYk'Mcf_'7]hmVfUbX]g\]b['g][bg'Wf]h]WU`cZ Hfi a dž'k \]`Y`U'q][b]Z]WUbh'&\$!Zcch'VU``ccb'XYd]Wh]b[`'Hfi a d`]b'U X]UdYfa UXY'Ub'YmY!WUhW\]b['UddYUfUbWY'Uh'h\Y'@cg'5b[Y`Yg dfchYgh"

@cWU`]nYX 'DfchYghg'UbX '7cbZfcbhUh]cbg

5 g[°]dfchYghg[°]i bZc[°]XYX[°]bUh]cbk]XYž[°]gdYW]Z]W[°]cWUh]cbg[°]ZUWYX[°]h\Y]f ck b WX U``Yb [Yg" + 5i gh]bž HYI Ugž Zcf]bghUb WY ž Zci f dc`]WY cZZ]WYfg`k YfY`]b^i fYX`Xi f]b[`U`dfchYgh`h\Uh`]bj c`j YX`\i bXfYXg`cZ XYa cbghfUhcfg"'5i h\cf]h]Yg'fYgcfhYX'hc'i g]b['W\Ya]WU`']ff]hUbhg'hc $\label{eq:constraint} X]gdYfgY`WfckXgž`k \]W\ a cjYX`VYhkYYb`h\Y`ghUhY`7Ud]hc``UbX`U$ ZYXYfU``Vi]`X]b[`\cig]b[`Ub`=79`cZZ]WY"`8Ygd]hY`YZZcfhg`hc`_YYd h\Y`YjYbh'dYUWYZi`ž'hYbg]cbg`YgWU`UhYXž'fYgi`h]b[`]b`h\Y`dc`]WY Wcg]b['h\Y'7Ud]hc`'YUf`m']b'Ubh]W]dUh]cb'cZ'h\Y'XYa cbghfUh]cbg" H\Y`5i gh]b`dc`]WY`YbXYX`i d`UffYgh]b[`Y][\h`]bX]j]Xi U`g h\fci[\cihh\Y`W\Uch]WYjYbhg"

`UghYX'gYj YfU``\ci fg'VYZcfY']h'k Ug'XYYa YX'Ub' i b`Uk Zi ` UggYa V`m 'Vm'dc`]WY UZhYf'cV'YWhg'k YfY'fYdcfhYX`m'h\fck b"

5Wfcqq`]b`8U``UqžU'dfchYgh'cb'U'W]hm'Vf]X[Y'XfYk'\ibXfYXq'UbX 8 Y gd]hY ']b]h]U`'UhhYa d hg hc 'ZUW]`]hUhY 'd Y UWYZ `'UggYa V`mž c ZZ]WY fg \UX`hc`ghYd`]bžYa d`cm]b[`dYddYf`gdfUm`UbX`ga c_Y`hc`WYUf`h\Y UfYU" 8]gW gg]cbg Ufci bX \ck hc VU UbW h\Y f][\hhc dfchYgh k]h\ di V`]WgUZYhm Wcbh]bi YžUg gYYb k]h\ HYI Ug; cj Yfbcf; fY[5VVchhg'Wca a Ybhg'UVci h'a U]bhU]b]b[``Uk Zi ``VY\Uj]cf"

BUh]cbk]XY FYgdcbgY UbX FYUWh]cbg

BUh]cbk]XYžh\Y'dfchYghg`\Uj Y'VYYb'Xf]j Yb'Vm'Ub[Yf'cj Yf]a a][fUh]cb`dc`]W]Ygž`i bXYfgWcfYX`Vm`fYWYbh`Yj Ybhq`]bWi X]b[`h\Y XYhU]ba Ybh'cZ'i b]cb'`YUXYf'8Uj]X'<i YfhU'Xi f]b[']a a][fUh]cb fU]Xg`]b`@cg`5b[Y`Yg"`=b`6cghcbž`\i bXfYXg`[Uh\YfYX`Uh`7]hm`<U``

