

7ci fgY'Cj Yfj]Yk

Ghuzz 7 cbhuWh8 Yhu]`g

'7cbj Ybcfg'

B Ua Y	9a U]`	5j U]`UV]`]hm	@cWUhjcb	D\cbY
>c\b'DYhYfgcb	^dYhYfgcb4 i bgk "YXi "Ui	Hi YgXUm'%da !&da . K YXbYgXUm %&da !%da	CZ[WY'%\$)ž @YjY`'%ž FcVYfh KYVghYf 6i]`X]b[-',) (,+\$

"@YWhifYfg"

B Ua Y	9a U]`	5j U]`UV]`] m	@cWUhjcb	D\cbY
>c\b`DYhYfgcb		‰da!%da	CZZJWY*%\$)ž @YjY`*%ž FcVYfh KYVgHYf 6i]*X]b[-',) '(, +\$

GWXcc`7cbHJWhi±bZcfa Uh]cb

Fcca " %&ž~Yj Y~" FcVYfhK YVghYf~6i]`X]b[

D\cbY.'f\$&E'-',)'(,)*

9a U]`. 'gUa 4 i bgk "YXi "Ui

K YVq]hY. \hdg.##qUa "Ufhq"i bgk "YXi "Ui

 $\label{eq:hamiltonian} $$HY'GW.cc``cZh,Y'5ftg'UbX'AYX]U'k ci`X``]_Y'tc'FYgdYWM\cong \cong m5W_bck``YX[Y'th,Y'HfUX]tjcbU``7i gtcX]Ubgž h,Y'6YXY[U'`fPYbg]b[tcb'WJa di gŁZ'; UX][U'`fP]tmUbX'5fthZ'`8Yg][b'7Ua di gYgŁ'UbX'th,Y'B[i bbUk U` dYcd'Y'f6i gtfU`]Ub'8YZYbW': cfWY'5WJXYa m]b'7UbVYffUŁ'cZth,Y'`UbXg'k \YfY'YUW\`WJa di g'cZl BGK ']g`cWJtYX''$

7ci fgY 8YW] g

7 fYX]hDc]bhg *

Gi a a UfmcZh\Y 7ci fgY

Gi VYWh5fYU. ? ge[U

: cW gYg cb h\Y a U cf hfYbXg ubX XYj Y cda Ybhg]b &\$h\ W bh fm WcbW fha i g]Wh\fci [\u00ed u gh XmcZ hYW\b]WU dfcW ggYg]b u k]XY fUb[Y cZ]ghYb]b[YI Ua d Yg" ±bWl XYg fYW bh5 i ghfu]Ub a i g]W

7 ci fgY @YUfb]b[Ci hWca Yg

- %" 7 cbh/l hi U`]gY`a U'cf`XYj Y`cda Ybhg`]b`a i g]WU``Wca dcg]h]cb`Xi f]b['h\Y`hk Ybh]Yh\`UbX`hk Ybhnl_Zfgh Wfbhi f]Yq
- &" 5bU`mgY`a i g]\WJ``HYV\\b]ei Yg`UbX`Udd`mih\Ya `hc`j Uf]ci g`ghmYg`cZhk Ybh]Yh\`UbX`hk Ybhn!Z]fgh\W\bhi fm a i g]\W
- ' " 5 Wei]fY 'Wf]h]WU```]ghYb]b['g_]``g'UbX'ZJa]`]Uf]mik]h\ 'U'Wfcgg!gYWf]cb'cZh\Y'fYdYfhcfmicZhk Ybh]Yh\ 'UbX k YbmlZfqh'Wfbhi fma i g]W
- ("5fh]W``UhY``c[]WU``Uf[iaYbhg`]b`Vch\`kf]hhYb`UbX`;YfVU``kUmg

