

ENGG2500

: i]X'A YW Ub]Wg'Zcf'9b[]bYYfg

HYfa %7 &\$&&

7ci fgY`Cj Yfj]Yk

GhJZ`7cbHJW`8YHJ]`g

7cbj Ybcfg

B Ua Y	9a Uj`	5j U]`UV]`]m	@cWJh]cb	D\cbY
GhYZJb: Y`XYf	g"Z`XYf4 i bgk "YXi "Ui	VmiUddc]bha Ybh	I BGK `K UHf F YgYUfW	

7ci fgY'8YHJ]`g

I b]hg'cZ7fYX]h*`

Gi a a UfmcZ\hY'7ci fgY

H\Y'cV'YWj]Y'cZ9B; ; & \$\$\$]g'hc']b]fcXi W' Yb[]bYf]b['ghi XYbhg'hc'h\Y'df]bW]d'Yg'cZZi]X'a YWU]b]Mg"
 Hcd]Mg'X]gW'ggYX']bW] XY: 'i]X'dfcdYfh]Yg"< nXfcgU]Wg" '6i cU]bW]d'fYggi fYg']b'Zi]X'gmgh'a g" Df]bW]d'Yg
 cZa Ugg'W'cbgYf] U]cb"GHYUXmZck 'YbYf[m'Yei U]cbg": 'ck'a YUgi fYa Ybh': cfW'g'UbX'a ca Ybh'a ']b
 Zck]b['Zi]Xg" '8]a Ybg]cbU'UbU'mg]g'z]g]a]Uf]m]UbX'd\mg]W]a cXY"]b["'D]dY'Zck "'bW'a dfYgg]V'Y'Ua]bUf
 UbX'hi fVi 'YbhZck ']b'd]dYg/]W]cb'ZUW'c' '9Ya YbhUfmVci bXUfm'UmYf'Zck /g_]b']W]cb'UbX'XfU["'Di a dg
 UbX'hi fV]bYg" 'Di a d'UbX'd]dY']b'Y'gmgh'a 'WUfUW]f]gh]Wg"

7ci fgY'5]a g

H\Y'cV'YWj]Yg'cZ\h]g'W'ci fgY'UfY'hc.

! 'b]fcXi W'ghi XYbhg'hc'h\Y'dfU]W]W'cZk UHf'Yb[]bYf]b['UbX'Zi]X'a YWU]b]Mg"
 ! 'b]fcXi W'ghi XYbhg'hc'h\Y'hYcfm]cZk c'ei]H'X]ZYfYbhgh'UXmZck g. W'cgYX'W'cbXi]hcf'd]dY'Zck 'f]Y"
 dfYggi f]gYX'Zck E'UbX'Vf]YZm'hc']Y'Y'gi fZUW'Zck 'f]Y" Zck g'k \Yf' h\Y'k UHf'gi fZUW']g'gi V'YW]hc
 U]a cgd\Yf]WdfYggi fY' "
 ! ;]Y'ghi XYbhg'Ub'i bXYfgh]UbX]b['cZ\hY'dfcdYfh]Yg'cZZi]Xg'za Ubca Yfhn'z'nXfcgU]Wg'z'h\Y'df]bW]d'Yg'cZ
 a Ugg'UbX'YbYf[m'W'cbgYf] U]cb'z'h\Y'z'cfW'g'UbX'a ca Ybh'a ']b'Zck]b['Zi]Xg'z'Zck ']b'd]dYg'z'Ua]bUf'UbX
 hi fVi 'YbhZck "
 ! '9bUV'Y'ghi XYbhg'hc'Udd'm]h\Y'Z' bXUa YbhU'df]bW]d'Yg'cZa Ugg'W'cbgYf] U]cb'z'YbYf[m'W'cbgYf] U]cb'UbX
 h\Y'a ca Ybh'a 'Yei U]cb'hc'h\Y'UbU'mg]g'cZ'Zck g']b'X]ZYfYbhg]W]bUf]cg"
 ! '9bUV'Y'ghi XYbhg'hc'W]ffm]ci h]U'X]a Ybg]cbU'UbU'mg]g'UbX'W]ffm]ci h\Y'gW]]b['Z'f'U'd\mg]W]a cXY"
 ! '9bUV'Y'ghi XYbhg'hc'a U_Y'Yg]h]a UH'g'cZVci bXUfm'UmYf'h]W]bYgg'UbX'j Y'cW]h]Yg'c] Yf'ZUhd'U]h'g'z'UbX'hc
 Yg]h]a UH'h\Y'z'cfW'g'cb'&8'UbX' '8'VcX]Yg']b'gi Va Yf[YX'Zck g"
 ! '9bUV'Y'ghi XYbhg'hc'ei Ub]h]Zmid]dY']W]cb'cggYg'UbX'hc']b]fcXi W']m]ci 'hc'gca Y'cZ\hY'UggcW]U]h'X'fYU']Z'
 dfcV'Ya g'cZd]dY'Zck 'W]W' U]cbg"

