$\&\,E\,Uf\_\,GbY'$ 

J

			HU[Y
H9JLA			
	AL=E .+	<u>: ig]bYgg</u>	
	AL=E.9+	<u>J]g</u> >UWhcfg	.3
	AL = E .:+	MbfYgc`jYX KhUZZ ; c a a Ybhg	/6
	AL=E /+	HfcdYfh]Yg	/6
	AL = E O +	DY[U HfcWYYX]b[g	0-
	AL = E 1 +	$E ]bY KUZYhm < ]gW^cgifYg$	0.
H9JL AA			
	AL = E 2 +		0/
	AL=E 3+	<u>SJYgYfjYXT</u>	0/
		EUbU[YaYbh g <]gWigg]cbUbX 9bU`mg]g cZ >]bUbW]U`; cbX]h]cbUbX JYgi`hg cZ GdYfUh]cbg	
		I i Ubh hUh jY UbX I i U` hUh jY < gW`cgifYg 9Vcih E Uf Yh J g	00
			23
		> bUbW  U` KhUhY a Ybhg UbX Kidd'Y a YbhUfm < UhU	26
	AL=E 6+	;\Ub[Yg]bUbX <]gU[fYY a Ybhg O]h\ 9\\cibhUbhg cb 9\\cibh]b[\UbX >]bUb\\]U\ <]g\\cgifY	./2
		; cbhfe`g UbX HfcWYXi fYg	./2
		Gh\Yf AbZcf a Uh]cb	./2
	AL=E 6;+		./2
H9JL AAA			
		<pre>&lt;]fYWhcfg) =1YWih]jY GZZ]WYfg UbX ; cfdcfUhY ?cjYfbUbWY</pre>	./3
		=1YWih]jY; cadYbgUh]cb	./3
	AL=E ./+	KYWif]hm GkbYfg\]d cZ; YfhU]b: YbYZ]W]U` GkbYfg UbX EUbU[YaYbh UbX JY`UhYX KhcW\c`XYf EUhhYfg	./3
	$AL = E \cdot O +$	; YfhU]b JY`Uh]cbg\]dg UbX JY`UhYX LfUbgUWh]cbg) UbX <]fYWhcf AbXYdYbXYbWY	./4
	$AL = E \cdot 1 +$	Hf]bW]dU 9 WWcibhUbh >YYg UbX KYfi]WYg	./4
H9 JL AN			.,
	AL=E .2+	$=1\ V\ hg\ UbX>\ bUbW\ U`\ KhUhY\ a\ Ybh\ KW\YXi`Yg$	./5
	AL=E .3+	<u>&gt;cfa*C Ki a a Ufm</u>	.0.
KA?F9LMJ	=K		.0/

 $FYkg \ ; cfdcfUh]cb \&h \ Yy; ca \ dUbm)z \ yFYkg \ ; cfd)z \ ykY)z \ yig)z \ cf \ ycifz' \ ]g \ U \ [`cvU` X]j \ Yfg]Z]YX \ a \ YX]U \ UbX \ ]bZcf \ a \ Uh]cb \ gYfj]WYg \ Wc \ a \ dUbm \ ZcWigYX \ cb \ WfYUh]b[ \ UbX \ X]ghf]Vih]b[ \ Uih \ cf]hUh]j Y \ UbX \ Yb[U[]b[ \ WcbhYbh \ UbX \ ch \ Yf \ dfcXi \ Whg \ UbX \ gYfj]WYg \ hc \ Wcbgi \ a \ Yfg \ UbX \ Vig]bYggYg \ h \ fci \ [\ cih \ h \ Y \ kcf \ X+ \ L \ Y \ ; ca \ dUbm \ Wc \ a \ df]gYg \ Vig]bYggYg \ UWfcgg \ U \ fUb[Y \ cZ \ a \ YX]U) \ ]bW`iX]b[ \ X][]hU` \ fYU` \ YghUhY \ gYfj]WYg) \ gi VgWf]dh]cb \ j \ [XYc \ gYfj]WYg \ ]b \ 9 \ ighfU`]U) \ bYkg \ UbX \ ]bZcf \ a \ Uh]cb \ gYfj]WYg \ UbX \ Vcc_ \ di \ V`]g\ ]b[) \ h \ Uh \ UfY \ X]ghf]VihYX \ ibXYf \ gc \ a \ YcZ \ h \ Y \ kcf \ X|g \ a \ cgh \ fYWc \ [b]nUV`Y \ UbX \ fYgdYWhYX \ VfUbXg) \ ]bW`iX]b[ \ BOL \ EHSS \ A[YLL[ \ 8V \ YUHS) \ OHYYVUfZ) \ < ck \ BcbYg) \ BOL \ / \ Z[YHSPHU) \ 6 \ LYHSK \ A \ U) \ BOL \ A \ U) \ BOL \ B^PTLZ$ @UfdYf; \ c``]bg \ HiV`]g \ Yfg) \ > c \ lhY`) \ > GP \ KHGJLK \ 9 \ ighfU`]U) \ fYU`YghUhY+Wc \ a \ +Ui) \ fYU`hcf+Wc \ a \ ') \ hU`\_KHGJL \ UbX \ a \ Ubm \ ch \ Yfg+$ 

ghUhY a Ybhgz k ]h\]b h\Y a YUb]b[ cZ KYWh]cb / .= cZ h\Y = 1W\Ub[Y 9Wh UbX KYWh]cb / 49 cZ h\Y KYWif]h]Yg 9Wh cZ .600) Ug U a YbXYX+ 9\" ghUhY a Ybhg h\Uh UfY bch ghUhY a Ybhg cZ \]ghcf]WU ZUWh UfY Zcfk UfX\*\cc\_]b[ ghUhY a Ybhg+ L\Y k cfXg yYldYWh)z yk]\"\z yYgh] a UhY)z yUbh]W]dUhY)z ydfYX]Wh)z yVY ]YjYz UbX g] a ]'Uf YldfYgg]cbg UbX jUf]Uh]cbg h\YfYcZ UfY ]bhYbXYX hc ]XYbh]Zm Zcfk UfX\*\cc\_]b[ ghUhY a Ybhg+ L\YgY ghUhY a Ybhg UddYUf] b U bi a VYf cZ d`UWYg ]b h\]g XcWi a Ybh UbX ]bW\"iXY ghUhY a Ybhg fY [UfX]b[ h\Y ]bhYbh) VY\"]YZ cf WiffYbh YldYWhUh]cbg cZ h\Y; c a dUbm) ]hg X]fYWhcfg cf ]hg cZZ]WYfg k ]h\ fYgdYWh hc) U a cb[ ch\Yf h\]b[g) hfYbXg UZZYWh]b[ h\Y; c a dUbm\]g Z]bUbW]U\" WcbX]h]cb cf fYgi\"hg cZ cdYfUh]cbg) h\Y; c a dUbm\]g ghfUhY[m UbX ghfUhY[]W ]b]h]Uh]jYg UbX h\Y cihWc a Y cZ Wcbh]b[YbW]Yg giW\ Ug \]h][Uh]cb UbX ]bj Ygh][Uh]cbg+ J YUXYfg UfY WUih]cbYX h\Uh Ubm Zcfk UfX\*\cc\_]b[ ghUhY a Ybhg UfY bch [ iUfUbhYYg cZ ZihifY dYfZcfa UbWY UbX ]bj c\"jY f]g\_g UbX ibWYfhU]bh]Yg+ E cfY ]bZcfa Uh]cb fY[UfX]b[ h\YgY f]g\_g UbX ibWYfhU]bh]Yg UbX ch\Yf ]a dcfhUbh ZUWhcfg h\Uh Wci\X WUigY UWhiU\" fYgi\"hg hc X]ZZYf a UhYf]U\"m Zfc a h\cgY ]b h\Y Zcfk UfX\*\cc\_]b[ ghUhY a Ybhg ]g gYh Zcfh\ ibXYfh\Y \YUX]b[ yhYa .9+ J]g\_\ >UWhcfgz ]b h\]g 9bbiU\" JYdcfh+ L\Y; c a dUbm XcYg bch cfX]bUf]\"m a U\_Y dfc^YWh]cbg cZ ]hg ZihifY cdYfUh]b[ fYgi\"hg UbX ibXYfhU\_Yg bc cV\"][Uh]cb &UbX YldfYgg\"m X]gW\U] a g Ubm cV\"][Uh]cb\"hc diV\"W\"m idXUhY cf fYj]gY Ubm Zcfk UfX\*\cc\_]b[ ghUhY a Ybhg) k\Yh\Yf Ug U fYgi\"h cZ bYk ]bZcfa Uh]cb) ZihifY YjYbhg cf ch\Yfk]gY) YlWYdh Ug fYei]fYX Vm\"Uk+ JYUXYfg g\ci\X

 $fYU`Wc\ a\ YfW]U`+Wc\ a+Ui\ cZZYf\ U\ dfcXiWh\ |\]YfUfW\ k\ |\]W\ YbUV`Yg\ fYU`\ YghUhY\ U\ [Ybhy\ UbX\ dfcdYfhm\ XYjY`cdYfg\ hc\ id\ [fUXY\ ]gh]b\ [UXjYfh]gYa\ Ybhy\ hc\ ]bWfYUgY\ h\Y]f\ dfc\ a\ ]bYbWY\ cb\ h\Y\ g]hY)\ Ug\ kY``Ug\ U\ jUf]Yhm\ cZ\ hUf\ [YhYX\ dfcXiWhg)\ ]bW`iX]b\ [a\ YX]U\ X]gd`Um\ UXjYfh]g]b\ [a\ YYg]Yfh]g]b\ [a\ YX]U\ Xgd`Um\ UXjYfh]g]b\ [a\ YX]U\ Yig]bYgg\ cZZYfg\ ib]e\ iY\ UXjYfh]g]b\ [cddcfhib]h]Yg\ cb\ J=9\ ?fcid\ g\ YYg]hYg\ hc\ dfcdYfhm\ XYjY`cdYfg\ UbX\ ch\Yf\ fY`YjUbh\ a\ Uf\_Yhg)\ ]bW`iX]b\ [ih]`]h]Yg\ UbX\ hY`Ywc\ a\ a\ ib]WUh]cbg)\ ]bgifUbWY)\ Z]bUbWY)\ Uihc\ a\ ch]j\ Y\ UbX\ fYhU]`+\ J=9\ ?fcid\ U`gc\ dfcj]XYg\ fYg]XYbh]U`\ dfcdYfhm\ XUhU\ gYfj]WYg\ hc\ h\ Y\ Z]bUbW]U`\ gYWhcf\ h\ fci\ [\ ]hg\ HfcdhfUW\_\&Zcf\ a\ Yf`m\ @c\ a\ YhfUW\_'\ XUhU\ gYfj]WYg\ Vig]bYgg)\ df]\ a\ Uf]`m\ cb\ U\ a\ cbh\ m\ gi\ VgWf]dh]cb\ VUg]g+$ 

 $J=9\ ?fcid|g\ ]bhYfbUh]cbU`\ cdYfUh]cbg\ Wcbg]gh\ cZ\ X][]hU`\ dfcdYfhm\ UggYhg\ ]b\ 9g]U)\ ]bW`iX]b[\ k\c``m*ckbYX\ dfcdYfhm\ dcfhU`g\ ]b\ @cb[\ Ccb[\ UbX\ ;\]bU)\ U\ 32+2\ ]bhYfYgh\ ]b\ =\ `UfU\ LYW\bc`c[]Yg\ HhY+\ DhX+\ \&y=\ `UfUz')\ U\ `YUX]b[\ X][]hU`\ fYU`\ YghUhY\ gYfj]WYg\ dfcj]XYf\ ]b\ AbX]U\ h\Uh\ ck\bg\ UbX\ cdYfUhYg\ HfcdL][Yf+Wc\ a\ UbX\ @cig]b[+Wc\ a\ \&FYkg\ ;\ cfd\ \c`Xg\ U\ 01+0\ \#\ ]bhYfYgh\ ]b\ =\ `UfU')\ UbX\ Ub\ .5\ \#\ ]bhYfYgh\ ]b\ HfcdYfhm\ ?\ ifi\ z')\ U\ `YUX]b[\ X][]hU`\ dfcdYfhm\ hYW\bc`c[m\ Wc\ a\ dUbm\ cdYfUh]b[\ a\ Uf\_Yhd`UWYg\ ]b\ Kcih\YUgh\ 9g]U+\ J=9\ ?fcid\ UWei]fYX\ ]hg\ ]bhYfYgh\ ]b\ HfcdYfhm\ ?\ ifi\ hfUbgUWh]cb)\ J=9\ ?fcid\ YbhYfYX\ ]bhc\ Ub\ U[fYY\ a\ Ybh\ hc\ gY`\ ]hg\ /4\ \#\ ]bhYfYgh\ ]b\ [\ AcihYfgh\ ]b\ HcjY)\ Ug\ hYf\ UgYhg\ ]bW`iXY\ U/-\ \#\ ]bhYfYgh\ ]b\ EcjY)\ Ug\ fYZYfYbWYX\ UVcjY+\ J=9\ ?fcid|g\ [bhYfYgh]g]b[\ `giYgYgYgXYf]jY\ h\Y\ a\ U^cf]hm\ cZ\ h\Y]f\ fYjYbiY\ Zfc\ a\ h\Y]f\ dfcdYfhm\ UXjYfh]g]b[\ `]gh]b[\ dfcXiWhg\ UbX\ a\ cbh\`m\ UXjYfh]g]b[\ giVgWf]dh]cbg\ Zfc\ a\ fYU`\ YghUY\ U[Ybhg\ UbX\ dfcdYfhm\ XYjY`cdYfg+$ 

## 4PUHU**J**PHS ALY JP**J**LZ

 $J=9 ? fcid|g Z]bUbW]U^c gYfj]WYg Vig]bYgg YbWc a dUggYg Ub YbX*hc*YbX X][]hU^c dfcdYfhm gYUfW^c UbX Z]bUbW]b[ Y1dYf]YbWY UbX a cfh[U[Y Vfc_]b[ gYfj]WYg ibXYf ]hg K a Ufh^]bY w dYfgcbU^c a cfh[U[Y UXj]gYfg VfUbX+ <math>J=9 ? fcid \Ug UWWY^YfUhYX ]hg Z]bUbW]U^c gYfj]WYg ghfUhY[m h^fci[^h^Y fYWYbh UWei]g]h]cbg cZ Ecfh[U[Y ; ^c]WY D] a ]hYX) U^YUX]b[ 9 ighfU^]Ub a cfh[U[Y Vfc_]b[ Vig]bYgg)$ 

Ab UXX]h]cb hc fYU`hcf+Wc a ') E c jY U`gc cZZYfg cb`]bY hcc`g UbX gYfj]WYg hc Xc\*]h\*mcifgY`Z `UbX`cfXg UbX hYbUbhg) Ug kY`` Ug dfcZYgg]cbU` gcZhkUfY UbX gYfj]WYg dfcXiWhg+ L\YgY ]bW`iXY 9 jU]`) U d`UhZcf a h\Uh ] a dfcjYg h\Y fYbh]b[ Y1dYf]YbWY Zcf Xc\*]h\*mcifgY`Z `UbX`cfXg UbX hYbUbhg k]h\ cb`]bY hcc`g) YXiWUh]cbU` WcbhYbh UbX kcfX\*WUgg giddcfh+ 9 jU]` Y a d`cmg U jUf]Yhm cZ df]W]b[ a cXY`g) ]bW`iX]b[ giVgWf]dh]cb ZYYg) Ug kY`` Ug Z]1YX\* cf jUf]UV`Y\*df]W]b[ a cXY`g+

 $\begin{tabular}{ll} Ug kY`` Ug Uddg) UbX Y1W`iX]b[ cZZ*d`UhZcfa X]ghf]Vih]cb' UWWcibhYX Zcf Uddfc1] a UhY`m 34 # cZ j]g]hg hc OKB|g X][]hU`bYkg UbX]bZcfa Uh]cb dfcXiWhg UWWcfX]b[ hc 9XcVY 9bU`mh]Wg+ \\ \begin{tabular}{ll} UWWcfX]b[ hc 9XcVY 9bU`mh]Wg+ \\ \end{tabular}$ 

s  $OHYYVUfZ 5YV \setminus W+ L \setminus Y : Uffcb \mid g ? fcid ZcWigYg cb < ck BcbYg Wcbgi a Yf VfUbXg cihg]XY cZ L \setminus Y O U`` KhfYYh BcifbU` ZfUbW \ ]gY) ]bW`iX]b[ <math>OHYYVUfZ$  UbX  $EUf\_YhOUhW \setminus Uacb[ ch \setminus Yf dfcdYfh]Yg+$ 