HYUWX]b[GhfUhY[]Yg

5 ˈfUb[Y ˈcZhYUWX]b[ˈghfUhY[]Yg ˈ]bWi XY ``YWi fY ˈghmY ˈdfYgYbhUh]cbgžX]gW gg]cbž[fci d ˈk cf_ž UbU`mg]g ˈcZ gWcfYg ˙UbX ``]ghYb]b[ˈhc ˈfYWcfX]b[g"' · H\YgY ˈk]` ˙VY ˈgi ddcfhYX k]h\ fYgci fWYg ˙]bWi X]b[ˈdf]a UfmUbX gYWcbXUfmXcW a Ybhgža i g]WU``gWcfYgžfYWcfX]b[g ˙UbX ˙j]gi U``a UhYf]U`g ˙]b ˈh\Y ˈhYUWX]b[ˈcZh\]g ˙Wci fgY ¨ Gca Y ˙Wci fgY ˙bchYq ˙UbX k YY_`mfYj]Yk ˈei]nnYg ˈk]` ˙VY ˙Uj U] ˙UV`Y ˙cb ˙]bY

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@]ghYb]b['HYgh'%'	&) ।	GYY BchYg 6Y ck "	%Ž Ž(
@]gh/b]b['HYgh'&'	&) ı	GYY`BchYg`VY`ck"	%₹ ž(
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GHJfhXUhY. Bch5dd`]WUV`Y

 $\textbf{8YHJ} \verb|`g.'HYgh\Y`X'] b `WUgg/fYgi `hdfcj] XYX'k] h \] b `cbY'k YY_"$

5XX]h]cbU``XYhJ]`g.

 $H\Y^*=b!!7^*Uggg@ygt$$ %$

8 YHU]`g. 'DfYdUfUhcfmbcHYgfN⁄z\$\$\$'k cfXgŁ'cb'gi [[YgHYX'fYUX]b[g'fbb'YggUmhcd]WŁZ'k f]HHYb'ZYYXVUW_'Zfca 'YWfi fYf/&z)\$\$'k cfX'YggUm'ZYYXVUW_'dfcj |XYX'j |U'Hi fb|H|b

5XX]h]cbU`XYhU]`g.

5ggYgga YbhZcf'h\Y'5bU'mh]WU`'9ggUmi]g'VUgYX'cb'lk c'Wca dcbYbhg.

%" DfYdUfUlrcfmbchYgʻZcfʻh\Yʻ9ggUmUbX#cfʻ[fci dʻk cf_'UWfjj]hJYg. k cfh\'%) ı 'cZh\Y'hchU`a Uf_'Zcfʻh\Y Wci fgY": i fh\Yf`XYhU]`gʻhc`VY`a UXY`Uj U]`UV`Y`j]U`A ccX`Y"

&":5bU`mh]WJ``YggUmcZ&) \$\$`k cfXg`cb`U`[]j Yb`hcd]Whc`VY`gi Va]hhYX`j]U`Hi fb]h]b`Vm("\$\$da `cb`: f]XUmi&* 5df]``fYbX`cZK YY_'%\$£". k cff\\`') | `cZh\Y`hchJ``a Uf_'Zcf`h\Y`Wti fgY"

5 https://bxubww.Fyei]fyaybhg

 $5\,hh/bXUbW/``Uh'@YWh'fYg``UbX\#cf``Hi~lccf]U`g`]g`a~UbXUhcfm`]b``h\]g``Wci~fgY"``I~bYI~W'~gYX``UVgYbW/``Zfca~`a~cfY~h\Ub`&$i~~k~]```fYgi~`h']b``h\Y``Uk~UfX``cZU`:~U]``;~fUXY"$