7ci fgY'@YUfb]b['Ci hW'a Yg

5Zf'gi W]W'ggZ 'm'W'a d'Y]b['h]g'W'ci fgY'z'm]ci 'g\ci 'X'VY'UV'Y'hc.

@YUfb]b['Ci hW'a Y	95'GHU[Y'%7ca dYHbW]Yg
%"6Y'UV'Y'hc'YI'd]U]b'UbX'Udd'm]h\Y'VUg]WdfcdYfh]Yg'cZZi]Xg'UbX \ck'h\YgY'fY'U]h'hc'Zi]X'Zck "	D9%"%žD9%"&žD9%"%žD9%"&
&"6Y'UV'Y'hc'YI'd]U]b'h\Y'Z' bXUa YbhU'df]bW]d'Yg'cZZi]X'Zck ']b d]dYg'UbX']Y'Y'gi fZUW'Zck g']n'W'cb]bi]m'z'a ca Ybh'a 'UbX YbYf[m'z'UbX'_bck 'hc'k \U]h]h] U]cbg'h\YgY'df]bW]d'Yg'W]b'VY Udd']YX"	D9%"%žD9%"&žD9%"%žD9%"&
' "'6Y'UV'Y'hc'UggYgg'YbYf[m'cggYg']b'd]dYg'Xi Y'hc']W]cb'UbX j Uf]ci g'd]dY'Z]h]b[g"	D9%"%žD9%"&žD9%"%žD9%"&
(' "6Y'UV'Y'hc'YI'd]U]b'UbX'XYgW]VY'h\Y'W'cbX]h]cbg'z'cf'Zck g']b d]dYg'i bXYf'k \]W'j Uf]ci g'Zck 'fY[]a Yg'k]'cW]W'f'f]k'Ua]bUf'UbX hi fVi 'YbhZck g'z'f]k'hi fVi 'YbhZck g'k \]W'UfY'\nXfUi ']W]m]fci [\	D9%"%žD9%"&žD9%"%žD9%"&

@YUfb]b[`Ci hMca Y	95 `GHJ[Y`%7ca dYhYbWYg

5ggYgga Ybh

FZWX S^YdSVWXdFZ[e UagdeWi [^ ad_S^k TWTSeW a` fZWeg_ aXfZWeUadMe Xa_ WsUZ aXfZW
 SeeWee_ W ffSe] eZ H\Y:]bU`9I Ua]g`k cft`*\$i` cZmci f:]bU`A Uf_]ZWUgg`k cf_]g`]bWi XYX`UbX`%\$ \$i`]Z
 ma if fWUgg`k cf_]g`]bWi XYX"

FZWUSee i ad] [e i adZ &" . aXfZW8[S^? Sd] [X[UgVWz5`a Uf_cZUh`YUgh(\$i`]b`hY`Z]bU`YI Ua]bUh]cb
]g`fYeI]fYX`VYzcfY`hY`WUgg`k cf_]fC b`]bY`ei]nnYg`UbX`UV`WUgg`UggYgga Ybh]g`]g`]bWi XYX`]b`hY`Z]bU`
 a Uf_`H\Y`Zcfa U`YI Ua]gW]d]g`k]`bchVY`fYh`fbYX`Vi hmcI`UfY`dYfa]hYX`hc`j]Yk`hY`a Uf_YX`gW]d]h`

@afW FZW`WUfgdWdWchWe fZWdYzf fa SV`gef fZWX S^eUadMe Tk eUS` Y [XSYdWW Tk fZW: WSV aX
 E UZaaž

E fgVW fe i Za bWad_ baadk [fZWcg[U] cg[| I We S` V i ad] eZabe SdWdWa__ W VW fa V[eUgee bdaYdMe
 i [fZ fZW`WUfgdWdVgd` Y fZWfWd_ž