 $gi VgWf]dh]cbg UbX W]fWi`Uh]cb ]g VUgYX cb bYkg UbX YX]hcf]U` WcbhYbh) XUhU UbX UbU`mh]Wg WcbhYbh]b fYgYUfW\ hcc`g) gi VgWf]dh]cb df]W]b[) WcjYf df]WY UbX) Zfc a h] a Y hc h] a Y) jUf]cig dfc a ch]cbg+; c a dYh]h]cb Zcf UXjYfh]g]b[ ]g VUgYX idcb UXjYfh]gYfg| ^iX[ a Ybhg Ug hc h\Y a cgh YZZYWh]jY a YX]U Zcf h\Y]f UXjYfh]g]b[ ViX[Yhg) k\]W\ ]g ]b hifb VUgYX idcb jUf]cig ZUWhcfg) ]bW`iX]b[ W]fWi`Uh]cb jc`ia Y) fYUXYfg\]d `YjY`g) UiX]YbWY XY a c[fUd\]Wg) UXjYfh]g]b[ fUhYg) UXjYfh]g]b[ YZZYWh]jYbYgg UbX VfUbX ghfYb[h\ UbX fYdihUh]cb+9g U fYgi`h cZ fUd]X`m W\Ub[]b[ UbX Yjc`j]b[ hYW\bc`c[]Yg) X]ghf]Vih]cb d`UhZcf ag UbX Vig]bYgg a cXY`g) UbX WcffYgdcbX]b[ W\Ub[Yg]b Wcbgi a Yf VY\Uj]cf) h\Y Wcbgi a Yf*ZcWigYX Vig]bYggYg k]h\]b h\Y < c k BcbYg gY[ a Ybh Wcbh]biY hc ZUWY ]bWfYUg]b[ Wc a dYh]h]cb Zcf Vch\ W]fWi`Uh]cb UbX UXjYfh]g]b[ fYjYbiY) ]bW`iX]b[ Zfc a U jUf]Yhm cZ U`hYfbUh]jY bYkg UbX ]bZcf a Uh]cb gci fWYg+ L\YgY]bW`iXY$ 

 $L\Y\Vcc\_diV\]g\]b\[Vig]bYgg\ cdYfUhYg\]b\U\][\mWc\ a\ dYh]h]jY\ a\ Uf\_Yh\ h\Uh\]g\ ei]W\mW\ Ub\[]b\[UbX\ Wcbh]biYg\ hc\ gYY\ hYW\bc\c]WU\]bbcjUh]cbg+\ @UfdYf;\ c``]bg\ Wc\ a\ dYhYg\ k]h\ ch\Yf\ Uf[Y\ diV']g\Yfg)\ giW\ Ug\ HYb[i]b\ JUbXc\ a\ @cigY)\ K]\ a\ cb\ $KW\ighYf\ UbX\ @UW\YhhY\ D]jfY)\ Ug\ kY``Ug\ k]h\ bi\ a\ Yfcig\ g\ a\ U``Yf\ diV']g\Yfg)\ Zcf\ h\Y\ f][\hg\ hc\ kcf\_g\ Vm\ kY``*\_bc\ kb\ Uih\cfg\ UbX\ diV']W\ dYfgcbU`]h]Yg8\ Wc\ a\ dYh]h]cb\ Wci`X\ U`gc\ Wc\ a\ Y\ Zfc\ a\ bYk\ YbhfUbhg\ Ug\ VUff]Yfg\ hc\ Ybhfm\ ]b\ Vcc\_diV`]g\]b[UfY\ ck+Ab\ UXX]h]cb)$ 

#### 8FWS > 5

## 5 LULYHS

 $NUf] cig UgdYWhg cZ h\Y ; cadUbm | g UWh] j | h | Y giV^YWh hc fY[i`Uh] cb | b bia Yfcig ^if] gX] Wh] cbg UfcibX h\Y kcf X+ L\Y | bhfcXi Wh] cb cZ bYk `Ukg UbX fY[i`Uh] cbg | b Wcibhf] Yg k \YfY h\Y ; cadUbm | g dfcXi Whg UbX gYfj | WYg UfY dfcXi WYX cf X] ghf] VihYX) UbX W\Ub[Yg] b h\Y YbZcfWY a Ybh cZ Yl] gh| b[`Ukg UbX fY[i`Uh] cbg | b h\cgY Wcibhf] Yg) Wci`X \UjY U bY[Uh] jY ] a dUWh cb h\Y ; cadUbm | g | bh\YfYghg+$ 

# /\Z[YHSPHU ; LKPH @LN\SH[PVU

 $L\ y \ ; c \ a \ dUbm \ | g \ i \ VgWf \ ] dh \ c \ b \ h'\ Yj \ ] g \ c \ b \ h'\ Yghg \ UfY \ g \ i \ VfWh \ hc \ 9 \ i ghfU^] U \ | g \ fY \ [i`Uhcfm \ ZfU \ a \ Yk \ cf_Zcf \ h\ Y \ VfcUXWUgh] b \ [] b Xi ghfm) \ ] b W`i X] b \ [h\ Y \ 9 \ i ghfU^] Ub \ : fcUXWUgh] b \ [KYfj] WYg \ 9 Whz' \ UbX \ h\ Y \ LY`YWc \ a \ a \ i b] WUh] cbg \ 9 Whz' \ UbX \ UggcW] UhYX \ ; cXYg+ L\ Y \ _Ym \ fY \ [i`Uhcfm \ VcXm \ Zcf \ h\ Y \ 9 \ i ghfU`] Ub \ VfcUXWUgh] b \ [bXighfm \ ] b \ Y \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] g \ h\ Y \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] g \ h\ Y \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] b \ Y \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] b \ Y \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] b \ You \ 9 \ i ghfU`] Ub \ YcUXWUgh] b \ [bXighfm \ ] b \ You \ You$ 

 $CYm \ fY[i`Uhcfm] ggiYg \ Zcf \ giVgWf]dh]cb \ hY`Yj]g]cb \ dfcj]XYfg \ ]bW`iXY7 \ \&U' \ Ubh]*g]d\ cb]b[fYghf]Wh]cbg \ x \ WiffYbh`m \ ibXYf \ h\ Y \ \{Ubh]*g]d\ cb]b[fYghf]Wh]cbg \ x \ WiffYbh`m \ ibXYf \ h\ Y \ \{Ubh]*g]d\ cb]b[fYghf]Wh]cbg \ x \ WiffYbh`m \ ibXYf \ h\ Y \ \{Ubh]*g]cb \ dfcj]XYfg \ UfY \ dfYjYbhYX \ Zfc \ a \ UWei]f]b[f][hg \ hch \ h\ Y Yj]gY \ WYfhU]b \ ghYX \ YjYbhg \ \&Zcf \ Y1U \ a \ Y) \ h\ Y \ G`m \ a \ d\ W \ Y2 \ ubX \ WYfhU]b \ 9 \ ighfU`]Ub \ J \ i`Yg \ ZcchVU`` \ UbX \ Wf]W_Yh \ a \ UhW \ Yg' \ ib`Ygg \ bUh]cbU` \ cf \ Wc \ a \ a \ YfW]U` \ hY`Yj]g]cb \ VfcUXWUghYfg \ UjY \ bch \ cVhU]bYX \ h\ YgY \ f][hg \ /3 \ kYY_g \ VYZcfY \ h\ Y \ ghUfh \ cZ \ h\ Y \ YjYbh \ cf \ h\ Y \ f][hg \ A \ YY_g \ VYZcfY \ h\ Y \ yjYbh \ cf \ h\ Y \ YjYbh \ Y \ YjYbh \ YjYbh \ YjYbh \ Y \ YjYbh \ YjYbh \ Y \ YjYbh \ YjYbh \ Y \ YjYbh \ Y \ YjYbh \ YjYbh \ YjYbh \ Y \ YjYbh \ YjYbh \ Y \ YjYbh \ YjYbh$ 

 $dfcdYfh]Yg+ Ah ]g bch mYh W`YUf k YhYf hY M+C+ k]`` a U_Y WcffYgdcbX]b[ W V Ub[Yg hc ]hg Y1]gh]b[ Hf]j UWm UbX =`YWhfcb]W ; c a a i b]WUh]cbg JY[i`Uh]cbg) k \]W\ ] a d`Y a YbhYX h\Y Y*Hf]j UWm <]fYWh]jY ]b h\Y M+C+$ 

Ab 9 ighfU^]U) XUhU df]jUWm `Ukg] a dcgY UXX]h]cbU` fYei]fY a Ybhg cb cf[Ub]nUh]cbg h\Uh\UbX`Y dYfgcbU` XUhU Vm) U a cb[ ch\Yf h\]b[g) fYei]f]b[ h\Y X]gW`cgifY cZ Wfcgg\*VcfXYf XUhU hfUbgZYfg) d`UW]b[ fYghf]Wh]cbg cb X]fYWh a Uf\_Yh]b[ dfUWh]WYg UbX] a dcg]b[ a UbXUhcfm XUhU VfYUW\ fYdcfh]b[) UbX UXX]h]cbU` XUhU df]jUWm UbX gYWif]hm fYei]fY a Ybhg UbX]bXighfm ghUbXUfXg UfY ibXYf Wcbg]XYfUh]cb+

 $AbXighfm \ dUfh]W]dUbhg \ ]b \ h\ Y \ M+K+) = i \ fcdY \ UbX \ 9 \ ighfU`]U \ \ \ UjY \ hU\_Yb \ ghYdg \ hc \ ]bWfYUgY \ Wc \ a \ d`]UbWY \ k \ ]h \ \ fY`Yj Ubh \ ]bXighfm*`YjY` ghUbXUfXg \ UbX \ dfUWh]WYg) \ ]bW`iX]b[ \ h\ Y \ ]a \ d`Y \ a \ YbhUh]cb \ cZ \ gY`Z*fY[ i`Uhcfm \ fY[] \ a \ Yg \ Zcf \ cb`]bY \ VY\ Uj]cfU` UXjYfh]g]b[ \ h\ Uh \ ]a \ dcgY \ cV`][Uh]cbg \ cb \ dUfh]W]dUh]b[ \ Wc \ a \ dUb]Yg) \ giW \ Ug \ h\ Y \ ;c \ a \ dUbm) \ hc \ []jY \ Wcbgi \ a \ Yfg \ U \ VYhhYf \ ibXYfghUbX]b[ \ cZ \ UXjYfh]gY \ a \ Ybhg \ h\ Uh \ UfY \ Wighc \ a \ ]nYX \ VUgYX \ cb \ h\ Y]f \ cb`]bY \ VY\ Uj]cf+$ 

 $L\y \] bhYfdfYhUh]cb \ UbX \ Udd`]wUh]cb \ cZ \ XUhU \ df]j \ Uwm \ UbX \ gYWif]hm \ `Ukg \ UfY \ cZhYb \ ibWYfhU]b) \] b \ Z`il) \ UbX \ Yjc`j]b[\] bh \Y \ Mb]hYX \ KhUhYg \ UbX \] bhYfbUh]cbU``m+ E \ cfYcjYf) \ XUhU \ df]j \ Uwm \ UbX \ gYWif]hm \ `Ukg \ j \ Ufm \ VYhk \ YYb \ `cWU`) \ ghUhY) \ ZYXYfU` \ UbX \] bhYfbUh]cbU` ^if]gX]\wh]cb \ UbX \ a \ Um \ dchYbh]U``m \ WcbZ`]\wh Zfc a ^if]gX]\wh]cb \ hc ^if]gX]\wh]cb+ L\Y ; c a \ dUbm \ Wcbh]bi Yg \ hc a \ cb]hcf \ dYbX]b[ `Y[]g`Uh]cb \ UbX \ fY[i`Uhcfm \ |b]h]Uh]j Yg \ hc \ UgWYfhU]b \ fY`Yj UbWY) \ UbU`mnY \] a \ dU\wh \ UbX \ XYj Y`cd \ ghfUhY[]\w \ X]fY\wh]cb \ giffcibX]b[ \ fY[i`Uhcfm \ hfYbXg \ UbX \ XYj Y`cd \ a \ Ybhg) \] \ |b\V`iX]b[ \ UbM \ \UbY \ fYei]fYX \]b \ h\Y ; c \ a \ dU\m \ df]j \ U\wm \ UbX \ gY\wiff\mathra{\text{lm}} \ Wc \ a \ d`]UbWY \ dfc[fU \ a \ g+ \]$ 

## $C\&9\&>YLZZ @LN\setminus SH[PVU]$

 $9 g U fYgi`h cZ h\Y ] a d`Y a YbhUh]cb cZ fYWc a a YbXUh]cbg cZ h\Y DYj Ygcb ]bei]fm ]bhc h\Y M+C+ dfYgg) U HfYgg J YWc [b]h]cb HUbY` fYgdcbg]V`Y Zcf Uddfcj]b[) cj YfgYY]b[ UbX a cb]hcf]b[ U bYk dfYgg fY[i`Uhcfm VcXm cf VcX]Yg k Ug YghUV`]g\YX+ GbWY Uddfcj YX Vm h\Y HfYgg J YWc [b]h]cb HUbY`) h\Y bYk dfYgg fY[i`Uhcfm VcXm cf VcX]Yg k ci`X VY fYgdcbg]V`Y Zcf cj YfgYY]b[ dUfh]W]dUh]b[ di V`]g\Yfg+ Ab UXX]h]cb hc h\Y HfYgg J YWc [b]h]cb HUbY`) WYfhU]b `Y[]g`Uh]cb dfcj]XYg h\Uh di V`]g\Yfg k \c UfY bch a Ya VYfg cZ Ub Uddfcj YX fY[i`Uhcf a Um VY`]UV`Y Zcf Y1Y a d`Ufm XU a U[Yg]b WYfhU]b WUgYg k \YfY gi W\ XU a U[Yg UfY bch WiffYbh`m Uk UfXYX UbX) ]Z KYWh]cb 1- cZ h\Y; f] a Y UbX ; cifhg 9 Wh /-.0 ]g Wc a a YbWYX) h\Y dUm a Ybh cZ Wcghg Zcf Vch\ dUfh]Yg ]b`]VY` UWh]cbg ]b WYfhU]b WlfWi a ghUbWYg+$ 

 $HfYgg fY[i`Uhcf AEHJ=KK k Ug fYWc[b]nYX Ug Ub UddfcjYX fY[i`Uhcf Vm h\Y HfYgg J YWc[b]h]cb HUbY` cb GWhcVYf /2) /-.3+ \\ @ckYjYf) diV`]WUh]cbg fYdfYgYbh]b[h\Y a U^cf]hm cZ h\Y ]bXighfm ]b h\Y M+C+) ]bW`iX]b[FYkg MC) YbhYfYX ]bhc V]bX]b[ WcbhfUWhg hc Zcf a Ub U`hYfbUh]jY fY[i`Uhcf) h\Y AbXYdYbXYbh HfYgg KhUbXUfXg Gf[Ub]gUh]cb) cf AHKG) ]b KYdhY a VYf /-.1+ AHKG WiffYbh`m \Ug bc d`Ubg hc Udd`m Zcf fYWc[b]h]cb Zfc a h\Y HfYgg J YWc[b]h]cb HUbY`+ AHKG \Ug Ub ]bXYdYbXYbh W\U]f a Ub UbX U ./* a Y a VYf VcUfX) h\Y a U^cf]hm cZ k\]W\ UfY ]bXYdYbXYbh+ AHKG cjYfgYYg h\Y = X]hcfg|; cXY cZ HfUWh]WY) fYei]fYg a Y a VYfg hc ] a d`Y a Ybh Uddfcdf]UhY ]bhYfbU` [cjYfbUbWY dfcWYggYg UbX fYei]fYg gY`Z*fYdcfh]b[cZ Ubm ZU]`ifYg) dfcj]XYg U Wc a d`U]bhg \UbX`]b[gYfj]WY) \Ug h\Y UV]`]hm hc fYei]fY diV`]WUh]cbg hc df]bh WcffYWh]cbg UbX \Ug h\Y dc k Yf hc ]bjYgh][UhY gYf]cig cf gmghY a ]W VfYUW\Yg cZ h\Y = X]hcfg|; cXY cZ HfUWh]WY UbX`Yjm Z]bYg cZ id hc q. a ]``]cb+ AHKG \Ug U`gc ]bhfcXiWYX Ub UfV]hfUh]cbg W\Y a Y hc fYgc`jY W`U] a g U [U]bgh diV`]WUh]cbg+ L\Y VifXYbg AHKG ] a dcgYg cb |hg df]bh a YX]U a Ya VYfg) ]bW`iX]b[h\Y; ca dUbm|g bYkgdUdYf diV`]g\]b [Vig]bYggYg ]b h\Y M+C+) a Um fYgi`h ]b Wc a dYh]h]jY X]gUXjUbhU[Yg j Yfgig ch\Yf Zcf a g cZ a YX]U UbX a Um ]bWfYUgY h\Y Wcghg cZ fY[i`Uhcfm Wc a d`]UbWY+$ 