@97HIF9. ±b ``YWhifYg`m

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Ya Ybhg

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	Hi hcf]U`	\hdg.#k k k "mci hi VY"\vca #k UH\vX3j 19@5?:., NI 8a [H\i fgXUmž'&%: YVfi Ufm'&"\$\$da !("\$\$da ž'K YVghYf
K YY_`&.`&) ': YVfi Ufm!'' A UfWX	@YWhifY	; %+" K YXbYgXUnž'&+': YVfi Ufm'%"\$\$da!' "\$\$da ž K YVghYf'; %+
		% %%! % % . +DZi YbWY cZ: c`_ A i g]WY9I dfYgg]cb]ga "'I gY cZC fW. YglfUh]cb" +DZi YbWY cZdcdi `Uf`a i g]W
		6Å`U`6Uffi`_```5``Y[fc`6UfVUfc`f% %/Ł/`\hhdg.#k k k "mci hi VY"Wca #k Uh/W.3j 1E'BEj8HdVek ````
		6`i YVYUfX g`7 UghY`f% %让/`\hdg.# kkk"mci hi VY"Wca *k UhW.3j 1V <f \bk<="" ll)="" td="" xa=""></f>
		7 \ Uf`Yg`j Yg```H\fYY`D`UWYg`]b`BYk `9b[`UbX`f%-%%%(比/`\hdg.#k k k "mci hi VY"Wca *k UhW\3j 1Xm) F gF@W Yg
		5fbc`X'GW\cYbVYf[''' D]Yffch'@i bU]fY ''f%
		-{cf'GhfUj]bg_m```H\Y'F]hY'cZ'Gdf]b['f%-% Ł/`\hdg. #kkk"mcihiVY"Wca#kUhWk3j1::D^↑cbL,
		H\fYY'D]YWYg'Zcf'GHf]b['EiUfHYh'f% %(Ł/`\hdg.#k k k "mci hi VY"Wca #k UHW\3j 1XI Yd8^; [I bW
		DYfWn; fU]b[Yf``H\Y`K Uff]cfg f% %!%*Ł/
		\htdg.#k k k "mci hi VY"Wca #k UhWk 3j 1 Sf&][]f[bGg { cf'GhfUj]bg_m''' F U[h]a Y 'Zfca '>: [efa[dWVg E a VSf'fl%- % \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
		FU[h]a Y'Zcf'‱']bghfi a Ybhg'f‰ %+!% Ł/`\hdg.#k k k "mci hi VY"Wta #k UhW\3j 1c\b: E 8 h? L >W
	Hi hcf]U`	H\i fgXUmž'&, ': YVfi Ufm'&"\$\$da!("\$\$daž'K YVghYf ; %+"
K YY_" ."("A UfWX"!"%\$ A UfWX	@YWhi fY	K YXbYgXUmž'\$*'A UfW.'%"\$\$da!' "\$\$da ž'K YVghYf ; %+"