5ggYgga YbhUg_	K Y][\h	8i Y`8UhY	7ci fgY`@YUfb]b[Ci hMa Yg`5ggYggYX
%":]bU`9I Ua]bUh]cb	* \$i	Bch5dd`]WUVY	%ž &ž' ž(ž) ž*
&"@UV`WUgg`UbX`dcghUV cb`]bY`UggYgga Ybhg	&(K YY_g" ž) ž	%ž &ž' ž(ž) ž+
' "'C b`]bY`E i]nnYg	%*		%ž &ž' ž(ž) ž*

5ggYgga Ybh% :]bU`9I Ua]bUh]cb

5XX]h]cbU`XYHJ]g

&`C b`]bY`E i]nnYg`k]`VY`Wca d`YH`X`cb`h`Y`A ccX`Y`Wci fgY`dU[Y`H`Ymk]`UW`ci bhZcf, i `cZ`h`Y`Wci fgY`
a Uf`_`YUWX`UbX`k]`hU`_`Y`d`UW.

E i]n`%`K`YY`_) /H\i fgXUm%+h`A UfWX`Zca`*.`\$!, .`\$`da`Zcf`U`&`\ci fg`Xi fU]cb"

E i]n`&.`K`YY`_`%\$/H\i fgXUm&%gh5df]`Zca`*.`\$!, .`\$`da`Zcf`U`&`\ci fg`Xi fU]cb"

C`h`Yf`UggYgga`Ybh]bZcfa`U]cb.

8U`h`cZa`Uf`_`g`fYh`fbYX.`(,` \fg`U`Z`h`f`WcgY`cZC`b`]bY`E`i`]n

DYbU`mZcf`U`h`gi`Va`]gg]cb.) i `dYf`XUm

: cf`Z`f`h`Yf`XYHJ]g`d`YUgY`gYY`h`Y`A`ccX`Y`Wci`fgY`i`bXYf`HUV`C`b`]bY`E`i`]nnYg`"

5 HbXUbW F YeI jfYa YbHg

Gh XYbHg UFY gfc b [mYbWci fU [YX'fc UHbX'U''WUggYg UbX'fYj]Yk ''YWh fY fYWcfX]b [g"

7 ci fgY'GWXYXi `Y

[J Yk WUgg'ha YhUV`Y](#)

H]a YhUV`Y`

8 UHr	HmdY	7 cbHr bh
C!K YY_ '+' : YVfi Ufm! %%: YVfi Ufm	DfYgYbHjcb	<p>K Y'Wca Y'J]XYc"</p> <p>⊖ C!k YY_ 'k Yfi dfcj]XY'mci 'k]h'U' [YbYfU' k Y'Wca Y'j]XYc'UbX:k U'_h'fci [\ 'cZhY 9B; ; &) \$\$ Wci fgY''H\]g'k]''j]bW' XY' [c]b ['cj Yf hY'UggYgga Ybhgf'f' W' fYz''UVgzk cf_g\cdgz ZY'X hf'd'UbX'YI dYVWUjcbg'cZhY'Wci fgY''K Y'k]''U'gc k U'_mci 'h'fci [\ 'hY'A ccX'Y'Wci fgY'dU [Y''</p>
K YY_% '%(: YVfi Ufm! % : YVfi Ufm	@YWh fY	<p>⊖ K YY_% 'k Y'ghUfh [Yh]b []bhc'hY'VUg]Wg'cZk \Uh]g'U'Zi]X'UbX'k \m'Ug'9b []bYfgz]h]g'ca Yh]b [k Y'a i ghWcbg]XYf']b'ci f'XYg [] b''K Yfi hY'b'ghUfhc 'cc_'Uh'hY' ZfghcZ ('hcd]Wg'Wcj YfYX'Vm5 #DfcZ' Gd']b'Yf']b'hY' Zfgh\U'ZcZh]g'Wci fgY'fk YY_g'%' (Ł < nXfcghUjWg' ! k \]W']g'hY'ZcfW'g'YI YfYX'VmZi]Xg UhYgh''</p> <p>A cbXUm%(: YV. : 'i]X'DfcdYfh]Yg</p> <p>Hi YgXUm%) : YV. : < nXfcghUjWg</p>
	K cf_g\cd	<p>K cf_g\cd ''cWUjcb'UbX'h]a Y'Ug'dYf'mci f Ybfc''a Ybh'</p> <p>Mci f'XYa cbgfUhc'f'h]g:k YY_'k]'' [i]XY'mci]b mci f'k cf_g\cd'k \]W' Wcj Yfg: 'i]X'DfcdYfh]Yg'UbX < nXfcghUjWg''</p>
	C b`]bY'5Wj]]m	<p>Mci f'dfY! UV'Zcf'hY' < nXfcghUjWg''UV'k]''cdYb'h]g k YY_'cb'A cbXUmZcf'mci 'hc'k cf_'h'fci [\''</p> <p>HYgh'mci f'g_]`g']b'hY: 'i]X'A YWU]Wg'DfUW]W E i Ygh]cbg']b'A ccX'Y'Zcf'k YY_'%'</p> <p>E \$%8]a Ybg]cbg</p> <p>E \$&: 'i]X'DfcdYfh]Yg!' VUg]Wi bXYfghUbX]b [</p> <p>E \$' : 'i]X'DfcdYfh]Yg!' bi a Yf]W'</p>