# C&9& @HKPV OYVHKJHZ[PUN @LN\SH[PVU

 $L\Y\ ; c\ a\ dUbm\|g\ ]bhY`YWhi\ U`\ dfcdYfhm\ UggYhg\ ]bW`iXY7\ Wcdmf][\hg\ ]b\ Yk\ gdUdYfg)\ Vcc\_g)\ j\ ]XYc\ dfc\ [fU\ a\ a\ ]b\ [\ UbX\ ch\Yf\ WcbhYbh\ UbX\ hYW\bc`c\ []Yg8\ hfUXY\ a\ Uf\_g\ ]b\ bU\ a\ Yg\ Xc\ a\ U]b\ bU\ a\ Yg8\ UbX\ `]WYbgYg\ cZ\ ]bhY`YWhi\ U`\ dfcdYfhm\ f]\ [\hg+L\YgY\ `]WYbgYg\ ]bW`iXY7\ \&.'\ h\Y\ gdcfhg\ dfc\ [fU\ a\ a\ ]b\ [\ f]\ [\hg\ YFUh]cbU`\ J\ i\ [Vm\ DYU\ [iY)\ 9\ ighfU`]Ub\ >cchVU``\ DYU\ [iY)\ ;f]W\_Yh\ 9\ ighfU`]Ub\ >cchVU``\ DYU\ [iY)\ ;f]W\_Yh\ 9\ ighfU`]Ub\ XchVf\ VfcuXWUgh]b\ [\ f]\ [\hg\ XYgWf]YYX\ ]b\ FchY\ .3\ hc\ h\Y\ >]bUbW]U`\ KhUhY\ a\ Ybhg8\ \&'\ '\ ]WYbgYg\ Zfc\ a\ jUf]cig\ h\]fX\ dUfh]Yg\ cZ\ dUhYbhg\ UbX\ ch\Yf\ hYW\bc`c\ [m\ Zcf\ h\Y\ gYh*hcd\ Vc1Yg\ UbX\ fY`UhYX\ cdYfUh]b\ [\ UbX\ WcbX]h]cbU`\ UwWYgg\ gmghY\ a\ g\ igYX\ ]b\ h\Y\ ;c\ a\ dUbm\g\ giVgWf]dh]cb\ hY`Yj\ ]g]cb\ Vi\ g]bYgg8\ \&O'\ h\Y\ hfUXY\ a\ Uf\_\ ]WYbgYg\ Zcf\ h\Y\ fYU`hcf*Wc\ a\ '\ k\YVg]hY\ UXXfYgg)\ Ug\ k\Y`\ Ug\ h\Y\ y=9\ J\ D]WYbgYz'8\ UbX\ \&'\ h\Y\ hfUXY\ a\ Uf\_\ ]WYbgYg\ Zcf\ h\Y\ igY\ cZ\ >GP\ Zcf\ a\ Uh]j\ y\ hfUXY\ a\ Uf\_g$  igYX\ ]b\ h\Y\ ;c\ a\ dUbm\g\ dUm\*LN\ Vi\ g]bYgg\ b\Y\ y\ y>c1\ D]WYbgYgz'+Ab\ UXX]h]cb)\ ]hg\ ]bhY``YWhiU`\ dfcdYfhm\ UggYhg\ ]bW`\ iXY\ dUhYbhg\ cf\ dUhYbh\ Udd`]WUh]cbg\ Zcf\ ]bjYbh]cbg\ fY`UhYX\ hc\ ]hg\ dfcXiWhg)\ Vi\ g]bYgg\ a\ Yh\CXg\ UbX,cf\ gYfj\ ]WYg)\ bcbY\ cZ\ k\ ]W\ UfY\ a\ UhYf]U`

 $L\Y \WUdUV]`]h]Yg cZ h\Y ; c a dUbm|g kcf_ZcfWY \UjY \Wcbh]biYX hc Yj c`jY U`cb[k]h hY; c a dUbm|g Vig]bYgg UbX ghfUhY[m) \\ [bW`iX]b[VYWca]b[acfYX][]hU`+ <if]b[h\Y; GNA<*.6 dUbXYa]W) h\Y dUWY cZ h\]g Yj c`ih]cb]bWfYUgYX) Ug W\Ub[]b[ Wcbgi a Yf VY\Uj]cf UWWY YfUhYX h\Y g\]Zh]b h\Y; c a dUbm|g kcf_ZcfWY U``cWUh]cb hc kUfXg X][]hU` dfcXiWhg UbX gYfj]WYg+ L\Y; c a dUbm U`gc ]a d`Y a YbhYX U hfUbgZcf a Uh]cb]b]h]Uh]j Y hc ghfYU a`]bY cdYfUh]cbg UbX fYXiWY Wcghg UWfcgg VUW_ cZZ]WY ZibWh]cbg)]bW`iX]b[h\Y]bhfcXiWh]cb cZ Wc a a cb hYW\bc`c[m d`UhZcf a g) ghUbXUfX]n]b[]bhYfbU` dfcWYggYg) cihgcifW]b[jUf]cig UWh]j]h]Yg UbX fUh]cbU`]n]b[]hg fYU` YghUhY Zcchdf]bh) k\]W\]h Y1dYWhg hc ]bWfYUgY Wc``UVcfUh]cb UWfcgg ]hg Vig]bYggYg kcf`Xk]XY UbX cdh]a]nY h\Y dfcXiWh]j]hm UbX YZZ]W]YbWm cZ]hg kcf_ZcfWY+$ 

#### - ULTURF BNE ?BLUFS

 $L \ Y \ YY^{\circ}_{j} \ Y \ fm \ cZ \ ei \ U^{\circ}_{j} \ mb \ bY \ kg) \ ]bZcf \ a \ Uh]cb \ UbX \ YbhYfbU]b \ a \ Ybh \ hc \ Wighc \ a \ Yfg \ ]g \ U \ dUgg]cbUhY) \ df]bW]d^YX \ UbX \ difdcgYZi^YbhYfdf]gY+ \\ L \ Y \ ;c \ a \ dUbm \ YY^{\circ}_{j} \ Yj \ g \ dYcd^Y \ UfcibX \ h \ Y \ [^{cVY}_{hifb} \ hc \ FYkg \ ;cfd \ VYWUigY \ h \ Ym \ hfigh \ ]hg \ XYX]WUh]cb \ hc \ h \ cgY \ jU^{\circ}_{i} \ Yg \ UbX \ hc \ WcbXiWh]b[\ Vig]bYgg \ k]h \ ]bhY[f]hm+ L \ Y \ ;c \ a \ dUbm \ ]g \ U^{\circ}_{k} \ kumg \ a \ ]bXZi^{\circ}_{k} \ Uh \ cbY \ cZ \ ]hg \ [fYUhYgh \ UggYhg \ ]g \ ]hg \ fYdihUh]cb) \ UbX \ Yh \ ]WU^{\circ}_{k} \ WcbXiWh \ ]g \ dUfh \ cZ \ h \ Y \ j \ ]g]cb) \ ghfUhY[m \ UbX \ ZUVf]W \ cZ \ h \ Y \ ;c \ a \ dUbm+ L \ Y \ ;c \ a \ dUbm+ L \ Y \ ;c \ a \ dUbm \ Ug \ YghUV^{\circ}_{l}g \ YX \ U \ ;c \ a \ d^{\circ}_{l}UbWY \ KhYYf]b[\ ;c \ a \ a \ ]hhYY \ h \ h \ h \ Y \ ;c \ a \ d^{\circ}_{l}UbWY \ cb \ Yh \ ]Wg \ UbX \ Wc \ a \ d^{\circ}_{l}UbWY \ cV^{\circ}_{l}Wh]j \ g \ ]g \ Yj \ U^{\circ}_{l}UhYX \ ]b \ XYhYf \ a \ ]b]b[\ h \ Y \ dUmc \ ih \ cZ \ ]bWYbh]j Y Wc \ a \ d^{\circ}_{l}UhY \ hfU]b]b[\ h \ Y \ dUmc \ ih \ cZ \ ]wyhyhfU]b]b[\ h \ Y \ dUmc \ ih \ cZ \ ]wyhyhfU]b]b[\ h \ Y \ dUmc \ ih \ cZ \ ]wyhyhfU]b]b[\ h \ Y \ dUmc \ ih \ CZ \ ]wyhyhfU]b]b[\ h \ YhyhfU]b]b[\ h \ Y \ dUmc \ ih \ CZ \ ]wyhyhfU]b]b[\ h \ YhyhfU]b]b[\ h \ YhyhfU$ 

 $\label{thm:continuous} $$ \UjY UWWYgg hc U fUb[Y cZ hfU]b]b[ cddcfhib]h]Yg) ]bW`iX]b[ kcf_g\cdg UbX W`UggYg cb U jUf]Yhm cZ hcd]Wg) kYV]bUfg) ^cV*gdYW]Z]W hfU]b]b[ UbX ch\Yf Wcbh]bi]b[ YXiWUh]cb fYgcifWYg+ L\Y ; c a dUbm Zifh\Yf giddcfhg UbX XYjY`cdg ]hg Y a d`cmYYg h\fci[\ WUfYYf d`Ubb]b[ fYgcifWYg UbX dfc[fU ag h\Uh Vi]`X UbX ghfYb[h\Yb Y a d`cmYY `YUXYfg\]d g_]`g+ Ab UXX]h]cb) h\Y ; c a dUbm UbX ]hg Vig]bYggYg \UjY] a d`Y a YbhYX dfc[fU ag hc giddcfh fY[i`Uf dYfZcf a UbWY fYj]Y kg Zcf Y a d`cmYYg hc \][\`][\h h\Y]f ghfYb[h\g UbX ]XYbh]Zm h\Y g_]``g UbX [fckh\ UfYUg bYWYggUfm hc UXjUbWY h\Y]f WUfYYfg+ L\YgY dfc[fU ag \Y`d h\Y ; c a dUbm ]XYbh]Zm UbX ]bj Ygh]b h\Y bY1h [YbYfUh]cb cZ `YUXYfg\]d UbX fYdfYgYbh Ub ] a dcfhUbh Wc a dcbYbh ]b h\Y XYjY`cd a Ybh cZ ]hg hU`Ybh d]dY`]bY+$ 

## >NJQUF >SFRS

>cf difdcgYg cZ h\]g 9bbiU JYdcfh) h\Y; c a dUbm Wcibhg ib]eiY igYfg h\Y Z]fgh h] a Y Ub ]bX]j]XiU UWWYggYg U dfcXiWh|g kYVg]hY
ig]b[ U VfckgYf Xif]b[ U WU YbXUf a cbh\ UbX h\Y Z]fgh h] a Y Ub ]bX]j]XiU UWWYggYg U dfcXiWh|g a cV] Y cf hUV Yh Udd ig]b[ U a cV] Y
cf hUV Yh XYj]WY Xif]b[ U WU YbXUf a cbh\+ AZ h\Y igYf UWWYggYg a cfY h\Ub cbY cZ U dfcXiWh|g XYg\_hcd k YVg]hYg) a cV] Y k YVg]hYg)
a cV] Y Uddg UbX,cf hUV Yh Uddg) h\Y Z]fgh UWWYgg hc YUW\ giW\ kYVg]hY cf Udd ]g WcibhYX Ug U gYdUfUhY ib]eiY igYf+ Ab UXX]h]cb) igYfg
UWWYgg]b[ U dfcXiWh|g k YVg]hYg h\fci[\X]ZZYfYbh VfckgYfg) igYfg k\c W YUf h\Y]f VfckgYf WUW\Y Uh Ubm h] a Y UbX igYfg k\c UWWYgg U
dfcXiWh|g k YVg]hYg UbX Uddg h\fci[\X]ZZYfYbh XYj]WYg UfY U gc WcibhYX Ug gYdUfUhY ib]eiY igYfg+>cf U [fcid cZ dfcXiWhg giW\ Ug

 $/\ 2 L J S P U L P U 1 \\ Z [VTLY / K] L Y [PZPUN 3_W L U KP[ \YLZ P U [OL 1 V T W H U \fz < L^Z W H W L Y H U K = [OLY O \ZP U L Z Z L I V \SK 1 H \ZL P [Z @ L] L U \LZ H U K = W L Y H [P U N @ L Z \S[Z [V 2 L J S P U L A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P N U P W J H U [S \] K B U A P U P W J H U [S \] K$ 

 $< Y \ a \ UbX \ Zcf \ h\ Y \ ; c \ a \ dUbm \ | g \ dfcXi \ Whg \ UbX \ gYfj] \ Wy \ g \ g \ YjU \ i \ UhYX \ VUgYX \ cb \ U \ j \ Uf] \ Yhm \ cZ \ a \ Yhf] \ Wg+ > cf \ Y1U \ a \ d`Y) \ W] \ fWi \ `Uh] \ cb \ `YjY'g \ Zcf \ h\ Y \ ; c \ a \ dUbm \ | g \ bYk \ gdUdYfg) \ fUh] \ b \ [g \ dc] \ bhg \ Zcf \ ]hg \ WUV'Y \ W \ UbbY'g \ UbX \ bi \ a \ VYf \ cZ \ ]ghYbYfg \ Zcf \ ]hg \ fUX] \ cghUh] \ cbg \ UfY \ Ua \ cb \ [h\ Y \ Ua \ cibh \ cZ \ UXjYfh]g] \ b \ [h \ difW \ UgY \ Zfc \ a \ h\ Y \ ; c \ a \ dUbm \ Ug \ k \ Y` \ Ug \ UXjYfh]g] \ b \ [f \ UhYg+> cf \ h\ Y \ ; c \ a \ dUbm \ Ug \ k \ Y` \ Ug \ UXjYfh]g] \ b \ [f \ UhYg+> cf \ h\ Y \ ; c \ a \ dUbm \ Ug \ k \ Y` \ Ug \ UXjYfh]g] \ b \ [g \ UhYg+> cf \ h\ Y \ ; c \ a \ dUbm \ Ug \ k \ Y` \ Ug \ UXjYfh]g] \ b \ [g \ UhYg+> cf \ h\ Y \ ; c \ a \ dUbm \ Ug \ h\ Y \ bi \ a \ VYf \ cZ \ jg] \ b \ i \ a \ YUg \ ifY \ y \ b \ UWWifUhY`m \ a \ YUg \ ifY] \ b \ UwWifUhY`m \ a \ YUg \ ifY] \ b \ UbX \ gdYbX] \ b \ [h \ VhYg+]g] \ b \ [h \ UhYg+]g] \ b \ [h \ UhYg+]g] \ b \ [h \ UhXg+]g] \ b \ [h \ UhXg$ 

L\Y X][]hU` UXjYfh]g]b[ a Uf\_Yh U`gc Wcbh]biYg hc ibXYf[c W\Ub[Yg h\Uh a Um Zifh\Yf]a dUWh X][]hU` UXjYfh]g]b[ fYjYbiYg+ Hfc[fU a a Uh]W Vim]b[ W\UbbY`g h\Uh U``ck UXjYfh]g]b[ hc Vim UiX]YbWYg Uh gWU`Y d`Um U g][b]Z]WUbh fc`Y ]b h\Y UXjYfh]g]b[

Ab cfXYf hc dcg|h]cb |hg Vig|bYgg hc hU Y UX;UbhU[Y cZ [fckh\ cddcfhib]h]Yg) h\Y; c a dUbm \Ug a UXY UbX a Um Wcbh]biY hc a U Y  $ghfUhY[]WUWei]g]h]cbgUbX]bjYghaYbhgh\Uh]bjc'jYg][b]Z]WUbhf]g_gUbXibWYfhU]bh]Yg+L\YgYf]g_gUbXibWYfhU]bh]Yg]bWiXY)$ Uacb[ch\Yfg7&.'h\YX]ZZ]Wi`hm]b]bhY[fUh]b[bYk`m UWei]fYX Vig]bYggYg) cdYfUh]cbg UbX gmghYag)]bW`iX]b[Z]bUbW]U`fYdcfh]b[) ]bhYfbU` Wcbhfe`g UbX ]bZefaUh]eb hYW\bc`c[m) ]b Ub YZZ]W]Ybh UbX YZZYWh]jY a UbbYf) &/' h\Y W\U``Yb[Yg]b UW\]Yj]b[ ghfUhY[]W cV^YWh]jYg) Wcgh gUj]b[g UbX ch\Yf Ubh]W]dUhYX VYbYZ]hg) &O'h\Y dchYbh]U``cgg cZ \_Ym Y a d`cmYYg) Wighc a Yfg UbX gidd`]Yfg) &1'k]h\ fYgdYWh hc |bjYgh a Ybhg) flg g UggcW]UhYX k |h\ h\Y |bUV|`]hm hc Wcbhfc`h\Y cdYfUh]cbg cZ h\Y Vig]bYgg) &2'h\Y flg cZ X]jYfh]b[h\Y UhhYbh]cb cZ h\Y; c a dUbm|g gYb]cf a UbU [Y a Ybh Zfc a h\Y; c a dUbm|g cdYfUh]cbg) &3' ]b h\Y WUgY cZ ZcfY] [b UWei]g]h]cbg UbX |bjYghaYbhg)h\Y]adUWhcZgdYW|Z|WYWcbca|W)hU1)WiffYbWm)dc`|h|WU`)`Y[U`UbXfY[i`Uhcfmf]g gUggcW|UhYXk|h\h\YfY`YjUbh Wcibhf]Yg) &4' YldYbgYg UbX`]UV]`]h]Yg) Vch\ \_bckb UbX ib\_bckb) UggcW]UhYX k]h\ h\Y UWei]fYX Vig]bYggYg cf ]bjYgh a Ybhg) &5' ]b gc a Y WUgYg) ]bWfYUgYX fY[i`Uh]cb UbX &6' ]b gc a Y WUgYg) `c k Yf `]ei]X]hm Ug U fYgi`h cZ h\Y igY cZ WUg\ cf ]bWiffYbWY cZ XYVh hc ZibX giW\ UWei|g|h|cb cf |bjYgh a Ybh+ AZ Ubm UWei|fYX Vig|bYgg cf |bjYgh a Ybh ZU|`g hc cdYfUhY Ug Ubh|W|dUhYX cf Ub UWei|fYX Vig|bYgg WUbbch VY giWWYggZi``m ]bhY[fUhYX k]h\ h\Y; cadUbm|gY1]gh]b[Vig]bYggYg)h\Y; cadUbm|gVig]bYgg)fYgi`hg cZ cdYfUh]cbg) ZjbUbW]U` WcbX]h]cb UbX fYdihUh]cb Wci`X VY UXjYfgY`m UZZYWhYX) UbX h\Y; cadUbm a Um VY fYei]fYX hc fYWcfX bcb\*WUg\ ]adU]faYbh W\Uf[Yg Zcf h\Y kf]hY\*Xckb cZ WYfhU]b UWei]fYX UggYhg UbX ]bjYgh a Ybhg+ L\Y; c a dUbm|g UV]`]hm hc Wcbh]biY hc a U\_Y UWei]g]h]cbg XYdYbXg cb h\Y UjUj`UV]`]hm cZ gi]hUV`Y WUbX]XUhYg Uh UWWYdhUV`Y df]WYg UbX k\Yh\Yf fYghf]Wh]cbg UfY ] a dcgYX Vm fY[i`Uh]cbg) UbX Wc a dYhlhlcb Zcf WYfhUlb hmdYg cZ UWeilglhlcbg lg gl[b]ZlWUbh+