		% &\$ '-'% ' \$. '%! hcbY 'A i g]\\": i hi f]ga " '5bh]!
		F ca UbhjWjga #B Y c '7 'Ugg]Wjga 5fbc 'X 'G W c Y b V Y f [''' G i]h Y 'Z f'? 'Uj] Y f 'C d '' '&) 'fl % & % & ' \t' \ h d g . #k k k "mc i h V Y "W ca #k U h W 3 j 1 V E < F SN, L J j =
		9X[UfX'JUfYgY'''''±oh[fU`Yg'f%&)Ł/'\hhdg.# #kkk"mcihiVY"Wca#kUhWX3j1> <a'%mduu\g< td=""></a'%mduu\g<>
		5fbc`X`GWXcYbVYf[········Nk Y]`?`Uj]Yfgh W_Y`Cd" ''`f% &, !' %L/\hdg.#k k k "mci h VY"Wca #k UhWX3j 1j cm@bc\$< Xc5
		6Å`U`6UffiGhf]b['E i UfhYhBc"'('f%- &, Ł/\hdg.#k k k "mci hi VY"Wca #k UhWk3j 1a HbVf@L9 ; ≙
		9X[UfX'JUfYgY''''' €b]gUh]cb f% &-!'%L/ \hdg.#kkk"mcihiVY"Wca#kUhWX3j1k7`kU6i:C>5
		7 cd`UbX''''D]Ubc`J Uf]Uh]cbg f%'\$Ł/
		\htdg.#k k k "mci hi VY"Wca #k UhWk3j 1]%j ± SA !E [. -{ cf'GhfUj]bg_m''''Gma d\cbm'cZ'DgU`a g'f% -'\$Ł/\htdg.#k k k "mci hi VY"Wca #k UhWk3j 1 J I GÆ[D E 下 A
	Hi hcf]U`	H\i fgXUmž'\$+"A UfWX."&"\$\$da!("\$\$da žK YVghYf ; %+"
K YY_^(.^%%^A UfVX^!^%+ A UfVX	@YWh fY	K YXbYgXUmž'% 'A UfW.'%"\$\$da!' "\$\$da ž'K YVghYf ; %+"
		%'%-'%(,.:BYk:8]fYWgcbg:]b'9ifcdYUbž 5ighfU`]Ubž'UbX'5aYf]WUb'Aig]W
		6Å`U`6Uffi _```Aig]WZcf`Ghf]b[gžDYfW'gg]cbžUbX 7Y`YghU`f%'*Ł/\hdg.#kkk"mcihiVY"Wca#kUhWk3j 1a %&) MWE bl
		5 bhc b "K YVYfb " "J Uf]Uh]c b Yb Zc f D]Ub c "C d " "&+ "fl% '* * Ł/ \ hhdg. #k k k "mc i hi VY"Wc a #k UhW 3j 1) \ NL d 8; E!\$A
		5Ufcb'7cd'UbX'''9`'GU'cb'A I]Wc'f%' *Ł/'\hhdg.#kkk"mci hi VY"Wca *k UhWX3j 1A , !=+F UgYE
		>c\b'7U[Y'':]fgh7cbghfi Wh]cb']b'A YhU`f%'-Ł/\hdg.#k k k "mci hi VY"Wca #k UhWX3j1L'6c+S'9Le_

		C`]j]Yf'A Ygg]UYb''E i UfhYhZcf'h\Y'9bX'cZ'H]a Y'f%-(%L/`\htdg.#k k k "mci hi VY"Wta #k UhW\3j 11 YGJ i %nV:-(5Ufcb'7cd`UbX''' < cY!8ck b Zfca 'DaVWa'f% (&L/\htdg.#k k k "mci hi VY"Wta #k UhW\3j 1* UE M5B@ji [6Yb'Ua]b'6f]hhYb'''GYfYbUXY'Zcf'HYbcfž' <cfb'ubx "mci="" #k="" \$\text{hef="" 1="" 6u9}\$="" <="" `\htdg.#k="" de="" ghf]b[g'f%-('="" hi="" k="" l="" th="" uhw\3j="" vy"wta=""></cfb'ubx>
	Hi hcf]U`	>c\b`5bhj````7cffcVcfYY`f% (*Ł/\hdg.#k k k "mci hi VY"Wca #k UhWk3j 1*&YB&gh\i K _ H\i fgXUmž'%(`A UfWk.`&"\$\$da!("\$\$da ž'K YVghYf
K YY_').'%, 'A UfVX'!'&(A UfVX	@YWhi fY	; %+" K YXbYgXUmž&\$`A UfWX.`%"\$\$da!' "\$\$dažK YVghYf; %+ % (*'-'%)).`K cfX`K Uf'='UbX'dcghk Uf XYj Y`cda Ybhgža i g]ei Y`WcbWfÄhYžhchU` gYf]U`]ga "`+bXYhYfa]bUWh"
		>c\b`7U[Y```GcbUrUg`UbX`±brYf`iXYg f%-(*!(, Ł``GcbUrUg`%ž&ž' ž') fUg`YlUad`YgŁ/\hndg.# kkk"mcihiVY"Wca#kUhWk3j1B\$!m,cB8@[l
		D]YffY GW.UYZYf '''' 9hi XY Ui I '7\Ya]bg XY': Yf fl‰(, Ł/`\hhdg.#k k k "mci hi VY"Wca #k UhW.3j 1B - dC e, i *!V5
		C`]j]Yf'A Ygg]UYb``` AcXY`XY'j U`Yi fg'Yh XfjbhYbg]hÅg 'Zca 'CgSfdWUfgVWe VW ckfZ_W f% (-!%) \$Ł/\hdg.#kkk"mci hi VY"Wca #k UhWk3j 1W> 6; >5m5Eh
		A Uf[UfYhGi h\YfUbX``` <ui \hdg.<br="" bhyx`<]``g`f%-)\$ł="">#k k k "mci hi VY"Wca #k UhW\3j 1[WZS\L)CG: =</ui>
		? Uf\Y]bn'GhcW_\Ui gYb'' ? fYi ngd]Y`'f17 fcggd`UmŁ f% -) %比'`\hndg.#k k k "mci hi VY"Wca *k UhW.3j 15cl b_i E U, E \$
		>c\b`7U[Y```(''' /' \hndg.#k k k "mci hi VY"Wca #k UhWk3j 1>H9: ?:]LGI (
		D]YffY'6ci `Yn'''