		<p>hY`UVg"</p> <p>D`YUgY`gYY`A ccX`Y`Zc`f`Z f`h`Y`f`X`Y`H`J`g"</p>
	C b`]bY`5Wj]]m	<p>HYghmci f`g_]`g`]b`h`Y`:` `i`]X`A` Y`W`U`b`]W`g`D`f`U`W`]W`Y` E`i`Y`g`h`c`b`g`]b`A` ccX`Y`Zc`f`k`YY`_`(`</p> <p>E`%%`A` ca` Y`bh` a` `9`ei` U`h`c`b`</p>
	5ggYgga Ybh	<p>DfY`UV`!`@`UV`&`:`: `ck` `a` Y`h`Y`f`</p> <p>8`I` `9` `K` Y`X`b`Y`g`X`U`m`-` `A` U`f`W` `)%`\$`U`a`</p> <p>K`Y`][` \`h`b`[`.``(`i` `c`Z`W`e`i` f`g`Y`[` f`U`X`Y`</p> <p>H`m`d`Y`. `A` ccX`Y`E`i`]n`</p> <p>.</p> <p>G`Y`Y`A` ccX`Y`Zc`f`Z` f`h`Y`f`X`Y`H`J`]`g`</p>
h`k`Y`Y`_`]	Z`h`Y`Y`g`Y`W`e`%`X`A`U`f`W`Z`h`Y`W`e`i`@`g`W`k`f`Y` A`U`f`W`X`	<p>h`k`Y`Y`_`)` Z`h`Y`g`Y`W`e`b`X` \`U`Z`c`Z`h`Y`W`e`i` f`g`Y`k`]` W`e`a` a` Y`b`W`k`]`h` `U`W`U`b`[`Y`c`Z`Y`W`i` f`Y`f`r`c` `8`f`G`H`Y`Z`J`b` : `Y`X`Y`f`" `H`Y`g`Y`W`e`b`X` \`U`Z`k`]`"]`b`h`c`X`i` W`g`Y`j` Y`f`U` b`Y`k` `W`e`b`W`d`h`g`k` \`]`W`X` `U`f`Y` `V`U`g`Y`X`i` d`c`b`h`Y`W`e`b`h`Y`b`h` c`Z`h`Y`Z`f`g`h` \`U`Z`c`Z`h`Y`W`e`i` f`g`Y`" `h`i`g`h`U`f`g`k`]`h` `U`b`]`b`h`c`X`i` W`]`c`b`]`b`h`c`d`d`Y`Z`c`k`g`" `H`Y`W`e`b`h`Y`b`h`c`Z`K` Y`Y`_`)` `k`]`" `V`Y` \`][` \`m`i`f`Y`Y`j` U`b`h`Z`c`f`m`e`i` f`" `d`d`Y`Z`c`k` " `U`V` W`U`g`g`]`b` `K` Y`Y`_`+"`</p> <p>A`c`b`X`U`m`%(` h` `A` U`f`W`X`. `D`]`d`Y`Z`c`k` `)%`</p> <p>H`i` Y`g`X`U`m`%` h` `A` U`f`W`X`. `D`]`d`Y`Z`c`k` `&`</p>
	K`cf`_`g` \`cd`	<p>K`cf`_`g` \`cd`" `c`W`U`h`]`c`b` `U`b`X` `h`j`a` Y`U`g`d`Y`f`m`e`i` f` Y`b`f`c`" `a` Y`b`h`f`</p> <p>M`e`i` f`X`Y`a` c`b`g`h`f`U`r`c`f`h`]`g`k`Y`Y`_`k`]`" `[`i`]`X`Y`m`e`i`]`b` m`e`i` f`k`cf`_`g` \`cd`k` \`]`W`X` `W`e`j` Y`f`g`A` ca` Y`bh` a` `&`/` `D`]`d`Y`</p>