^if]gX]Wh]cbg giW\ Ug bUhifU^ X]gUghYfg) ]bW^iX]b[ Y	lhfYaY kYUh\Yf&k∖]W∖	aUm cWWif k]h\ ]bWfYUg]b[ Zi	YeiYbWm UbX ]bhYbg]hm')

BOL 1 = D72%). >HUKLTPJ HUK =[OLY APTPSHY 3WPKLTPJZ\$ >HUKLTPJZ VY EPKLZWYLHK 6LHS[O 1YPZLZ 1V\SK 6H]L H; H[LYPHS / K]LYZL 3\mlJ[ VU [OL 1VTWHU`fZ 0\ZPULZZ\$ @LZ\S[Z V\\ =\WLYH[PVUZ\$ 1HZO 4\$V^Z HUK 4PUHUJPHS > VZP[PVU\\ ]

 $< if]b[\ Z]gWU^{`}/-/.)\ dUfh]Wi^Uf^m]bh^YZ]fgh^U^Z)h^Y; GNA<*.6\ dUbXYa]W\ wcbh]biYXhc]a\ dUWhh^Y; cadUbm|g\ Vig]bYggYg) U^h^ci[\ h^Y]a\ dUWhg\ acXYfUhYXfY^Uh]jYhcZ]gWU^{`}/-/-+>cfYlUad^Y)\ Vig]bYggfYghf]Wh]cbg\ UbX\ g^Y^hYf^*]b^*d^UWY\ cfXYfg\ WUigYXU\ XYW^]bY]bb df]bh bYkgdUdYfjc^iaYg)k^]Y\ dcghdcbYaYbhg UbX WUbWY^Uh]cbg\ cZgdcfhg\ YjYbhg\ bY[Uh]jY^m]adUWhYX WcaaYfW]U^CgiVgWf]dh]cbfYjYbiYg UbX VfcUXWUgh UbX CUmcgiVgWf]VYfg+9XjYfh]g]b[fYjYbiYgU^gcXYW^]bYXXiYhch^Yfgi^h]b[YWcbca]WXckbhifb+O\]Yh^Y; cadUbmgUk[fckh\]bch^YfUfYUg)]bW^iX]b[X][]hU^giVgWf]VYfgUh]hgbYkgdUdYfVig]bYggYg)Vcc_gU^YgUh]hg:cc_HiV^]g]b[gY[aYbhUbXUiX]YbWY[fckh\]UhfYU^hcf+Wca')Xf]jYb]bdUfhVmdUbXYa]W*fY^UhYXW]fWiaghUbWYgUbXh^YbYkgYbj]fcbaYbh)h^]g[fckh\]aUmbchVYgighUbU^Y+$ 

Ab fYgdcbgY hc h\Y ; GNA<\*.6 dUbXY a ]W) h\Y ;  $cadUbm]bgh]hihYX fYachY kcf_]b[UffUb[YaYbhg Zcf U giVghUbh]U^aU^cf]hm cZ]hg Yad`cmYYg+ O\]`Y h\YgY UffUb[YaYbhg \UjY bch aUhYf]U^m UZZYWhYX h\Y ; <math>cadUbm|g$  UV]`]hm hc aU]bhU]b]hg Vig]bYgg cdYfUh]cbg hc XUhY) h\YgY kcf\_ UffUb[YaYbhg Wci`X)]b h\Y ZihifY) ghfU]b h\Y ; cadUbm|g Vig]bYgg Wcbh]bi]hm d'Ubg)]bhfcXiWY cdYfUh]cbU^f]g\_)]bW`iX]b[WmVYfgYWif]hm f]g\_g cf f]g\_g hc h\Y YZZYWh]jYbYgg cZ h\Y ; cadUbm|g ]bhYfbU^ Wcbhfc`g) UbX UZZYWh h\Y ; cadUbm|g dfcXiWh]j]hm UbX UV]`]hm hc aUbU[Y]hg Vig]bYgg UbX dYfZcf a Wf]h]WU^ ZibWh]cbg+

 $L\Y i\h a UhY \] a dUWh cZ h\Y \; GNA <*.6 dUbXY a \] W UbX ch\Yf g \] a \] ``Uf Yd]XY a \] Wg of k \] XYgdfYUX \YU\h \ Wf]gYg k \]`` XYdYbX cb) U a cb \[ ch\Yf h\] b \[ gYj Yf]hm) XifUh]cb) gdfYUX UbX Ubm fYcWWiffYbWY cZ giW \ Wf]gYg) h\Y \] a dUWh cZ \[ cj Yfb a YbhU \ UWh]cbg UbX Vig]bYgg UbX Wcbgi a Yf VY\Uj \] cf \[ ]b fYgdcbgY) h\Y YZZYWh]j YbYgg cZ UWh]cbg hU_Yb hc WcbhU]b cf a \[ ]h \] [UhY cihVfYU_g UbX dfYj Ybh cf \] a \[ ]h Ubm fYcWWiffYbWY) \[ ]bW iX]b \[ [h\Y XYj Y'cd a Ybh) Uj U]'UV]' \] hm UbX di V' ]W UWWYdhUbWY cZ YZZYWh]j Y hfYUh a Ybhg UbX j UWW]bYg) h\Y fYgi 'h\] \[ ['cVU' YWcbc a \] W WcbX]h]cbg UbX \ck e i \[ ]W_\] m UbX hc k \[ Uh Y1hYbh bcf a U' YWcbc a \] W UbX cdYfUh]b \[ WcbX]h]cbg WUb fYgi a Y) \] U" \[ cZ k \] W\UfY \] \[ ['m ibWYfhU]b UbX WUbbch VY dfYX]WhYX+ Ab UXX]h]cb) h\Y ; GNA <*.6 dUbXY a \] W UbX ch\Yf g \[ ]a \] 'Uf Yd]XY a \] Wg) dUbXY a \] Wg cf k \[ ]XYgdfYUX \YU'h\ Wf]gYg a Um U a d' \] Zm a Ubm cZ h\Y ch\Yf f]g_ ZUWhcfg X]gW'cgYX Y'gYk \YfY \] b h\] g yAhY a \. 9+ \[ J \] g_ \[ >UWhcfg+z \]$ 

 $ELHR\ 2VTLZ[PJ\ HUK\ 5SVIHS\ 3JVUVTPJ\ 1VUKP[PVUZ\ HUK\ DVSH[PSP[\ HUK\ 2PZY\backslash W[PVU\ PU\ [OL\ 4PUHUJPHS\ HUK\ =[OLY\ ;\ HYRL[Z\ ;\ H`/K]LYZLS`\ /MLJ[\ [OL\ 1VTWHU\ fZ\ O\backslash ZPULZZk$ 

L\Y M+K+ UbX [`cVU` YWcbc a ]Yg \UjY ibXYf[cbY) UbX a Um ]b h\Y ZihifY Y1dYf]YbWY) dYf]cXg cZ YWcbc a ]W UbX a Uf\_Yh k YU\_bYgg UbX ibWYfhU]bhm) ]bW`iX]b[ Ug U fYgi`h cZ h\Y; GNA<\*.6 dUbXY a ]W) hfUXY X]gdihYg VYhk YYb U bi a VYf cZ Wcibhf]Yg UbX \][\Yf ]bZ'Uh]cb+ L\YgY WcbX]h]cbg \UjY fYgi`hYX ]b) Uacb[ ch\Yf h\]b[g) U h][\hYb]b[ cZ) UbX ]b gc a Y WUgYg a cfY`] a ]hYX UWWYgg hc) h\Y WfYX]h UbX WUd]hU` a Uf\_Yhg) `c k Yf `Y j Y`g cZ `]e i ]X]hm) ]bWfYUgYg ]b h\Y fUhYg cZ XYZUi`h UbX VUb\_f i dhWm) `c k Yf Wcbgi a Yf UbX Vig]bYgg gdYbX]b[) `ckYf WcbgiaYf bYh kcfh\ UbX U XYW`]bY ]b h\Y fYU` YghUhY aUf\_Yh+KiW\ kYU\_bYgg UbX ibWYfhU]bhm UbX UggcW]UhYX aUf\_Yh X]gfidh]cbg \UjY cZhYb`YX hc VfcUXYf) dfc`cb[YX YWcbc a]W Xckbhifbg h\Uh\UjY \]ghcf]WU``m fYgi`hYX ]b`ckYf UXjYfh]g]b[ YldYbX]hifYg)`ckYf XY aUbX Zcf h\Y; cadUbm|g dfcXiWhg UbX gYfj]WYg UbX ibZUjcfUV`Y W\Ub[Yg]b h\Y a]l cZ dfcXiWhg UbX gYfj]WYg difW\UgYX UbX \UjY UXjYfgY`m UZZYWhYX h\Y ; c a dUbm|g Vig]bYgg) fYgi`hg cZ cdYfUh]cbg) Z]bUbW]U` WcbX]h]cb UbX`]ei]X]hm+ 9 bm Wcbh]biYX cf fYWiff]b[ YWcbc a ]W kYU\_bYgg ]g`]\_Y`m hc \UjY U g] a]`Uf] a dUWh cb h\Y; c a dUbm|g Vig]bYgg UbX fYXiWY]hg W]fWi`Uh]cb UbX giVgWf]dh]cb) UXjYfh]g]b[) fYU` YghUhY) Wcbgi a Yf UbX ch\Yf fYjYbiYg UbX ch\Yfk]gY bY[Uh]jY`m] a dUWh h\Y  $dyfZcf \ a \ UbWY \ cZ \ ] hg \ Vig]bYggYg+L\ Y \ ; c \ a \ dUbm \ ] g \ dUfh]Wi`Uf`m \ Y1dcgYX \ hc \ WYfhU]b \ 9 \ ighfU`] Ub \ Vig]bYgg \ f]g\_g) \ ] bW`iX]b[\ gdYW]Z]Wi \ f(x) \$ 9 ighfU`]Ub `Y[U` UbX fY[i`Uhcfm f]g\_g) Wcbgi a Yf dfYZYfYbWYg UbX Wc a dYh]h]cb) VYWUigY ]h \c`Xg U giVghUbh]U` U a cibh cZ 9 ighfU`]Ub UggYhg UbX [YbYfUhYX Uddfcl] a UhY`m 1/# cZ |hg Z|gWU`/-/. fYjYbiYg Zfca 9 ighfU`|U+ 9 g U fYgi`h) h\Y; cadUbm|g Vig|bYgg) fYgi`hg cZ cdYfUh]cbg UbX Z]bUbW]U` WcbX]h]cb a Um VY UXjYfgY`m UZZYWhYX Vm bY [Uh]jY XYjY`cd a Ybhg ]b h\Y 9 ighfU`]Ub a Uf\_Yh) ]bW`iX]b[) Zcf Y1U a d`Y) kYU\_bYgg ]b h\Y 9 ighfU`]Ub fYg]XYbh]U` fYU` YghUhY a Uf\_Yh k\]W\ \Ug`YX) UbX a Um ]b h\Y ZihifY`YUX) hc`c kYf`]gh]b[ jc`i a Yg Uh J=9 ?fcid+L\Y ; c a dUbm U`gc [YbYfUhYX Uddfcl] a UhY`m . 1 # cZ ]hg Z]gWU^ /-/. fYjYbiYg Zfc a h\Y M+C+) k \]W\ Wcbh]biYg hc YldYf]YbWY dc`]h]WU`) fY[i`Uhcfm) YWcbc a]W UbX a Uf\_Yh ibWYfhU]bhm Zc``ck]b[]hg Yl]h Zfc a h\Y = i fcdYUb Mb]cb) We a a cb'm fYZYffYX he Ug y: fYl]h+z O\]'Y h\Y M+C+ UbX h\Y = i fcdYUb Mb]cb \UjY YbhYfYX ]bhe U hfUXY UbX WccdYfUh]cb U[fYY a Ybh)

 $]bYZZYWh]jY\ cf\ ]bUXYe\ i\ UhY)\ UbX\ h\ Y\ ;\ c\ a\ dUbm\ |\ g\ X]gUghYf\ fYWc\ j\ Yfm\ UbX\ V\ i\ g]bYgg\ Wcbh]bi\ ]hm\ d`Ubb]b\ [\ a\ Um\ bch\ VY\ g\ i\ ZZ]W]Ybh\ hc\ UXXfYgg\ U``\ dchYbh]U`\ WmVYf\ Y\ j\ Ybhg\ cf\ ch\ Yf\ X]gfi\ dh\ |\ cbg^+$ 

Ab fYWYbh mYUfg) h\YfY \Ug VYYb U g][b]Z]WUbh f]gY ]b h\Y bi a VYf cZ WmVYfUhhUW g cb Wc a dUb]Yg| bYhkcf UbX ]bZcf a Uh]cb gmghY a g) UbX giW\ UhhUW\_g UfY VYWc a ]b[ ]bWfYUg]b[`m a cfY gcd\]gh]WUhYX) hUf[YhYX UbX X]ZZ]Wi`h hc XYhYWh UbX dfYjYbh U[U]bgh+ 9 g U fYgi`h cZ h\Y; GNA<\*.6 dUbXY a]W) fY a chY k cf\_ UbX fY a chY UWWYgg hc h\Y; c a dUbm|g gmghY a g \Ug]bWfYUgYX g][b]Z]WUbh`m) k\]W\ a Um UXjYfgY`m] a dUWh h\Y YZZYWh]jYbYgg cZ h\Y; c a dUbm|g gYWif]hm a YUgifYg+; cbgYeiYbh`m) h\Y f]g\_g UggcW]UhYX k]h\ giW\ Ub YjYbh Wcbh]biYhc]bWfYUgY) dUfh]Wi`Uf'm Ug h\Y; c a dUbm|g X][]hU` Vig]bYggYg Y1dUbX+ L\Y; c a dUbm \Ug Y1dYf]YbWYX) UbX Y1dYWhg hc Wcbh|biYhc VY giV^YWh hc) WmVYfgYWif|hm h\fYUhg UbX |bW|XYbhg) bcbY cZ k \ W\ \UjY VYYb a UhYf|U hc h\Y; c a dUbm hc XUhY) |bX]j|XiU^m cf |b h\Y U[[fY[UhY+@ckYjYf) h\YfY ]g bc UggifUbWY h\Uh h\YfY k]^ bch VY U WmVYfgYWif]hm h\fYUh cf |bW]XYbh h\Uh \Ug U a UhYf]U` UXjYfgY YZZYWh ]b h\Y ZihifY+ O\]`Y h\Y; c a dUbm UbX ]hg jYbXcfg \UjY XYjY`cdYX UbX ] a d`Y a YbhYX gYWif]hm a YUgifYg UbX ]bhYfbU` Wcbhfc`g h\Uh UfY XYg][bYX hc dfchYWh dYfgcbU` XUhU) Vig]bYgg ]bZcfaUh]cb) ]bW`iX]b[ ]bhY``YWhiU` dfcdYfhm) UbX ch\Yf WcbZJXYbh]U`]bZcfaUh]cb) hc dfYjYbh gmghYa X]gfidh]cb) XUhU`cgg cf Wcffidh]cb) UbX hc dfYjYbh cf XYhYWh gYWif]hm VfYUW\Yg) giW\ a YUgifYg a Um bch VY giWWYggZi` ]b dfYjYbh]b[ h\YgY YjYbhg Zfc a cWWiff[b[) dUfh]Wi`Uf`m []jYb h\Uh hYW\b]eiYg igYX hc UWWYgg) X]gUV`Y cf XY[fUXY gYfj]WY) cf gUVchU[Y gmghYag W\Ub[Y ZfYeiYbh`m+ 9 XX]h]cbU``m) |h a Um VY X]ZZ]Wi`h hc XYhYWh UbX XYZYbX U[U]bgh WYfhU]b h\fYUhg UbX j i`bYfUV]`]h]Yg h\Uh WUb dYfg]gh cjYf Y1hYbXYX dYf]cXg cZ h] a Y+ 9 bm bYhk cf\_ UbX ]bZcf a Uh]cb gmghY a g\*fY`UhYX YjYbhg Wci`X fYei]fY h\Y; cadUbm hc YldYbX g][b]Z]WUbh fYgcifWYg hc fY a YXm giW\ YjYbh+ EcfYcjYf) h\Y XYjY`cd a Ybh UbX a U]bhYbUbWY cZ h\YgY a YUgifYg ]g Wcgh`m UbX fYei]fYg cb[c]b[ a cb]hcf]b[ UbX idXUh]b[ Ug hYW\bc`c[]Yg W\Ub[Y UbX YZZcfhg hc cjYfWcaYgYWif]hm a YUgifYg VYWcaY a cfY gcd\]gh]WUhYXdYfhm) UbX ch\Yf