D`UnU'hc'j cWU``m'gi ddcfh'<i YfhU g'fY`YUgYž'fYUZZ]fa]b['h\Y]f Wca a]ha Ybh'hc']a a][fUbh'f][\hg": fca 'W\Ubhg'cZ' : fYY'8Uj]Xž ZfYY'h\Ya 'U`` 'hc'a YggU[Yg'U[U]bgh'Ui h\cf]hUf]Ub]ga 'UbX'Zcf XYa cWfUWhž'h\Y'gYbh]a Ybhg'YI dfYggYX'fYgcbUhY'XYYd`m'UWfcgg j Uf]ci g``cWUh]cbg"

@cc_]b[`U\YUXž'h\Y'd`UbbYX'a]`]hUfm'dUfUXY'hc'Wca a Ya cfUhY h\Y'5fa mg'&) \$h\`Ubb]j YfgUfm']g'U`fYUXm'VYWca]b[`U'ZcWU`'dc]bh Zcf'Z hi fY'dfchYghg"'Cf[Ub]nYfg'Zfca `FYZ gY': UgW]ga `UfY'fU``m]b[U[U]bgh'h\Y'Yj Ybhž'WU]a]b[`]h'Ug'U'a Ub]ZYghUh]cb'cZ'Hfi a d g]``Y[U`ž'i bWcbgh]hi h]cbU`ž'ZUgW]gh'h\fYUh'cZ'j]c`YbWY" `5g gdc_YgdYfgcb'Gi bgUfU'HUm`cf'\Ug'dc]bhYX'ci hž'h\]g']g'gYYb'Ug'U Wf]h]WU``a ca Ybh'hc'ghUbX'Z]fa `]b'XYZYbgY'cZ':]fgh'5a YbXa Ybh f][\hg"

5gʻh\Y`XUmʻi bZc`XgždfchYghgʻk]```gi fY`mʻWcbh]bi Yʻhcʻg\UdYʻh\Y bUh]cbU``X]U`c[iY`cbʻh\YgY`dfYgg]b[`]ggi Yg"`K \Yh\Yf`h\fci[\ dYUWYZi``XYa cbghfUh]cbgʻcfʻWcbZfcbhUh]cbgžYUWX`UWh`cZXYZ]UbWY g][bU`gʻU`ghfcb[`k]```Ua cb[`5a Yf]WUbgʻhcʻjc]WY`h\Y]f`WcbWYfbg UbX`XYa UbX`UWWci bhUV]`]hm`Zfca`h\Y]f``YUXYfg"

=b`U`W]a UhY`ZfUi [\h`k]h\`i bYUgY`UbX`i bWYfhU]bhmž`h\YgY`dfchYghg fYdfYgYbh`a cfY`h\Ub`a YfY`X]ggUh]gZUWh]cb/`h\Ym`fYZ`YWh`U`WU```Zcf ^hgh]WY`UbX`Yei]hm`Zcf`U``"`: cf`h\cgY`dUfh]W]dUh]b[ž`h\YfY g gca Yh\]b[`hc`VY`gU]X`Zcf`ghUbX]b[`i d YjYb`]b`h\Y`ZUWY`cZ cddcg]h]cb"

: cf`i dXUhYg`cb`h\Y`dfchYghg`UbX`h\Y`]a d`]WUh]cbg`cZ`hcXUmg Yj Ybhgž`gYY`h\Y`Wcj YfU[Y`Zfca `I G5`HcXUmž`BYk `=bX]Ub 9I dfYggž`UbX`B67`BYkg"

8 Y hU]`g	
Cfh	KUg\]b[hcb [·] 7cibhmžilG5
EiY``Yb	• k k k "i gUhc X Um"Wc a
	• k k k "bYk]bX]UbYI dfYgg"Wca
	● k k k "b V Wb Y k g"Wca

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