		HmdY. 'A ccX'Y'E i]n GYY'A ccX'Y'Zcf'Z fhYf'XYHJ]g
5ggYgga Ybh	E i]n'% H\Y'ei]n'k]''fi b'Zcf'&\fg'fH\i fgXUmiA UfWx '%+ž *.' \$!, .' \$da E'' H\Y'ei]n'k]''VY'UXa]b]ghYfYX'cb']bY'j]U'A ccX'Y'' K Y] [\h]b[.', i 'cZVci fgY' [fUXY''	
K YY_ '*.' &%A UfWx '! '&) A UfWx	F YUX]b[Bc ''YWñ fYg'UbX'k cf_g\cdg]b'K YY_ '*''2'l gY'h]g k YY_ 'hc' dfUWñW' UbX'WñHñ!i d'k]h' h\Y'Wci fgY WcbhY'bh'
K YY_ '+. '&, 'A UfWx '! '% 5df]	@YWñ fY	þ'k YY_ '+ž'k Y'Wcb]bi Y'k]h' d]dY'Zck 'WcbW'dhg'' H\Y''YWñ fYg'k]''bWñ XY'a UbmYI Ua d'Yg'k \]Wx k]''\Y'd'mci 'hc'i bXYfghUbX'h\Y'Z bXUa YbhU' WcbW'dhg''K Y'k]''U'gc'ghUfhk]h' U'bYk 'hc]jW '8]a Ybg]cbU'5bU'mg]g''k \]Wx'k]''VY'U'i gY'Z `' WcbW'dhZcf'a UbmYb[]bY'f]b['Wci fgYg'Xi f]b[mci f'XY[fYY'' A cbXUm&, 'A UfWx. 'D]dY'Zck '' Hi YgXUm&- 'A UfWx. '8]a Ybg]cbU'5bU'mg]g'%
	K cf_g\cd	K cf_g\cd''cWñ]cb'UbX'h]a Y'Ug'dYf'mci f Ybfc''a Ybh' Mci f'XYa cbgfhU'cf'h]g'k YY_'k]''[i]X'Y'mci]b mci f'k cf_g\cd'k \]Wx'Wci Yfg'D]dY'Zck / '8]a Ybg]cbU'UbU'mg]
	C b']bY'5Wñ]]m	Mci f'dfY!'UV'Zcf'h\Y'd]dY'Zck ''UV'k]''cdYb'h]g k YY_'cb'A cbXUmZcf'mci 'hc'k cf_'h'fci [\ HYgh'mci f'g_]`g]b'h\Y: 'i]X'a YWxUb]Wñ'DfUWñW E i Ygh'cbg]b'A ccX'Y'Zcf'k YY_+' E %('D]dY'Zck '!''cWñ''cggYg E %) 'D]dY'Zck '! 'Udd']Wñ]cbg E %* '8]a Ybg]cbU'UbU'mg]g!'VUg]Wñ
K YY_ ; . '('5df]'! ; '5df]	@YWñ fY	þ'k YY_ ; ž'k Y'k]''Wcb]bi Y'k]h' '8]a Ybg]cbU' 5bU'mg]g'UbX']hg'i gY']b'Zi]X'a YWxUb]Wñ Udd']Wñ]cbg''K Y'k]''Wci Yf'h\Y'hc]jWcb''D\mg]Wñ' a cXY''b[''k \]Wx'a U_Yg'i gY'cZX]a Ybg]cbU' UbU'mg]g'z'UbX'k]''ghUfhk]h' UgdY'Wñ'cb'Vci bXUfm