 $fYg]XYbhg \ k \ h \ WYfhU \ b \ f] \ [\ h \ Y]f \ dYfgcbU^ \ ]bZcf \ a \ Uh]cb+ \ KYY \ y \ ? \ cj \ Yfb \ a \ YbhU^ \ J \ Y[\ i`Uh]cb \ x \ < UhU \ Hf]j \ UWm \ UbX \ KYW \ i \ f]hmz \ Zcf \ a \ cfY \ [bZcf \ a \ Uh]cb+$ 

BOL  $7UKLI[LKULZZ\ VN\ [OL\ 1\ VTWHU\ HUK\ 1\ LY[HPU\ VN\ P[Z\ A\ |\ 1ZPKPHYPLZ\ TH\ /MLJ[\ [OLPY\ /\ 1PSP[\ V = WLYH[L\ [OLPY\ O\ ZPULZZLZ\ HUK\ TH\ OH]L\ H\ ;\ H[LYPHS\ /\ K]LYZL\ 3MNLJ[\ VU\ [OL\ 1\ VTWHU\ fZ\ 4PUHUJPHS\ 1\ VUKP[PVU\ HUK\ @LZ\ S[Z\ VN\ = WLYH[PVUZ\&\ BOL\ 1\ VTWHU\ HUK\ P[Z\ A\ |\ 1ZPKPHYPLZ\ TH\ 1L\ HISL\ [V\ 7UJ\ Y\ A\ |\ 1Z[HU[PHSS\ \ ;\ VYL\ 2\ LI]\ ^OPJO\ 1\ V\ SK\ 4\ Y[OLY\ 3\ HJLY1H[L\ [OL\ @PZRZ\ 2\ LZJYP1LK\ 6\ LYLPU&\ NUK\ P[Z\ A\ V]OLY\ 3\ HUK\ P[Z\ A\ V]OLY\ 4\ V]OLY\ 4\ HUK\ P[Z\ A\ V]OLY\ 4\ V]OLY\ 4\ HUK\ P[Z\ A\ V]OLY\ 4\ HUK\ P[Z\$ 

 $9 \ \text{g cZ BibY } 0-) \ /-/.) \ \text{FYkg } \ \text{cfd } \ \text{UX }''/+.2 \ \text{y}''] \ \text{cb cZ hchU' cihghUbX]b[} \ \text{[bXYVhYXbYgg &Y1W'iX]b[} \ \text{fY'UhYX dUfhm XYVh' k}h \ a Uhif]h]Yg \ \text{fUb[]b[} \ \text{Zfc a Z]gWU' } \ /-/0 \ \text{h} \ \text{fci[} \ \text{Z]gWU' } \ /-/6) \ \text{]bW'iX]b[} \ \text{"521 a]''] \ \text{cb UbX }''0.1 \ \text{a]''] \ \text{cb)} \ \text{fYgdYWh]jY'm} \ \text{cZ ]bXYVhYXbYgg } \ \text{Y'X Vm ]hg} \ \text{bcb*k } \ \text{c''m ckbYX giVg]X]Uf]Yg) } >c 1 \ \text{hY' UbX } \ \text{J} = 9 \ \text{?fcid } \&\text{We''YWh]jY'm k}h \ \text{FYkg } \ \text{; cfd)} \ \text{hY y } \ \text{yVhcfgz'} + L \ \text{Y } \ \text{JbXYVhYXbYgg cZ h}Y \ \text{yVhcfg UbX h}Y \ \text{hY' hYf ag cZ h}Y]f \ \text{Z]bUbW]b[} \ \text{UffUb[Y a Ybhg Wci'X7\&.''] a }h \ \text{hY}Yf \ \text{UV]'} \ \text{lhm hc cVhU]b UXX]h] \ \text{cbU}'' \ \text{Z]bUbW]b[} \ \text{Jb h}Y \ \text{ZihifY8\&}/' \ \text{a U_Y }h \ \text{a cfY X]ZZ]Wi'h \ \text{Zcf h}Y \ \text{a hc gUh]gZm h}Y]f \ \text{cV'}] \ \text{Uh]cbg ibXYf h}Y \ \text{hY hYf ag cZ h}Y]f \ \text{Z]bUbW]b[} \ \text{UffUb[Y a Ybhg)} \ \text{JbW'iX]b[ h}Y \ \text{dfcj]g]cbg cZ Ubm fY'Yj Ubh XYVh \ \text{Jbghfi a Ybhg} \ \text{WfYX]h} \ \text{U[fYY a Ybhg)} \ \text{JbXYbhifYg UbX g] a }'' \ \text{uf cf UggcW}]UhYX \ \text{XcWi a Ybhg} \ \text{\&Wc''YWh}] \ \text{y'm} \ \text{h}Y \ \text{y} \ \text{yVh} \ \text{cWi a Ybhgz'8 } \ \text{\&O''} \ \text{a }h \ \text{h}Y]f \ \text{UV]'} \ \text{hm hc fYZ]bUbWY h}Y}f \ \text{JbXYVhYXbYgg cb hYf ag UWWYdhUV'Y hc h}Y \ \text{a cf Uh U'`8 } \ \text{$1' \ '} \ \text{a }h \ \text{h}Y]f \ \text{ZY1]V]'} \ \text{hm hc d'Ub Zcf UbX UX^igh hc W}Ub[]b[ \ \text{Vig]bYgg UbX a Uf_Yh wcbX]h} \ \text{cb} \ \text{Jb} \ \text{h}Y \ \text{JbXighf}Yg \ \text{Jb} \ \text{k} \ \text{JW} \ \text{h}Y \ \text{m cdYfUhY UbX } \ \text{JbWfYUgY} \ \text{h}Y}f \ \text{Ji'} \ \text{a lh}Yf \ \text{UbX} \ \text{JbWfYUgY} \ \text{h}Yf \ \text{ug} \ \text{Zck hc a U_Y} \ \text{JbhfYgh UbX} \ \text{df]bw} \ \text{Ud} \ \text{dUm a Ybhg cb h}Yf \ \text{yVh} \ \text{h}YfYvm') \ \text{h}YfYvm') \ \text{h}YfYvm') \ \text{h}YfYvm') \ \text{h}YfYvm' \ \text{h}Yf \ \text{UbX} \ \text{a Um YUigY Uwc a dYh]h]j Y NgUX ubHU[Y UbX a Um fYXiWY \ \text{ubX} \ \text{JbW} \ \text{a Um WUigY Uwc a dYh]h]j Y NgUX ubHU[Y UbX a Um fYXiWY \ \text{ubX} \ \text{JbW} \ \text{UbX} \ \text{JbhU} \ \text{UbX} \ \text{JbhU} \ \text{UbX} \ \text{a Um fYXiWY} \ \text{UbX} \ \text{JbhU} \ \text{UWc a dYh]h]j Y NbhU[Y UbX a Um fYXiWY \ \text{Ub} \ \text{$ 

BOL 1VTWHU`fZ O\ZPULZZ 1V\\$K OL /K]LYZL\$`7TWHJ[LK I`10HUNLZ PU:H^\$ 5V]LYUTLU[H\$ >V\$PJ`HUK @LN\\$H]PVU&

BOLM[ VM [OL 1 VT WHU `fZ 1 VU[LU[\$ PUJ\$ \ KPUN 2 PNP[H\$ > PYHJ ` HUK APNUH\$ BOLM[\$ TH ` 2 LJYLHZL @L]LU \ L HUK / K]LYZL\$ ` / \|MLJ[ [OL 1 VT WHU `fZ 0 \ ZPULZZ HUK > YVMP[H I P\$P] ` &

L\Y; cadUbm|ggiWWYggXYdYbXg]bdUfhcb]hgUV]`]hmhcaU]bhU]bUbXacbYh]nYh\Y]bhY``YWhiU`dfcdYfhmf][\hg]b]hgWcbhYbh)UbX h\YZh cZ ]hg VfUbXg) dfc[fU a a ]b[) X][]hU` WcbhYbh) Vcc\_g UbX ch\Yf Wcdmf][\hYX a UhYf]U` UZZYWhg h\Y jU` i Y cZ ]hg WcbhYbh+ h\fYUh cZ WcbhYbh d]fUWm Vm aU\_]b[ ]h YUg]Yf hc ghfYUa)Xid`]WUhY UbX k]XY`m X]ghf]VihY d]fUhYX aUhYf]U`)]bW`iX]b[ Zfcach\Yf`Ygg\* fY[i`UhYX Wcibhf]Yg]bhch\Y; cadUbm|gdf]aUfmaUf\_Yhg+L\Y; cadUbmgYY\_ghc`]a]hh\Yh\fYUhcZ WcbhYbhd]fUWmVm)Uacb[ch\Yf a YUbg) dfY j Ybh]b[ i bU i h\cf]nYX UWWYgg hc ]hg WcbhYbh h\fc i [\ h\Y i gY cZ dfc[fU a a ]b[ WcbhYbh YbWfmdh]cb) g][bU` YbWfmdh]cb UbX ch\Yf gYWif]hm UWWYgg XYj]WYg UbX X][]hU`f][\hg a UbU[Y a Ybh gcZhkUfY) Ug kY``Ug Vm cVhU]b]b[g]hY V`cW\_]b[ cfXYfg U[U]bgh d]fUhY ghfYU a ]b[ UbX hcffYbh g]hYg UbX U jUf]Yhm cZ ch\Yf UWh]cbg+ @ckYjYf) h\YgY YZZcfhg a Um VY Wcgh`m UbX UfY bch U`kUmg gi WWYggZi`) dufh]Wi`uf`m Ug ]bZf]b[Yfg Wcbh]biY hc XYjY`cd hcc`g h\Uh ibXYf a ]bY gYWif]hm ZYUhifYg UbX YbUV`Y h\Y a hc X]g[i]gY h\Y]f ]XYbh]h]Yg cb`]bY+L\Y dfc`]ZYfUh]cb cZ ibUih\cf]nYX igY cZ h\Y ; c a dUbm|g WcbhYbh ibXYf a ]bYg`UkZi` X]ghf]Vih]cb W\UbbY`g UbX fYXiWYg h\Y fYjYbiY h\Uh h\Y; cadUbm Wci`X fYWY]jY Zfcah\Y`Y[]h]aUhY gU`Y UbX X]ghf]Vih]cb cZ]hg WcbhYbh+ HfchYWh]cb cZ h\Y; cadUbm|g ]bhY``YWhiU` dfcdYfhm f][ \hg ]g XYdYbXYbh cb h\Y gWcdY UbX XifUh]cb cZ ]hg f][ \hg Ug XYZ]bYX Vm Udd`]WUV`Y`Uk g ]b h\Y M+K+ UbX  $UVfcUX) \ UbX \ ]Z \ h \land cgY \land Ukg \ UfY \ XfUZhYX \ cf \ ]bhYfdfYhYX \ ]b \ k \ Umg \ h \land Uh \land ]a \ ]h \ h \land Y \ Y1hYbh \ cf \ XifUh]cb \ cZ \ h \land Y \ ;c \ a \ dUbm \ |g \ f] \ [ \land hg) \ cf \ ]Z \ Y1]gh]b[$ `Ukg UfY W\Ub[YX cf bch YZZYWh]jY`m YbZcfWYX) h\Y; cadUbm|g UV]`]hm hc [YbYfUhY fYjYbiY Zfca]hg]bhY``YWhiU` dfcdYfhm a Um XYWfYUgY) cf h\Y Wcgh cZ cVhU]b]b[ UbX a U]bhU]b]b[ f][\hg a Um ]bWfYUgY+ Ab UXX]h]cb) h\Y ZU]`i fY cZ`Y[U` UbX hYW\bc`c[]WU` dfchYWh]cbg hc Yjc`jY Ug d]fUWm UbX UggcW]UhYX hYW\bc`c[]WU` hcc`g VYWc a Y a cfY gcd\]gh]WUhYX Wci`X a U\_Y ]h a cfY X]ZZ]Wi`h Zcf h\Y ; c a dUbm hc UXYeiUhY`m dfchYWh ]hg ]bhY``YWhiU` dfcdYfhm) k\]W\ Wci`X) ]b hifb) bY[Uh]jY`m ] a dUWh ]hg jU`iY UbX Zifh\Yf ]bWfYUgY h\Y ; c a dUbm|g YbZcfWY a Ybh Wcghg+

 $4HPS \setminus I \setminus [OL\ 1\ VTWHU \setminus [V>YV[LJ[\ 1\ LY[HPU\ 7U[LSSLJ[\ \setminus HS>YVWLY[\ \ HUK\ OYHUKZ$\ VY\ 7UNYPUNLTLU[\ 1\ SHP\ TZ\ I \ \ BOPYK>HY[PLZ$\ 1\ V \setminus SK \ / K]LYZLS \ 7\ TWHJ[\ [OL\ 1\ VTWHU \int I \ O \setminus ZPULZZ$\ @LZ \setminus S[Z\ VM = WLYH[PVU\ HUK\ 4PUHUJPHS\ 1\ VUKP[PVU\& V] \ APUHUJPHS\ 1VUKP[PVU\& V]$ 

; c a dUbm hc W\Ub[Y]hg Vig]bYgg dfUWh]WYg cf cZZYf]b[g UbX`] a ]h ]hg UV]`]hm hc Wc a dYhY YZZYWh]jY`m+=jYb ]Z h\Y; c a dUbm VY`]YjYg Ubm giW\ W\U``Yb[Yg cf W`U] a g UfY k]h\cih a Yf]h) h\Ym WUb VY h] a Y\*Wcbgi a ]b[ UbX Wcgh`m hc XYZYbX UbX X]jYfh a UbU[Y a Ybh|g UhYbh]cb UbX fYgc ifWYg U k Um Zfc a ]hg Vig]bYgg+ Ab UXX]h]cb) h\Y; c a dUbm a Um VY WcbhfUWhiU``m fYei]fYX hc ]bXY a b]Zm ch\Yf dUfh]Yg U[U]bgh`]UV]`]h]Yg Uf]g]b[ cih cZ Ubm h\]fX dUfhm ]bZf]b[Ya Ybh W`U] a g+

BOL; HYRL[>YPJL VM [OL 1 V T WHU `fZ A[VJR; H ` 4S\J[\H[L APNUPMPJHU[S`&

Y|g

## LUVY cZ; cbhYbhg

- s U XiU W Ugg Wc a a cb Yei]hm WUd]hU ghfiWhifY8
- s U dfc\|V|h|cb cb ghcW \c`XYfg hU |b[ Ubm UWh|cb Vm kf|hhYb WcbgYbh k|h\cih U a YYh|b[8
- $s \quad gdYW]U`ghcW_\c`XYfg| \ a YYh]b[ \ hc \ VY \ WU``YX \ cb`m \ Vm \ h\ Y : cUfX \ cZ <]fYWhcfg) \ h\ Y ; \ V]f \ a \ Ub \ cf \ VY \ dihm ; \ V]f \ a \ Ub \ cZ \ h\ Y : cUfX \ cZ <]fYWhcfg) \ h\ Y ; \ ca \ dUbm\ g \ ci \ hghUbX]b[ \ jch]b[ \ ghcW_\8$
- s h\Y fYei]fY a Ybh h\Uh ghcW\_\c`XYfg []jY h\Y; c a dUbm UXjUbWY bch]WY hc bc a ]bUhY WUbX]XUhYg Zcf Y`YWh]cb hc h\Y: cUfX cZ <|fYWhcfg cf hc a U\_Y ghcW\_\c`XYf dfcdcgU`g Uh U ghcW\_\c`XYfg| a YYh]b[8
- s  $h\Y fYei]fY a Ybh cZ Ub UZZ]f a Uh]jY j chY cZ Uh `YUgh 32 # cZ h\Y j ch]b[ dc k Yf cZ h\Y ; c a dUbm|g c i hghUbX]b[ j ch]b[ ghcW_hc U a YbX cf fYdYU`]hg Vm*`U k g8$
- s jUWUbW]Yg cb h\Y : cUfX cZ <]fYWhcfg hc VY Z]``YX cb`m Vm U a U^cf|hm j chY cZ X]fYWhcfg h\Yb ]b cZZ]WY8
- s WYfhU]b fYghf]Wh]cbg cb h\Y hfUbgZYf cZ h\Y; c a dUbm|g g\UfYg8 UbX
- s h\Y:cUfX cZ < ]fYWhcfg hc ]ggiY) k]h\cih ghcW\_\c`XYf UddfcjU') HfYZYffYX KhcW\_ UbX KYf]Yg; caacb KhcW\_ k]h\ giW\ hYfag Ug h\Y:cUfX cZ < ]fYWhcfg a Um XYhYfa]bY+