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	Hi lcf]U`	H\i fgXUmž̃&, `A UfVX.`&"\$\$da!("\$\$dažK YVghYf ; %+"
K YY_'+.'%'5df]``! '+'5df]`	@YVVi fY	K YXbYgXUmž'\$' '5df]`.'%"\$\$da!' "\$\$daž'K YVghYf ; %+"
		%-*) `-'*``BYk 'aig]WZcf'jc]WY"`AUI]aU`]ga'# A]b]aU`]ga"'BYk '5igHfU`]Ub'aig]W
		GhYj Y''FY]\\\\'''''''7 ca Y'Ci h f%-**Ł/'
		\hdg.#kkk"mci hi VY"Wca #k UhWX3j1[\$KJ

		GcZJU; i VUmXi`]bU````%\$`DfY`i XYg`Zcf`Gc`c 7 Y``c fl% +(\text{L}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	Hi hcf]U`	H\i fgXUmž'\$('5df]`. '&"\$\$da!("\$\$da ž'K YVghYf'; %+"
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ACC8@9.AUHYf]U`g`Zcf`H\]g`Wci fgY`k]```VY`ZfYei Ybhma UXY`Uj U]`UV`Y`hc`U```ghi XYbhg`j]U`h\Y`AccX`YY@YUfb]b[`k YVg]HY.``c[!]b`k]h\`mci f`ghi XYbh=8`UbX`dUggk cfXžUbX`gY`YWhh\Y`ALG7'' %*&`7 ci fgY"

Ghi XYbhgʻUfYʻYl dYWhYXʻhcʻa cb]hcfʻh\YʻA ccX`Yʻa cXi `YʻZfYei YbhmXi f]b[ˈHYfa ˈZcfˈ]bZcfa Uh]cbžʻWUgg bchYgžʻUbXʻUbmi dXUhYgʻcbʻUggYgga Ybhg"

FYWca a YbXYX FYgci fW/g

<u>F97CAA9B898 H9LHG</u>. "h\Y'Zc``ck]b[']g'U'i gYZ ``[YbYfU``hYl h'Zcf'a i g]WcZh\Y'lk Ybh]Yh\ 'Wbhi fm

ł A cf[UbžF " Hk Ybh]Yh\ 7 Ybhi fmA i g]W BYk Mcf_. Bcfhcbž% - %fGYY Yl hYbg]j Y V]V`]c[fUd\mŁ

ł Acf Ubž F "fYXŁ Hk Ybh Yh 7 Ybh fm Aig]W. Ub Ubh Cc [m BYk Mcf_. Bcfcbž % - %"