		<p>`UmYfg"</p> <p>A cbXUm('5df]. '8 ja Ybg]cbU`'5bU`mg]g'&/' D\mg]WU`'A cXY`"]b['%</p> <p>Hi YgXUm) '5df]. 'D\mg]WU`'a cXY`g'&/' '6ci bXUfm @UmYfg</p>
K cf_g\cd		<p>K cf_g\cd`cWU]cb`UbX`h]a Y`Ug`dYf`mci f Ybfc``a Ybh'</p> <p>Mci f`XYa cbglfUhc`f`h.]g`k YY_`k]``[i]XY`mci `]b mci f`k cf_g\cd`k \]W\`Wcj Yfg`8 ja Ybg]cbU` UbU`mg]g`/ 'D\mg]WU`'a cXY`g</p>
Hi h@UV		<p>@UVcfUhc`fmWUgg`cb`D]dY`Zck ``'8UhY`UbX`H]a Y`Ug dYf`mci f`Ybfc``a Ybh'</p> <p>H\Y`UV`cZZYfg`Ub`cddcfhi b]m]Zcf`ghi XYb]g`hc Yb\UbW`h.Y]f`YUfb]b[`j]U`UbXg`cb`YI dYf]YbW`]b h.Y`UVg"</p> <p>D`YUgY`gYY`A ccX`Y`Zcf`Z fh.Yf`XYH]`g"</p>
C b`]bY`5W]j]m		<p>HYghmci f`g_]`g`]b`h.Y`:`i]X`A YWU`b]Wg`DfUW]WY E i Ygh]cbg`]b`A ccX`Y`Zcf`k YY_`,`</p> <p>E %+`8 ja Ybg]cbU`'5bU`mg]g`!`Udd`]WU]h]cbg</p> <p>E % `D\mg]WU`'A cXY`"]b[</p>
5ggYgga Ybh		<p>DfY`UV`!`@UV`` `D]dY`:``ck</p> <p>8I 9.`K YXbYgXUm*`'5df]`%\$Ua</p> <p>K Y][`h]b[.`.``(i`cZWci fgY`[fUXY</p> <p>HmdY.`A ccX`Y`E i]n</p> <p>.</p> <p>GYY`A ccX`Y`Zcf`Z fh.Yf`XYH]`g</p>
K YY_`-.`%%5df]`!`% 5df]	@YWi fY	<p>h`k YY_`-`z`k Y`k]``Wcb]bi Y`hc`YUfb`UVci h Vci bXUfm`UmYfg`]bW`X]b[`h.Y`WU`W`U]cb`cZ Z]W]cb`ZcfW`g``h`ci f`Hi YgXUm`YWi fY`z`k Y`k]`` Z]b]g\`h.Y`Wci fgY`k]h`h.Y`hcd]Wcb`XfU[`ZcfW`g`z]Y``ZcfW`g`cb`V`i ZZVcX]Yg`YI dcgYX`hc`Zi]Xg`]b a`ch]cb"</p> <p>A cbXUm%%5df].`6ci bXUfm@UmYfg</p>

		Hi YgXUm%&'5df]'. '8FU[': cfW
K cf_g\cd		K cf_g\cd`cWU]cb`UbX`hja Y`Ug`dYf`mci f Ybfc``a Ybh' Mci f`XYa cbgfhUhf`h.]g:k YY_`k]``[i]XY`mci `]b mci f`k cf_g\cd`k \]Wk `Wcj Yfg`D\mg]WU`a cXY`g`&/ 6ci bXUfm`UmYfg
C b`]bY`5W]j]m		HYghmci f`g_]`g`]b`h.Y: `i]X`A YWkUb]Vg`DfUW]WV E i Ygh]cbg`]b`A ccX`Y`Zcf`k YY_`- E %- `6ci bXUfm@UmYfg# f]W]cb: cfWg E &\$`8FU[': cfW
5ggYgga Ybh		DcgH`UV`!`@UV" `D]dY: `ck 8I `9. `A cbXUm%%5df]ž) da " K Y][\h]b[. . (i `cZWci fgY`[fUXY HmdY. `A ccX`Y`E i]n GYY`A ccX`Y`Zcf`Z fhYf`XYfU]g
K YY_`%\$.`% `5df]`!`&& 5df]	@YWi fY	h`h.Y`Z]bU`YWi fY`cZH`Y`Wci fgY`fHi YgXUm`cZ K YY_`%\$Łk Y`k]``\Uj Y`U`E / 5`gYgg]cb`]b`k \]Wk ? f]ghYb`UbX`GHZ]b`k]``Ubgk Yf`Ubmci Ygh]cbg`mci a Um\Uj Y" A cbXUm% `5df]`. !2`Di V`]W<c`]XUm`fbc`YWi fYŁ` Hi YgXUm%- `5df]`. F Yj]g]cb`YWi fY
K cf_g\cd		K cf_g\cd`cWU]cb`UbX`hja Y`Ug`dYf`mci f Ybfc``a Ybh' Mci f`XYa cbgfhUhf`h.]g:k YY_`k]``[i]XY`mci `]b mci f`k cf_g\cd`k \]Wk `Wcj Yfg`8FU[': cfW
5ggYgga Ybh		E i]n`& H\Y`ei]n`k]``fi b`Zcf`&\fg`fH\i fgXUm5df]`&%ž *.`\$!, .`\$da Ł` H\Y`ei]n`k]``VY`UXa]b]ghYfYX`cb`]bYj]U`A ccX`Y`" K Y][\h]b[. . i `cZWci fgY`[fUXY"
:]Y`Xk cf_		:]Y`X`hf]d`h`h.Y`I`BGK`K`UHf`F`YgYUfWk @UVcfUhfcm