L\YgY dfcj]g]cbg \wci`X X]g\wcifU[Y dchYbh]U` \U\wei]g]h]cb dfcdcgU`g \UbX \wci`X XY`\Um cf dfYjYbh \U \\\Ub[Y]b \\cbhfc` cZ \h\Y; c a d\Ubm) \text{YjYb} \]b \h\Y \\\UgY \k\YfY \U a \U^cf]\hm cZ \h\Y ghc\\\_\c`XYfg a \Um \\\cbhg]XYf gi\\\ dfcdcg\U`g) \]Z \text{YZZY\\h}jY) \text{XYg}f\Uo`\text{Y}+

Ab UXX|h|cb) |b WcbbYWh|cb k|h\ h\Y KYdUfUh|cb) h\Y ; c a dUbm|g : cUfX cZ < |fYWhcfg UXcdhYX U ghcW \c`XYf f| [ \hg U [ fYY a Ybh) k \]W\ lh Y1hYbXYX |b BibY /-.1) BibY /-.2) BibY /-.5 UbX U[U]b |b BibY /-/.+ HifgiUbh hc h\Y Zcifh\ U a YbXYX UbX fYghUhYX ghcW \c`XYf f][\hg U[fYY a Ybh) YUW\ cihghUbX]b[g\UfY cZ h\Y; ca dUbm|g Wc a a cb ghcW\_ \Ug UhhUW\YX hc]h U f][\h Ybh]h`]b[]hg \c`XYf hc difW\UgY Zfcah\Y;cadUbm UXX]h]cbU`g\UfYgcZ]hg;`Ugg9;caacb KhcW\_UbX;`Ugg:;caacb KhcW\_]bh\Y YjYbhh\Uh U dYfgcb cf [fcid UWei]fYg VYbYZ]W]U`ckbYfg\]d cZ .2# cf a cfY cZ h\Y h\Yb\*cihghUbX]b[;`Ugg:;ca a cb KhcW\_k]h\cih UddfcjU`cZ h\Y ; cadUbm|g:cUfX cZ <]fYWhcfg) giV^YWh hc YlWYdh]cbg Zcf dYfgcbg VYbYZ]W]U``m ckb]b[.2 # cf acfY cZ h\Y; cadUbm|g; `Ugg: ; caacb KheW ] aa YX]UhY`m Zc``ck ]b[ h\Y KYdUfUh]cb+ L\Y gheW \c`XYf f][\hg U[fYY a Ybh Wci`X aU Y]h acfY X]ZZ]Wi`h Zcf U h\]fX\* dUfhm hc UWei]fY h\Y; cadUbm|g jch]b[ WcaacbghcW\_k]h\cih h\Y UddfcjU^cZ]hg: cUfX cZ < ]fYWhcfg+L\Y f][\hg Y1d]fY cb BibY .5) /-//) Y1WYdh Ug ch\Yfk]gY dfc j XYX ]b h\Y f][\hg U[fYY a Ybh+>i fh\Yf) Ug U fYgi`h cZ \ ]g UV]`]hm hc Uddc]bh WYfhU]b a Y a VYfg cZ h\Y VcufX cZ X]fYWhcfg cZ h\Y WcfdcfUhY hfighYY cZ h\Y E i fXcW\ >U a ] m Lfigh) k \]W\ VYbYZ]W]U``m c k bg `Ygg h\Ub cbY dYfWYbh cZ h\Y ; cadUbm|g cihghUbX|b[; `Ugg 9; caacb KhcW UbX Uddfcl]aUhY`m O5+1 # cZ h\Y; cadUbm|g; `Ugg:; caacb KhcW Ug cZ Biby O-) /-/.) C+ JidYfh EifXcW\ a Um VY XYY a YX hc VY U VYbYZ|W|U`ckbYf cZ h\Y g\UfYg VYbYZ|W|U`m ckbYX Vm h\Y EifXcW\ >U a ]`m Lfigh+ C+ JidYfh EifXcW\) \ckYjYf) X]gW`U] a g Ubm VYbYZ]W]U`ckbYfg\]d cZ h\YgY g\UfYg+ 9`gc) C+ JidYfh EifXcW\ VYbYZ]W]U``m ckbgcf aUm VY XYY aYX hc VYbYZ]W]U``m ckb Ub UXX]h]cbU' cbY dYfWYbh cZ h\Y; cadUbm|g; `Ugg:; caacb KhcW UbX `Ygg h\Ub cbY dYfWYbh cZ h\Y; c a dUbm|g; `Ugg 9; c a a cb KhcW\_ Ug cZ BibY 0-) /-/.+L\ig) C+ JidYfh EifXcW\ a Um VY XYY a YX hc VYbYZ]W]U``m ckb]bh\YU[[fY[UhY`Yggh\Ub cbY dYfWYbh cZh\Y; cadUbm|g; `Ugg9; caacb KhcW\_UbX Uddfcl]aUhY`m 06+1#cZ h\Y; cadUbm|g; \underset \ Zfc a aU |b| dfcdcgU'g |b|c'i|b| Ub UWei|g|h|cb cZ h\Y; c a dUbm+ 9 XX|h|cbU'`m) h\Y c k bYfg\|d WcbWYbhfUh|cb cZ; 'Ugg: ; c a acb KhcW\_ Vm h\Y E ifXcW\ >U a ]`m Lfigh ]bWfYUgYg h\Y`]\_Y`]\ccX h\Uh dfcdcgU'g giV a ]hhYX Zcf ghcW\_\c`XYf UddfcjU` h\Uh UfY giddcfhYX Vm h\Y EifXcW\ >U a ]`m Lfigh k]` VY UXcdhYX UbX dfcdcgU`g h\Uh h\Y EifXcW\ >U a ]`m Lfigh XcYg bch giddcfh k]` bch VY UXcdhYX) k\Yh\Yf cf bch giW\ dfcdcgU'g hc ghcW\_\c'XYfg UfY U'gc giddcfhYX Vm h\Y ch\Yf\c'XYfg cZ; 'Ugg: ; c a a cb KhcW\_+>ifh\Yf a cfY) h\Y UXcdh]cb cZ h\Y Zcifh\ U a YbXYX UbX fYghUhYX ghcW\_\c`XYf f][\hg U[fYY a Ybh k]` dfYjYbh) ib`Ygg h\Y; c a dUbm|g: cUfX cZ <]fYWhcfg ch\Yfk]gY XYhYf a ]bYg Uh h\Y h] a Y) ch\Yf dchYbh]U' ghcW\c`XYfg Zfc a UWei]f]b[ U g] a ]`Uf ckbYfg\]d dcg]h]cb ]b h\Y; c a dUbm|g; `Ugg : ; c a a cb KhcW\_ UbX) UWWcfX]b[`m) Wci`X dfYjYbh U a YUb]b[Zi` W\U``Yb[Y hc h\Y E ifXcW\ >U a]`m Lfigh|g]bZ`iYbWY cjYf a UhhYfg giVa]hhYX Zcf ghcW \c`XYf UddfciU+

FcbY+

L\Y; cadUbm ckbg UbX`YUgYg jUf]cig fYU` dfcdYfh]Yg]bh\Y M+K+) = ifcdY) 9 ighfU`]U UbX 9 g]U h\Uh UfY ih]`]nYX]bh\Y WcbXiWh cZ]hg Vig]bYggYg+ = UW\ cZ h\YgY dfcdYfh]Yg]g Wcbg]XYfYX hc VY]b [ccX WcbX]h]cb) UXYeiUhY Zcf]hg difdcgY UbX gi]hUV`m ih]`]nYX UWWcfX]b[

Fch Udd`]WUV`Y+

 $FYkg \ ; cfdcfUh]cb|g \ ; `Ugg 9 \ ; caacb \ KhcW\_UbX \ ; `Ugg : \ ; caacb \ KhcW\_UfY `]ghYX \ UbX \ hfUXYX \ cb \ L\ Y \ FUgXUe ?`cVU` \ KY`YWh \ E Uf\_Yh \ \&yFUgXUez') \ ]hg \ df]bW]dU` a Uf\_Yh) \ ibXYf h\ Y gm a Vc`g yFOK9z UbX yFOK)z \ fYgdYWh]j Y`m+ ; @=KK < Ydcg]hUfm \ AbhYfYghg \ &y; < Agz' \ fYdfYgYbh]b[ \ h\ Y \ ; cadUbm|g \ ; `Ugg 9 \ ; caacb \ KhcW\_UbX \ ; `Ugg : \ ; caacb \ KhcW\_UfY `]ghYX UbX \ hfUXYX \ cb \ h\ Y \ 9 \ ighfU`]Ub \ KYWif]h]Yg = 1W\Ub[Y \ &y9KPz' \ ibXYf \ h\ Y gm a Vc`g yFOKDNz UbX yFOK)z \ fYgdYWh]j Y`m+ 9 g cZ B i`m 0-) /-/.) \ h\ YfY \ kYfY \ Uddfcl] a UhY`m \ .4)--- \ c`XYfg cZ fYWcfX cZ g\UfYg cZ \ ; `Ugg 9 \ ; caacb \ KhcW\_UbX 1-- \ c`XYfg cZ fYWcfX cZ g\UfYg cZ \ ; `Ugg : \ ; caacb \ KhcW_+$ 

#### . JVJEFNES

>cf ]bZcf a Uh]cb fY [UfX]b [ X]j ]XYbXg) gYY FchY . / x KhcW\_\c`XYfgl =e i ]hm ]b h\Y UWWc a dUbm]b[ ; cbgc`]XUhYX >]bUbW]U` KhUhY a Ybhg+

## 3SSUFR: URDIBSFS OG / QUJTY < FDURJTJFS

Ab  $E Um /-.0) h Y ; c a d Ubm | g : c Uf X c Z < ] f Y Wh c f g & h Y y : c Uf X c Z < ] f Y Wh c f g Z Ui h \ c f ] n Y X h Y ; c a d Ubm he f Y d i f W \ Ug Y i d he Ub U [ [f Y [Uh Y c Z "2-- a] ``] c b c Z ] hg ; `Ugg 9 ; c a a c b Khc W_+ F c ghc W_ f Y d i f W \ Ug Y g k Y f Y a UXY X i f ] b [ h Y Z] g W U m Y Uf g Y b X Y X B i b Y O-) /-/.) h Y ; c a d Ubm W i a i `Uh ] j Y m f Y d i f W \ Ug Y X Uddf c 1] a Uh Y m 2+/ a ] ``] c b g \ Uf Y g c Z ; `Ugg 9 ; c a a c b Khc W_ Z c f Ub U [ [f Y [Uh Y Wegh c Z Uddf c 1] a Uh Y m "4. a ] ``] c b + L \ Y f Y a U] b ] b [ Ui h \ c f] n Y X U a c i bh i b X Y f h \ Y g hc W_ f Y d i f W \ Ug Y d f c [f U a Ug c Z B i m O-) /-/. k Ug Uddf c 1] a Uh Y m "1/6 a ] ``] c b + 9 `` X Y W J g ] c b f Y [ Uf X] b [ Ubm Z i h i f Y g hc W_ f Y d i f W \ Ug Y g C Y X J g W f Y h ] c b c Z U X i `m Uddc ] b h Y X Z f c a h ] a Y hc h ] a Y b `] [ h c Z a Ubm Z U W h c f y d i f W \ Ug Y g K Y \ Y g U i h Y g x Y b h g Ub X X Y V h Z U W ] `] hm W c j Y b U b h Q c A Ub M Z U W h G b f U w h Y g c a d Ub M g Y [ Uf Y a Y b h g Ub X X Y V h Z U W] `] hm W c j Y b U b h Q c A J h h Y g h C a a ] h h Y G h G b Y G h Uh h Y W c a a ] h h Y a Um X Y a f Y j U b h L Y g h c W_ f Y d i f W \ Ug Y U i h \ C f n Uh ] c h Uh Y C C A \ J f Y W h G b h Uh h Y W c a a ] h Y Y a Um X Y a f Y Y J Ub h L Y g h C W_ f Y d i f W \ Ug Y U i h \ C f n Uh ] c h Uh Y Uh Ub M h A Y \ C Uf X c Z < ] f Y W h C Z \ J f Y W h G g U Ub h \ Y \ C Uf X c Z < ] f Y W h G g Ub X h \ Y \ C Uf X c Z \ J f Y W h G g W Ub b h G f g J Y Ub m Ug g i f Ub W Y g h Uh Ub M UX X J h J c b U g Y G Y G f Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y H Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y + Y G i f W \ Ug Y Y H Y G I W G G Y G I H Y G A Y G I H Y G A G A G A G A G A G A G$ 

 $L\ \ ; c\ a\ dUbm\ X]X\ bch\ difW\ UgY\ Ubm\ cZ\ ]hg\ ; `Ugg\ 9\ cf\ ; `Ugg\ : \ ; c\ a\ a\ cb\ KhcW\_Xif]b[\ h\ Y\ Z]gWU`\ mYUfg\ YbXYX\ BibY\ O-)\ /-/.)\ /-/-UbX\ /-.6+$ 

Fch Udd`]WUV`Y+

BOPZ KPZJ\ZZPVU HUK HUHS`ZPZ JVU[HPUZ Z[H[LTLU[Z [OH[ JVUZ[P]\[L dMVY^HYK%VVRPUN Z[H[LTLU[Ze ^P[OPU [OL TLHUPUN VM ALJ[PVU \*) 3 VM [OL ALJ\YP[PLZ 3\_JOHUNL /J[ VM ) . +, \$ HZ HTLUKLK "[OL d3\_JOHUNL /J[e#\$ HUK ALJ[PVU \*- / VM [OL ALJ\YP[PLZ /J[ VM ) . ++\$ HZ HTLUKLK /SS Z[H[LTLU[Z [OH[ HYL UV] Z[H[LTLU[Z VM OPZ[VYP]HS MHJ[ HYL MVY^HYK%SVVRPUN Z[H[LTLU[Z BOL ^VYKZ dL\_WLJ[\$e d^PSS\$e dLZ[PTH[L\$e dHU[PJPWH[L\$e dWYLKPJ[\$e dIL\$PL]Le HUK ZPTPSHY L\_WYLZZPVUZ HUK ]HYPH[PVUZ [OLYLVM HYL PU[LUKLK [V PKLU[PN` MVY^HYK% SVVRPUN Z[H[LTLU[Z BOLZL Z[H[LTLU[Z HWWLHY PU H U\T ILY VM WSHJLZ PU [OPZ KPZJ\ZZPVU HUK HUHS`ZPZ HUK PUJS\KL Z[H[LTLU[Z YLNHYKPUN [OL PU[LU[\$ IL\$PLM VY J\YYLU L\_WLJ[H[PVUZ VM [OL 1 VTWHU`\$ P[Z KPYLJ[VYZ VY P[Z VMMPJLYZ ^P[O YLZWLJ[ [V\$ HTVUN V[OLY [OPUNZ\$ [YLUKZ HMMLJ[PUN [OL 1 VTWHU fZ MPUHUJPHS JVUKP[PVU VY YLZ\S[Z VM VWLYH[PVUZ\$ [OL 1 VTWHU fZ Z[YH[LN` HUK Z[YH[LNPJ PUP[PH[P]LZ HUK [OL V\]JVTL VM JVU[PUNLUJPLZ Z\]JO HZ SP[PNH[PVU HUK PU]LZ[PNH[PVUZ\$ @LHKLYZ HYL JH\[PVULK [OH[ HU` MVY^HYK%SVVRPUN