7 ci fgY 9j U'i Uhcb UbX 8 Yj Y'cda Ybh

Ghi XYbhiZYXVUW_']g'cb'h\]g'Wti fgY']g'[Uh\YfYX'dYf]cX]WU``m'UbX']g'U`k Umg'WUfYZ ``m'Wtbg]XYfYX'k]h\'U j]Yk 'hc'UW]b['cb']hWtbghi Wlj Y`mk \YfYj Yf'dcgg]V`Y": YYXVUW_']g'[Uh\YfYX'Vmj Uf]ci g'a YUbg']bWi X]b[h\Y'cWWg]cbU`']bZcfa U`'cb!`]bY'ei Ygh]cbbU]fY'UbX'j]U'h\Y'a cfY'Zcfa U`'A m9I dYf]YbW'Gi fj Ym'DfcW'gg Wta d`YhYX'Uh'h\Y'YbX'cZYUW\'HYfa "'

#b^^][\hcZdfYj]cig^ZYYXVUW_^Zca 'ghi XYbhg^]b'h\]g^Wci fgYž'a cfY 'Ya d\Ug]g^\Ug'VYYb'd`UW\X'cb'a i g]W Zca 'h\Y^\UhYf'dUfhcZh\Y'lk Ybh]Yh\ 'W\bhi fmUbX`]bhc'h\Y`ZfghidUfhcZh\Y'lk Ybhn\Zfgh'W'bhi fm]]b'cfXYf'hc Z fh\Yf'Wcbgc`]XUhY'h\Y'ghi XYbhg'i bXYfghUbX]b['cZh\Y'WcbhYl h\Zcf'a i g]WUbX'a i g]WU`XYj Y`cda Ybhg'cj Yf h\]g'dYf]cX"'5`gcž'Z fh\Yf'UhhYa dhg'\Uj Y`VYYb'a UXY'hc'Ybgi fY'h\Uhghi XYbhg'\Uj Y`UWW\gg'hc'fYWcfX]b[g'cZa i g]WX]gW ggYX'Xi f]b['h\Y'Wci fgYž'YgdYW]U``mj]U'mci hi VY'k\]W\"]g'Ub'YUg]`mUWW\gg]V'Y'fYgci fW Zcf'a cghghi XYbhg"

Gi Va]gg]cb cZ5ggYgga YbhHUg_g Gi Va]gg]cb cZ5ggYgga YbhHUg_g Hi fb]h]b Gi Va]gg]cb

5 WUXYa]W<cbYghmUbX D`U[]Uf]ga

D`U[]Uf]ga i]gii g]b[ih\Yik cfXgicfi]XYUgicZch\YfgiUbXidfYgYbh]b[ih\Ya iUgimci fick b"i±i\WbihU_Yia Ubm Zcfa gžZfca iXYi]VYfUhYiW\YUh]b[ihciU\W]XYbhU`m\Wcdm]b[iZfca iUigci f\Wik]h\ci hiU\w_bck iYX[Ya Ybh'

IBGK [fcidg'd'U[]Uf]ga]bhc'h\Y'Zc``ck]b[WUhY[cf]Yg.

7 cdm]b[.'i g]b['h\Y'gUa Y'cf'j Yfmg]a]`Uf'k cfXg'hc'h\Y'cf][]bU`hYl h'cf']XYU'k]h\ci h'UW_bck `YX[]b['h\Y gci fW'cf'i g]b['ei chUh]cb'a Uf_g"'H\]g'U`gc'Udd`]Yg'hc']a U[Ygž'Ufh'UbX'XYg][b'dfcYWhgž'Ug'k Y``'Ug dfYgYbhUh]cbg'k \YfY'gca YcbY'dfYgYbhg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'