		<p>C b: f]XUm&&:5df]`fk YY_`%\$Ł'gh XYbŋ:k]``\Uj Y h\Y`cddcfh b]mhc j]g]h5i gffU`]Uŋ`YUX]b[`K Uŋf 9b[]bYYf]b[`ZŪ]hYg!`h\Y`K Uŋf`F YgYUfW</p>
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F Ygci fWg

DfYgWf]VYX`F Ygci fWg`

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H\Y`@YWfi fY`BchYg`Zcf`h\Y`hYfa`UfY`Uj U]UV`Y`Zca`h\Y`l`b]j Yfg]mi6cc_g\cd": i`j`Yfg]cbg`cZ`h\Y`bchYg`k`j`
VY`a`UXY`Uj U]UV`Y`cb`h\Y`A`ccX`Y`dU[Y`cZ`h\Y`Wci`fgY`tc[Y`h\Y`f`k`]h`h\Y`YWfi fY`fY`WcfX]b[z`YWfi fY`g`]XYgž
YhW

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F YWca`a`YbXYX`F Ygci fWg

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7Yb[Y`ž`M`5`"U`bX`7]a`VU`Už`>`A`"ž: `i`jX`A`YW`Ub]Wg: i`bXUa`YbU`g`/`5dd`]WU]h]cbg`(Yž`A`W`fUk`!<]`ž`&`\$`%`+`ž`
(`h`YX]h]cbž`G`=j`Yfg]cbž`G`6`B`!`%`.`-`+`,`!`%`&`)`-`*`-`*`)`(`@`B`G`K` `@]VfUfm`-`)`Wcd]YgQ

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H`Y`K`UHf`F`YgYUfVX`@UVcfUhcfm]g`&&_a`VmifcUX`Z`ca`h`Y`?`Ybg]b[`h`c`b`W]a`di`g`6i`gYg`k`j`VY`d`fcj`]XYX`hc`hU`Y`mci`hc`K`F`@`UbX`fYh`fb`hc`?`Ybg]b[`h`c`b`M`ci`W]b`a`U`Y`mci`f`c`k`b`k`Umihc`UbX`Z`ca`K`F`@`f`%`\$`?`]b[`G`h`Y`Y`h`Z`A`Ub`mJ`U`Y`L`Z`mci`W`X`c`c`g`Y`K`Y`k`j`a`U`Y`gi`fY`h`U`h`h`Y`Z]Y`X`hf]d`]g`7`C`J`-`g`U`ZY`"
K`Y`k`j`d`fcj`]XY`g`Y`d`U`f`U`h`b`c`h]W`c`b`A`c`c`X`Y`]b`W`X]b[`d`c`g`hc`]XY`b`h]Z`mci`f`]b`h`Y`f`Y`g`h`UbX`hc`g`W`X`Y`i`Y`h`Y`Vi`g`U`c`W`h]cb`UbX`g]h`j`]gh`U`W`W`f`X]b[`n`f`