L\Y; cadUbm a UbU[Yg UbX fYdcfhg]hg Vig]bYggYg]b h\Y Zc``ck]b[g]1 gY[a Ybhg7

- s . JHJTBL ; FBL / STBTF < FRVJDFS x L\Y < ][]hU^ JYU^ = ghUhY KYfj]WYg gY[ a Ybh Wcbg]ghg cZ h\Y ; c a dUbm|g 3.+1 # ]bhYfYgh ]b J=9 ?fcid UbX 5-# ]bhYfYgh ]b EcjY L\Y fY a U]b]b[ /-# ]bhYfYgh ]b EcjY ]g \YX Vm J=9 ?fcid J=9 ?fcid ]g U a Uf\_Yh\*YUX]b[ X][]hU^ a YX]U Vig]bYgg gdYW]U^]n]b[ ]b dfcdYfhm UbX ]g `]ghYX cb h\Y 9 ighfU^]Ub KYWif]h]Yg =1W\Ub[Y &y 9 KPZ' & 9 KP7 J=9' + J=9 ?fcid UXjYfh]gYg dfcdYfhm UbX dfcdYfhm\*fY^UhYX gYfj]WYg cb ]hg kYVg]hYg UbX a cV]Y Uddg) ]bW`iX]b[ 9 ighfU^]U|g `YUX]b[ fYg]XYbh]U^) Wc a a YfW]U^ UbX g\UfY dfcdYfhm kYVg]hYg) fYU^YghUhY+Wc a+Ui) fYU^Wc a a YfW]U^+Wc a+Ui UbX >`Uh a UhYg+Wc a+Ui) UbX dfcdYfhm dcfhU^g ]b AbX]U UbX = Ugh 9 g]U+ Ab UXX]h]cb) J=9 ?fcid dfcj ]XYg dfcdYfhm\*fY^UhYX XUhU hc h\Y Z]bUbW]U^ gYWhcf UbX Z]bUbW]U^ gYfj ]WYg h\fci[ \ Ub YbX\*hc\*YbX X][]hU^ dfcdYfhm gYUfW\ UbX Z]bUbW]b[ Y1dYf]YbWY UbX U a cfh[U[Y Vfc ]b[ cZZYf[b[+

; cbgi a Yfg cjYfk \Y`a ]b[`m hifb hc h\Y ]bhYfbYh UbX a cV]`Y XYj]WYg Zcf fYU` YghUhY ]bZcf a Uh]cb UbX gYfj]WYg+ L\Y <][]hU` JYU` =ghUhY KYfj]WYg gY[ a Ybh|g gi WWYgg XYdYbXg cb ]hg Wcbh]bi YX ]bbcj Uh]cb hc dfcj]XY dfcXi Whg UbX gYfj]WYg h\Uh UfY i gYZi` Zcf Wcbgi a Yfg UbX fYU` YghUhY) a cfh[U[Y UbX Z]bUbW]U` gYfj]WYg dfcZYgg]cbU`g UbX UhhfUWh]jY hc ]hg UXjYfh]gYfg+ L\Y <][]hU` JYU` =ghUhY KYfj]WYg gY[ a Ybh cdYfUhYg ]b U \][\`m Wc a dYh]h]jY X][]hU` Ybj]fcb a Ybh k]h\ ch\Yf cdYfUhcfg cZ fYU` YghUhY UbX dfcdYfhm k YVg]hYg UbX a cV]`Y Uddg+

 $L\Y > c lhY ? feid We a dYhYg Zef UiX]YbWYg df] a Uf] `m k] h\U j Uf]Yhm cZ ch\Yf j]XYe WebhYbh dfej]XYfg) giW\Ug hfUX]h]cbU` > fYY*Le* 9]f \&y>L9z' LN cdYfUhcfg]b 9 ighfU`]U) ]bW`iX]b[ h\Y h\fYY a U^cf We a a YfW]U` > L9 bYhk cf_g UbX hk e a U^cf [cjYfb a Ybh*ZibXYX > L9 VfeUXWUghYfg) UbX WebhYbh dfej]XYfg h\Uh XY`]jYf j]XYe dfe[fU a a]b[ cjYf h\Y ]bhYfbYh+ L\YgY dfej]XYfg]bW`iXY) AbhYfbYh HfehcWe` hY`Yj]g]eb) cf AHLN) giVgWf]dh]eb j]XYe*cb*XY a UbX UbX VfeUXWUgh j]XYe*cb*XY a UbX dfej]XYfg8 ghYU a]b[ gYfj]WYg cZZYfYX h\fei[\X][]hU` a YX]U dfej]XYfg8 Ug k Y`` Ug dfe[fU a a Yfg UbX X]ghf]Vihefg h\Uh dfej]XY WebhYbh X]fYWh`m he Webgi a Yfg ejYf h\Y ]bhYfbYh+$ 

 $9\,F\,;\,\,cdYfUhYg\,h\Y\,KCQ\,F=OK\,bYh\,k\,cf\_)\,9\,ighfU\,]U\,|g\,/\,1^*\cif\,\,a\,i\,h]^*W\UbbY')\,\,a\,i\,h]^*d\,UhZcf\,a\,\,bY\,k\,g\,gYfj\,]WY)\,\,UbX\,\,U\,gc\,\,c\,k\,bg\,\,UbX\,\,cdYfUhYg\,\,h\Y\,\,9\,ighfU\,]U\,\,;\,\,UbbY'\,\,AHLN\,\,gYfj\,]WY\,Zcf\,\,]bhYfbUh]cbU'\,\,a\,Uf\_Yhg+\,\,J\,Yj\,Yb\,i\,Y\,\,]g\,\,df]\,a\,Uf]^m\,\,XYf]j\,YX\,\,Zfc\,\,a\,\,a\,cbh\markel{eq:cdyfuhyg}\,\,UZZ]'\,]UhY\,\,ZYYg\,\,fYWY]j\,YX\,\,Zfc\,\,a\,\,dUm^*LN\,\,dfc\,j\,]XYfg\,\,VUgYX\,\,cb\,\,h\Y\,\,bi\,\,a\,\,VYf\,\,cZ\,\,g\,i\,VgWf]VYfg\,\,UbX\,\,UX\,j\,Yfh]g]b\,[+$ 

$fYgi`hYX ]b \ UiX]YbWY \ ZfU[\ a \ YbhUh]cb \ UbX ]bWfYUgYX \ Wc \ a \ dYh]h]cb+LYW \ bc`c[]Yg \ UbX \ dc`]W]Yg \ \ \ UjY \ U`gc \ VYYb \ UbX \ k]`` \ Wcbh]biYg \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	/ he VY

### +VBJL

 $Ab < YWY \ a \ VYf \ / -/ -) \ h \ Y \ ; c \ a \ dUbm \ UWe \ i \ jfYX \ J \ YbhU \ i \ h]cbg) \ AbW+ \ \&y \ 9 \ jU]\ z' \ Zcf \ ]b]h]U' \ WUg \ Wcbg]XYfUh]cb \ cZ \ Uddfc \ 1] \ a \ UhY \ m$ 

L\Y Zc^c k  b  hUV'Y gYhg Zcfh\ h\Y; c a dUbm g cdYfUh b  fYg1 hg Zcf Z gWU\ /-/. Ug Wc a dUfYX hc Z gWU\ /-/-+

; FSULTS OG 9 PFRBTJONS \ OJSDBL (&(' VFRSUS OJSDBL (&(&

/-/. kUg df] a Uf]`m XiY hc ]bWfYUgYX Y1dYbgYg cZ

 $8\textit{FT JNDOMF "LOSS#} \ x \ FYh \ ]bWc \ aY \ kUg "056 \ a] ``]cb \ Zcf \ h\ Y \ Z]gWU` \ mYUf \ YbXYX \ BibY \ 0-) \ /-/-) \ Ub \ ]a \ dfcj Y \ a \ Ybh \ cZ ".)601 \ a] ``]cb) \ df] \ a \ Uf] \ m \ Xf]j \ Yb \ Vm \ h\ Y \ UVgYbWY \ cZ \ bcb*WUg \ ]a \ dU]f \ a \ Ybh \ W\ Uf[Yg \ fYWc[b]nYX]b \ Z]gWU` \ /-/-) \ |][\ Yf \ LchU` \ KY[\ a \ Ybh = : AL < 9 \ UbX \ ][\ Yf \ Gh\ Yf) \ bYh) \ dUfh]U``m \ cZZgYh \ Vm \ |][\ Yf \ hU1 \ Y1dYbgY+$ 

8 FT "JNDOMF# LOSS BTTRJCUTBCLF TO NONDONTROLLJNH JNTFRFSTS x FYh ]bWc a Y Uhhf]V i hUV Y hc bcbWcbhfe``]b[]bhYfYghg kUg "26 a]``]cb Zcf h\Y Z]gWU` mYUf YbXYX BibY 0-) /-/.) Ug Wc a dUfYX hc U bYh `cgg Uhhf]V i hUV Y hc bcbWcbhfe``]b[]bhYfYghg cZ "/43 a]``]cb Zcf h\Y Z]gWU` mYUf YbXYX BibY 0-) /-/-) df] a Uf]`m XiY hc h\Y UVgYbWY cZ h\Y bcb\*WUg\] a dU]f a Ybh W\Uf[Yg fYWc[b]nYX]b Z]gWU` /-/- Uh h\Y ; c a dUbm|g >c1hY` fYdcfh]b[ ib]h+

### <FHMFNT +NBLYSJS

 $KY[\ a\ Ybh = : AL < 9\ ]g\ XYZ]bYX\ Ug\ fYj\ Ybi\ Yg\ cdYfUh]b[\ Y1dYbgYg\ UbX\ gY`]b[)\ [YbYfU`\ UbX\ UX\ a\ ]b]ghfUh]j\ Y\ Y1dYbgYg+\ KY[\ a\ Ybh = : AL < 9\ XcYg\ bch\ ]bW`iXY7\ XYdfYW]Uh]cb\ UbX\ U\ a\ cfh]nUh]cb)\ ]a\ dU]f\ a\ Ybh\ UbX\ fYghfi\ Whif]b[\ W\Uf[Yg)\ Yei]hm\ `cggYg\ cZ\ UZZ]`]UhYg) ]bhYfYgh\ &Y1dYbgY'\ ]bWc\ a\ Y)\ bYh)\ ch\Yf)\ bYh\ UbX\ ]bWc\ a\ Y\ hU1\ &Y1dYbgY'\ VYbYZ]h+\ KY[\ a\ Ybh = : AL < 9\ a\ Um\ bch\ VY\ Wc\ a\ dUfUV`Y\ hc\ g]\ a\ ]`Uf`m\ h]h`YX\ a\ YUgifYg\ fYdcfhYX\ Vm\ ch\Yf\ Wc\ a\ dUb]Yg)\ g]bWY\ Wc\ a\ dUb]Yg\ UbX\ ]bjYghcfg\ a\ Um\ X]ZZYf\ Ug\ hc\ k\ Uh\ ]hY\ ag\ g\ ci`X\ VY\ ]bW`iXYX\ ]b\ h\YWU`Wi`Uh]cb\ cZ\ KY[\ a\ Ybh = : AL < 9+$ 

 $KY[\ a\ Ybh = : AL < 9\ ]g\ h\ Y\ df]\ a\ Ufm\ a\ YUgifY\ igYX\ Vm\ h\ Y\ ; c\ a\ dUbm|g\ W\]YZ\ cdYfUh]b[\ XYW]g]cb\ a\ U\_Yf\ hc\ YjU`iUhY\ h\ Y\ dYfZcf\ a\ UbWY\ cZ) UbX\ U`cWUhY\ fYgcifWYg\ k\]h\]b)\ h\ Y\ ; c\ a\ dUbm|g\ Vig]bYggYg+\ KY[\ a\ Ybh = : AL < 9\ dfcj]XYg\ a\ UbU[\ Y\ a\ Ybh)\]bj\ Yghcfg\ UbX\ Yei]hm\ UbU`mghg\ k\]h\ U\ a\ YUgifY\ hc\ UbU`mnY\ h\ Y\ cdYfUh]b[\ dYfZcf\ a\ UbWY\ cZ\ h\ Y\ ; c\ a\ dUbm|g\ Vig]bYgg\ gY[\ a\ Ybhg\ UbX\ ]hg\ YbhYfdf]gY\ jU`iY\ U[U]bgh\ \]ghcf]WU`\ XUhU\ UbX\ Wc\ a\ dYh]hcfg|\ XUhU)\ U`h\ ci\ [\ \]ghcf]WU`\ fYgi`hg\ a\ Um\ bch\ VY\ ]bX]WUh]j\ Y\ cZ\ ZihifY\ fYgi`hg\ \&Ug\ cdYfUh]b[\ dYfZcf\ a\ UbWY\ ]g\ \][\ ``m\ Wcbh]b[\ Ybh\ cb\ a\ Ubm\ ZUWhcfg)\ ]bW`iX]b[\ Wighc\ a\ Yf\ hUghYg\ UbX\ dfYZYfYbWYg'+$ 

 $LchU` KY[a Ybh = : AL < 9] g U bcb*? 9 9 H a YUgifY UbX g \ci`X VY Wcbg]XYfYX ] b UXX]h]cb hc) bch Ug U giVgh]hi hY Zcf) bYh ]bWc a Y \& cgg') WUg \ Z ck UbX ch \ Yf a YUgifYg cZ Z]bUbW]U` dYfZcf a UbWY fYdcfhYX ] b UWWcfXUbWY k]h\ ? 9 9 H+ Ab UXX]h]cb) h \ ]g a YUgifY XcYg bch fYZ YWh WUg \ UjU]`UV`Y hc ZibX fYei]fY a Ybhg UbX Y1W` iXYg ]hY a g) giW\ Ug XYdfYW]Uh]cb UbX U a cfh]nUh]cb UbX ] a dU]f a Ybh UbX fYghfi Whif]b[ W\Uf[Yg) k \]W\ UfY g][b]Z]WUbh Wc a dcbYbhg ]b UggYgg]b[ h\Y ; c a dUbm|g Z]bUbW]U` dYfZcf a UbWY+ L\Y ; c a dUbm VY`]YjYg h\Uh h\Y dfYgYbhUh]cb cZ LchU` KY[a Ybh = : AL < 9 dfcj]XYg igYZi` ]bZcf a Uh]cb fY[UfX]b[ h\Y ; c a dUbm|g cdYfUh]cbg UbX ch\Yf ZUWhcfg h\Uh UZZYWh h\Y ; c a dUbm|g fYdcfhYX fYgi`hg+ KdYW]Z]WU``m) h\Y ; c a dUbm VY`]YjYg h\Uh Vm Y1W`iX]b[ WYfhU]b cbY*h] a Y cf$ 

$<][]hU^ JYU^ =ghUhY KYfj]WYg$	" .)060	" 2.1	" .)-32	" 012
KiVgWf]dh]cb N]XYc KYfj]WYg	/)-4/	026	.)551	0/0
<ck bcbyg<="" td=""><td>.)4-/</td><td>00/</td><td>.)26-</td><td>/03</td></ck>	.)4-/	00/	.)26-	/03
: cc_HiV`]g\]b[	.)652	0-0	.)333	/.1
FYkg EYX]U	/)/-2	2/	/)5	20
$Gh \setminus Yf$		&/54'	/	&.25'

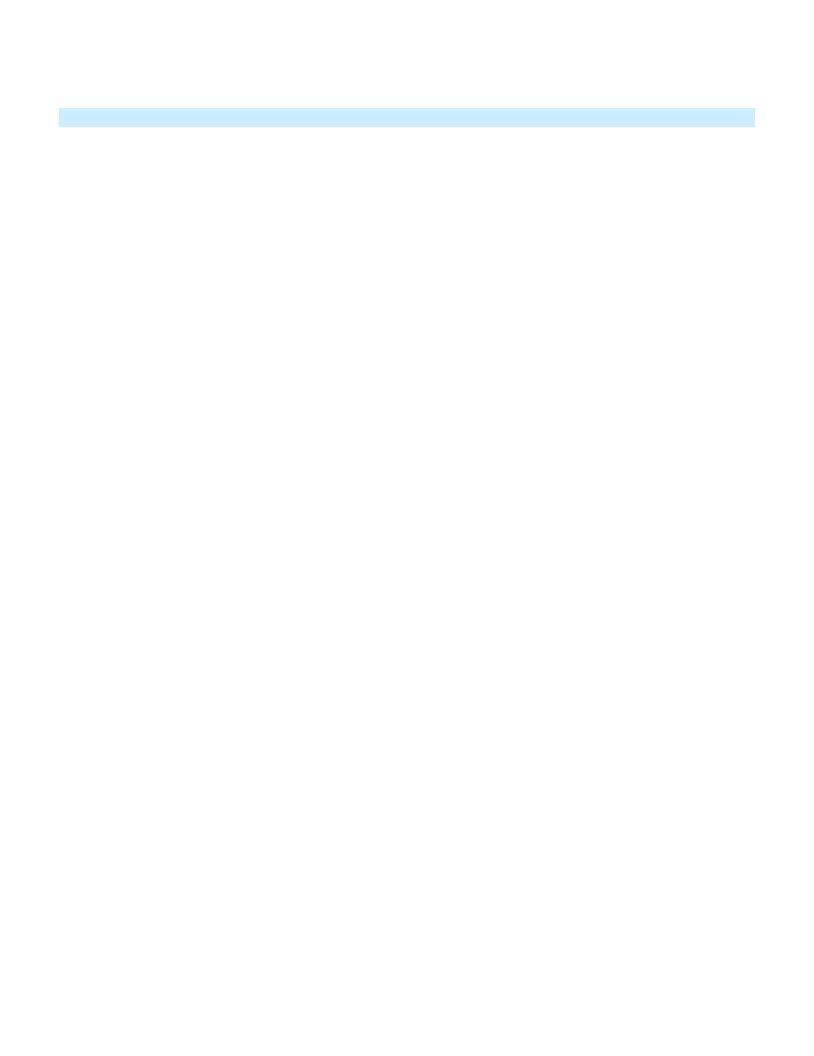
<sup>.</sup> JHJTBL ; FBL / STBTF <FRVJDFS "