⇒ Uddfcdf]UhY 'dUfUd\fUg]b[. '7\Ub[]b['U'ZYk'k cfXg'UbX'd\fUgYg'k\]Y 'a cghmfYhU]b]b['h\Y'cf][]bU`ghi Wh fY 'UbX#cf'dfc[fYgg]cb'cZ]XYUg'cZh\Y'cf][]bU`žUbX']bZcfa Uh]cb'k]h\ci hUW_bck `YX[Ya Ybh'H\]g'U`gc Udd`]Yg']b'dfYgYbhUh]cbg'k\YfY'gca YcbY'dUfUd\fUgYg'Ubch\Yf'g']XYUg'cf'k cfXg'k]h\ci h'WfYX]h'UbX'hc d]YW]b['hc[Yh\Yf'ei chYg'UbX'dUfUd\fUgYg']bhc'U'bYk'k\c`Yžk]h\ci h'Uddfcdf]UhY'fYZYfYbW]b['"

7 c``i g]cb.'k cf_jb['k]h\ch\Yfg'Vi hdUgg]b['cZZh\Y'k cf_'Ug'U'dYfgcb'g']bX]j]Xi U``k cf_"'7 c``i g]cb'U`gc]bWi XYg'dfcj]X]b['mci f'k cf_'hc'Ubch\Yf'ghi XYbhVYZcfY'h\Y'Xi Y'XUhYžcf'Zcf'h\Y'di fdcgY'cZh\Ya d`U[]Uf]g]b['UhiUbmh]a Yž'dUm]b['Ubch\Yf'dYfgcb'hc'dYfZcfa 'Ub'UWUXYa]WhUg_ž'ghYU']b['cf'UWei]f]b[Ubch\Yf'dYfgcb'g'UWUXYa]Wk cf_'UbX'Wcdm]b[']hz'cZYf]b['hc'Wca d'YhY'Ubch\Yf'dYfgcb'g'k cf_'cf'gYY_]b[dUma YbhZcf'Wca d'Yh]b['UWUXYa]Wk cf_"

±bUddfcdf]UhY`W]hUh]cb.`7]h]b[`gcifWrg`k\]W\`\UjY`bchVYYb`fYUXžk]h\cihUW_bck`YX[]b[`h\Y`´gYWcbXUfm´gcifWrZfca`k\]W\`_bck`YX[Y`cZh\Ya`\Ug`VYYb`cVhU]bYX"

8 i d`]\WUh]cb`ffgY`Zd`U[]\Uf]ga "Ł gi Va]\h]b[`mci f`ck b`k cf_ž]b`k \c`Y`cf`]b`dUfhžk \YfY`]h\Ug`dfYj]ci g`m VYYb`dfYdUfYX`cf`gi Va]\hYX`Zcf`Ubch\Yf`UggYgga Ybhcf\Wci fgY`UhI BGK `cf`Ubch\Yf`i b]j Yfg]\m'

7 cffYWnfYZYfYbWlb['dfUWnWyg.

• DUfUd\fug]b[z'gi a a Uf]q]b[z'YggUmk f]hb['UbX'ha Y'a UbU[Ya Ybh

5 WUXYa]W = b Zcfa Uh cb ·

: cf`YggYbhJU``gh XYbh`]bZcfa UhJcb`fY`UhJb['hc.

- fYei Yghg Zcf Yl hYbg]cb/
- `UhY`gi Va]gg]cbg`[i]XY`]bYg/
- fYj]Yk 'cZa Uf_g/
- I BGK '< YU`h\ 'UbX'GUZYhmdc`]\\\Yg/
- YI Ua]bUh]cb dfcWYXi fYg/
- gdYWJU``Wcbg]XYfUhjcb`]b`h\Y`Yj YbhcZ]``bYgg`cf`a]gUXj Ybhi fY/
- gh XYbhYei]mUbX X]gUV]`]m/
- UbX'ch\Yf'YggYbhJU`'UWUXYa]W']bZcfa UhJcbž'gYY

\hdg.#k k k "Uffg"i bgk "YXi "Ui #W ffYbhgh XYbhg#UWUXYa]W]bZcfa Uf]cb#dfchcWc`g![i]XY`]bYg#

.

=a U[Y 7 fYX]h

5 i gh]b "&\$% "G\]`]b["K i

7F = 7CG

7F = 7CG Dfcj]XYf 7cXY. \$\$\$-,;