@UVcfUhcfmK cf_`H`Y`UVcfUhcfmk cf_]g`Ub`Y`gg`Y`b`h]U`W`e`a`d`c`b`Y`b`h`c`Z`h`]g`W`e`i`fgY`M`ci`f`U`h`Y`b`X`U`b`W`U`b`X`d`U`f`h]V]d`U`h]cb`]b`5`@`UVcfUhcfmk cf_]g`U`f`Y`e`i`]f`Y`a`Y`b`h`Z`c`f`h`Y`W`e`i`fgY`"
H`c`U`W`W`e`i`b`h`Z`c`f`7`C`J`-`f`Y`U`g`c`b`g`z`k`Y`k`j` \Uj`Y`Z]W`!`h`c`!`Z]W`U`V`W`U`g`g`Y`g`U`g`k`Y`U`g`U`b`c`b`]b`Y`f`Y`W`e`f`X]b[`c`Z`h`Y`U`V`W`U`g`g`Y`g`K`Y`g`h`f`c`b[`m`Y`b`W`e`i`f`U`Y`mci`hc`d`U`f`h]V]d`U`h`Y`]b`h`Y`Z]W`!`h`c`!`Z]W`a`c`X`Y`g]b`W`h`h`]g`k`j`U`c`k`mci`hc`X]f`Y`W`h`m]b`h`Y`f`U`W`h`k`]h`h`Y`U`V`X`Y`a`c`b`g`h`f`U`h`c`f`U`b`X`U`g`_`U`b`m`e`i`Y`g`h]c`b`g`mci`a`U`m`U`j`Y`H`Y`U`V`W`U`g`g`]g`b`c`h`X`Y`g]b`Y`X`hc`g]a`d`m`W`e`Y`W`h`X`U`h`f`Y`j`Y`f`m`g`h`i`X`Y`b`h`k`j`f`Y`W`]j`Y`U`b`]b`X`j`]X`i`U`X`U`h`g`Y`h`Z`c`f`h`Y`d`c`g`h`U`V`

5 WUXYa]W=Zcfa Uh]cb

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5ddYbX|l . '9b[]bYYfg'5i ghfU`U'f95E'DfcZYgg]cbU`'9b[]bYYf'7ca dYhYbWm
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Dfc[fUa 'hYbXYX'@YUfb]b['Ci hWta Yg	
? bck `YX[Y'UbX'g_]`VUgY	
D9%"%7 ca dfY\Ybg]j YzhYcfmVUgYX'i bXYfghUbX]b['cZhY'i bXYfd]bb]b['bUh fU`UbX d\mg]WU`gWYbWg'UbX'hY'Yb[]bYYf]b['Z bXUa YbH'g'Udd`]WUV'Y'hc'hY'Yb[]bYYf]b['X]gWd`]bY	
D9%"&'7 cbWdh U`i bXYfghUbX]b['cZhY'a UhYa Uh]Wg'z'bi a Yf]WU`UbU'mg]g'ghUhg]Wg'z'UbX Wta di h'f'UbX']bZ'fa Uh]cb'gWYbWg'k \]W' i bXYfd]b'hY'Yb[]bYYf]b['X]gWd`]bY	
D9%" " 'h!XYdh'i bXYfghUbX]b['cZgdYWU`]ghVcX]Yg'cZ_bck `YX[Y'k]h]b'hY'Yb[]bYYf]b[X]gWd`]bY	
D9%"('8]gWfba YbhcZ_bck `YX[Y'XYj Y`cda YbhUbX'fYgYUfW'X]fYW]cbg'k]h]b'hY Yb[]bYYf]b['X]gWd`]bY	
D9%") ? bck `YX[Y'cZYb[]bYYf]b['XYg][b'dfUW]W'UbX'WcbhYi h U`ZUW'c'fg]a dUW]b['hY Yb[]bYYf]b['X]gWd`]bY	
D9%"* 'i bXYfghUbX]b['cZhY'gW'cdY'z'df]bWd`Yg'z'bcfa g'z'UW'W'ci bHUV`]h]Yg'UbX'Vci bXg'cZ gi gh]bUV'Y'Yb[]bYYf]b['dfUW]W']b'hY'gdYW]ZWX]gWd`]bY	
9b[]bYYf]b['Udd`]WU]h]cb'UV`]jm	
D9%"%5dd`]WU]h]cb'cZYghUV`]g\YX'Yb[]bYYf]b['a Yh'cXg'hc'Wta d'Yi'Yb[]bYYf]b['dfcV'Ya gc`]b[
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DfcZYgg]cbU`UbX'dYfgcbU`Uhf]Vi hYg	
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D9' "' '7fYUh]j Y'z']bbcj Uh]j Y'UbX'dfc!UW]j Y'XYa YUbcif	
D9' "('DfcZYgg]cbU`i gY'UbX'a UbU[Ya YbhcZ]bZ'fa Uh]cb	
D9')" 'C'fXYf'ma UbU[Ya YbhcZgY'z'UbX'dfcZYgg]cbU`WcbXi W]	
D9' "*" '9ZYW]j Y'hYUa 'a Ya VYfg\]d'UbX'hYUa ``YUXYfg\]d	