"	.)5/2	" .)340	" .2/	6 #
	/	.41	03	/. #
	04	04	X	x #
	&.)001'	&.)//-'	&1'	&6' #
	&046'	&O1.'	&05'	&'#
	"	.)5/2 / 04 &.)001'	.)5/2 .)340 /41 04 04 &.)001' &.)//-'	.)3/2 .)340 .2/ /41 03 04 04 x &.)001' &.)//-' &1'

 $> cf \ h\ Y\ Z]gWU\ mYUf\ YbXYX\ BibY\ O-)\ /-/.)\ fYjYbiYg\ Uh\ h\ Y\ KiVgWf]dh]cb\ N]XYc\ KYfj]WYg\ gY[\ a\ Ybh\ ]bWfYUgYX\ ".55\ a\ ]``]cb\ cf\ .-\#)\ Ug\ Wc\ a\ dUfYX\ hc\ Z]gWU\ /-/-)\ df]\ a\ Uf]\ m\ XiY\ hc\ h\ Y\ deg]h]jY]\ a\ dUWh\ cZ\ ZefY][b\ WiffYbWm\ Z`iWhiUh]cbg\ UbX\ ".56\ a\ ]``]cb\ cZ\ |[\Yf\ ghfYU\ a\ ]b[fYjYbiYg\ df]\ a\ Uf]\ m\ Zfc\ a\ CUmc\ UbX\ O7<53)\ dUfh]U``m\ cZZgYh\ Vm\ `c\ k\ Yf\ giVgWf]dh]cb\ fYjYbiYg\ fYgi\ h]b[\ Zfc\ a\ ZYk\ Yf\ fYg]XYbh]U`\ VfcUXWUgh\ giVgWf]VYfg+; ca\ a\ YfW]U`\ giVgWf]dh]cb\ fYjYbiYg\ k\ YfY\ `Uf[Y`m\ Z`Uh)\ Ug\ h\ Y\ fYWcjYfm\ ]b\ h\ Y\ Ca\ a\ YfW]U`\ gYWhcf\ Xif]b[\ h\ Y\ gYWcbX\ U''\ Zc\ Z]gWU'\ /-/-+\ @c\ k\ YjYf)\ cb[c]b[\ `cW_Xckbg\ k\ ]h\ ]b\ WYfhUjb\ ghUhYg\ ]b\ 9\ ighfU`]U\ UfY\ Y1dYWhYX\ hc\ UjY\ U\ a\ cXYgh\ bY[Uh]jY\ ]a\ dUWh\ cb\ Wc\ a\ a\ YfW]U`\ giVgWf]dh]cb\ fYjYbiYg\ ]b\ h\ Y\ Z]fgh\ ei\ UfhYf\ cZ\ Z]gWU'\ /-/+\ L\ Y\ ]a\ dUWh\ cZ\ ZcfY][b\ WiffYbWm\ Z`iWhiUh]cbg\ cZ\ h\ Y\ M+K+\ Xc``Uf\ U[U]bgh\ cWU'\ WiffYbW]Yg\ fYgi`hYX\ ]b\ U\ fYjYbiY\ ]bWfYUgY\ cZ\ "/.4\ a\ ]``]cb)\ cf\ ./\ #)\ Zcf\ h\ Y\ Z]gWU'\ mYUf\ YbXYX\ BibY\ O-)\ /-/.\ Ug\ Wc\ a\ dUfYX\ hc\ Z]gWU'\ /-/-+$ 

 $cf h Y Z gWU mYUf YbXYX BibY O- /-/.) KY [a Ybh = : AL < 9] bWfYUgYX "O3 a] ``] cb cf ... #) Ug Wc a dUfYX hc Z gWU /-/-) df] a Uf] m XiY hc h Y "O3 a] ``] cb dcg]h] jY ] a dUWh cZ ZcfY] [b WiffYbWm Z i Whi Uh] cbg UbX `c k Yf YbhYfhU] b a Ybh dfc [fU a a]b[) hfUbg a]gg] cb UbX Y a d`cmYY Wcghg+ L Y ] bWfYUgY k Ug dUfh] U`m cZZgYh Vm ] bWfYUgYX ] bj Ygh a Ybh ] b ghfYU a] b[ dfcXi Whg UbX "O2 a] ``] cb ] b \] [ Yf gdcfhg dfc [fU a a]b[ f] [ hg UbX dfcXi Wh] cb Wcghg) df] a Uf] m Xf] j Yb Vm h Y UVgYbWY cZ`] j Y gdcfhg ] b h Y Zcifh ei UfhYf cZ Z] gWU /-/- XiY hc$ 

- &X' LchU` UbX HU]X 07 < 53 giVgWf]VYfg Ug cZ BibY 0-) /-/. UbX /-/-+ 07 < 53 kUg `UibW\YX cb E Um /2) /-/-+
- &Y' LchU` UbX HU]X >c1hY` Fck giVgWf]VYfg Ug cZ BibY O-) /-/. UbX /-/-+
- &Z' 9 j YfU[Y a cbh\`m VfcUXWUgh fYg]XYbh]U` gi VgWf]dh]cb fYj Ybi Y dYf i gYf &Y1W`i X]b[ Gdhi g' &: fcUXWUgh 9 J HM' Zcf h\Y Z]gWU` mYUfg YbXYX BibY O-) /-/. UbX /-/-



 $giVgWf]VYf [fckh\) k\]W\ k\YfY\ dUfh]U``m\ cZZgYh\ Vm\ df]bh\ j\ c`i\ a\ Y\ XYW\]bYg\ fYgi`h]b[\ Zfc\ a\ h\Y\ W`cgifY\ cf\ hfUbg]h]cb\ hc\ X][]hU`\ cZfY[]cbU`\ UbX\ Wc\ a\ a\ i\ b]hm\ bY\ k\ gdUdYfg+$ 

### <L^ZC9

 $JYjYbiYg kYfY "61/a] ``]cb Zcf h\Y Z]gWU` mYUf YbXYX BibY O-) /-/.) Ub ]bWfYUgY cZ "11 a] ``]cb) cf 2 \#) Ug Wc a dUfYX hc Z]gWU` /-/- fYjYbiYg cZ "565 a] ``]cb+; ]fWi`Uh]cb UbX giVgWf]dh]cb fYjYbiYg ]bWfYUgYX "11 a] ``]cb) df] a Uf] `m Xf]jYb Vm h\Y "03 a] ``]cb dcg]h]jY ]a dUWh cZ ZcfY][b WiffYbWm Z`iWhiUh]cbg) WcjYf df]WY ]bWfYUgYg) a U]b`m Uh <math>BOL\ A\setminus U$ ) UbX X][]hU` giVgWf]VYf [fckh\) a U]b`m Uh  $BOL\ B^TLZ$  UbX  $BOL\ A\setminus UKH$ `  $B^TLZ$ ) dUfh]U``m cZZgYh Vm g]b[`Y\*Wcdm jc`i a Y XYW`]bYg Y1UWYfVUhYX Vm; GNA<\*.6) df] a Uf]`m Uh  $BOL\ A\setminus U$ + 9 XjYfh]g]b[ fYjYbiYg XYWfYUgYX "0 a]``]cb df] a Uf]`m XiY hc Wcbh]biYX k YU\_bYgg]b h\Y df]bh UXjYfh]g]b[ a Uf\_Yh Y1UWYfVUhYX Vm; GNA<\*.6) dUfh]U``m cZZgYh Vm h\Y ".3 a]``]cb dcg]h]jY] a dUWh cZ ZcfY][b WiffYbWm Z`iWhiUh]cbg UbX X][]hU` UXjYfh]g]b[ [fckh\+

### - URRFNT OJNBNDJBL - ONEJTJON

 $L\Y df]bW]dU^igYg cZ WUg\h\Uh UZZYWh h\Y ; cadUbm|g^jei]X]hm dcg]h]cb]bW^iXY h\Y Zc``ck]b[7 cdYfUh]cbU^Y1dYbX]hifYg]bW^iX]b[Yad`cmYY Wcghg) dUdYf difW\UgYg UbX dfc[fU a a]b[ Wcghg8 WUd]hU^Y1dYbX]hifYg8]bWcaY hU1 dUmaYbhg8]bjYghaYbhg]b UggcW]UhYX$ 

 $L\ \ ; c\ a\ dUbm\ X]X\ bch\ difW\ UgY\ Ubm\ cZ\ ]hg\ ; `Ugg\ 9\ cf\ ; `Ugg\ : \ ; c\ a\ a\ cb\ KhcW\_Xif]b[\ h\ Y\ Z]gWU`\ mYUfg\ YbXYX\ BibY\ O-)\ /-/\ .\ UbX\ /-/-+$ 

# . JVJEFNES

 $L\Y Zc``ck]b[\huV`Y gi \ a \ a \Uf]nYg \ h\Y X]j]XYbXg \ XYW`UfYX \ UbX \ dU]X \ dYf \ g\UfY \ cb \ Vch\h\Y \ ; c \ a \ dUbm\g \ ; `Ugg \ 9 \ ; c \ a \ a \ cb \ KhcW\_ \ UbX \ ; `Ugg \ : \ ; c \ a \ a \ cb \ KhcW_7$ 

; Ug\X]j]XYbXg dU]X dYf g\UfY

## <L^Z 1 VYWVYH[PVU OVYYV^PUNZ

 $9g\ cZ\ BibY\ 0-)\ /-/.)\ h\ Y\ ;\ c\ a\ dUbm\ \ \ UX\ Vcffc\ k\ ]b\ [g\ cZ\ "652\ a\ ]``]\ cb+\ Ab\ 9\ df]'\ /-/.)\ h\ Y\ ;\ c\ a\ dUbm\ ]ggi\ YX\ ".\ V]``]\ cb\ cZ\ gYb\ jcf\ bch Yg\ XiY\ /-/. KYb\ jcf\ Fch Yg\ Y'Uf\ ]bh Yf Ygh\ Uh\ U\ Z]\ 1YX\ fUhY\ cZ\ 0+542\ \#\ dYf\ Ubbi\ a)\ dUmUV`Y\ ]b\ WUg\ gY\ a\ ]^Ubbi\ U``m\ cb\ EUm\ .2\ UbX\ Fcj Y\ a\ VYf\ .2\ cZ\ YUW\ mYUf)\ Wc\ a\ a\ YbW\ jb\ [Fcj Y\ a\ VYf\ .2)\ /-/.+L\ Y\ bch Yg\ k\ ]``\ a\ Uhif Y\ cb\ EUm\ .2)\ /-/6+$ 

# 4V\_[LS 5YV\W OVYYV^PUNZ

 $9\ g\ cZ\ BibY\ O-)\ /-/.)\ h\ Y>c\ 1hY'UW]`]hm)\ U\ a\ ci\ bhg\ ci\ hghUbX]b[\ ibXYf\ h\ Y\ /-.6\ ;fYX]h>UW]`]hm\ UbX\ /-.4\ O\ cf_]b[\ ;Ud]hU`>UW]`]hm)\ ]hg\ ci\ hghUbX]b[\ M-K+\ df]j\ UhY\ d`UWY\ a\ Ybh\ gYb]cf\ ibgYWifYX\ bchYg\ UbX\ U\ a\ ci\ bhg\ ci\ hghUbX]b[\ ibXYf\ h\ Y\ LY`ghfU>UW]`]hm\ &XYgWf]VYX\ VY`ck')\ UbX\ &]]'\ hchU`ibXfUkb\ Wc\ a\ a\ ]h\ a\ Ybhg\ cZ\ 9\ "001\ a]``]cb\ UjU]` a)\ dU U]` a\ /6+$ 

All!										
$HifW\setminus UgY cV^{\ }[Uh]cbg^{\&U'}$	"	.)-1/	"	111	"	1 - /	"	3	"	6-
Kdcfhg dfc[fU a a]b[f][ $\hg^{kV'}$		/)-//		1 - /		605		113		/03
Hfc[fU a a]b[ Wcghg <sup>&amp;W'</sup>		412		/32		10-		03		.1
GdYfUh]b[ `YUgYg <sup>&amp;X'</sup>										
LfUbg a ]gg]cb Wcghg <sup>AY'</sup>		/-4		0-		21		04		53
DUbX UbX Vi]`X]b[g		.)0.0		. 20		/34		//1		336
H`Ubh UbX a UW\]bYfm		.0		4		2				X
>]bUbWY `YUgYg										
LfUbg a ]gg]cb Wcghg <sup>&amp;Y'</sup>		3		0.		25		.4		X
: cffck]b[g <sup>kZ'</sup>		/)//1		X		5/1		01-		.)-3-
AbhYfYgh dUm a Ybhg cb Vcffc k]b[ $g^{k[']}$		105		54		.03		6/		./0
LchU` Wc a a]h aYbhg UbX WcbhfUWhiU` cV`][Uh]cbg	"	5)	"	.)1.6	"	0)1	"	.)/66	"	/)/45

<YhYf a ]b]b[ ZU]f jU`iY fYei]fYg h\Y Y1YfW]gY cZ g][b]Z]WUbh ^iX[ a Ybhg) ]bW`iX]b[ ^iX[ a Ybhg UVcih Uddfcdf]UhY X]gWcibh fUhYg) `cb[\*
hYf a [fckh\ fUhYg) fY`YjUbh Wc a dUfUV`Y Wc a dUbm YUfb]b[g a i`h]d`Yg UbX h\Y U a cibh UbX h] a ]b[ cZ Y1dYWhYX ZihifY WUg\ Z ckg+
<if]b[ h\Y Zcifh\ eiUfhYf cZ Z]gWU` /-/.) Ug dUfh cZ h\Y ; c a dUbm|g `cb[\*fUb[Y d`Ubb]b[ dfcWYgg) h\Y ; c a dUbm Wc a d`YhYX ]hg
UbbiU` [ccXk]`` UbX ]bXYZ]b]hY\*`]j YX ]bhUb[]V`Y UggYh] a dU]f a Ybh hYgh+</pre>

$L\Y$ ; c a dUbm g UbbiU hU1 fU	JhY ]g VUgYX df]aUf]`m cb ]hg	g [Yc[fUd\]W]bWcaYUbX	ghUhihcfm hU1 fUhYg ]b h\Y	jUf]cig^if]gX]Wh]cbg]b

$ L Y _{Ym} Uggi a dh] cbg igYX ] b XYj Y`cd] b [ h Y ; c a dUbm   g Z] gWU` /-/. UbX /-/- bYh dYf] cX] W VYbYZ] h Wcghg \&] bWc a Y' Zcf ] hg d`Ubg Wcbg] gh cZ h Y Zc``ck] b [7 $

$\underline{EUbU[Y\ a\ Ybh g\ J\ Ydcfh\ cb\ AbhYfbU`\ ;\ cbhfc`\ Gj\ Yf>]bUbW]U`\ J\ Ydcfh]b[}$	3-
JYdcfhg cZ AbXYdYbXYbh JY[]ghYfYX HiV`]W 9WWcibh]b[>]fa	3.
; cbgc`]XUhYX KhUhY a Ybhg cZ GdYfUh]cbg Zcf h\Y Z]gWU` mYUfg YbXYX BibY O-) /-/.) /-/- UbX /6	31
; cbgc`]XUhYX KhUhY a Ybhg cZ ; c a dfY\Ybg]jY AbWc a Y &Dcgg' Zcf h\Y Z]gWU` mYUfg YbXYX BibY O-) /-/.) /-/- UbX /6	32
; cbgc`]XUhYX : U`UbWY K\YYhg Ug cZ BibY O-) /-/. UbX /-/-	33
; cbgc`]XUhYX KhUhY a Ybhg cZ ; Ug\ >`ckg Zcf h\Y Z]gWU` mYUfg YbXYX BibY O-) /-/.) /-/- UbX /6	34
; cbgc`]XUhYX KhUhY a Ybhg cZ =ei]hm Zcf h\Y Z]gWU` mYUfg YbXYX BibY O-) /-/.) /-/- UbX /6	35
FchYg hc h\Y; cbgc`]XUhYX>]bUbW]U` KhUhY a Ybhg	36

OY \UjY UiX]hYX FYkg; cfdcfUh]cb|g]bhYfbU` Wcbhfc` cjYf Z]bUbW]U` fYdcfh]b[ Ug cZ BibY 0-) /-/.) VUgYX cb Wf]hYf]U YghUV`]g\YX]b AbhYfbU`; cbhfc` x AbhY[fUhYX >fU a Yk cf\_]ggiYX Vm h\Y; c a a ]hhYY cZ Kdcbgcf]b[ Gf[Ub]nUh]cbg cZ h\Y LfYUXkUm; c a a ]gg]cb &/-.0 ZfU a Yk cf\_' &h\Y; GKG Wf]hYf]U'+Ab cif cd]b]cb) FYkg; cfdcfUh]cb &h\Y; c a dUbm' a U]bhU]bYX)]b U`` a UhYf]U` fYgdYWhg) YZZYWh]jY ]bhYfbU` Wcbhfc` cjYf Z]bUbW]U` fYdcfh]b[ Ug cZ BibY 0-) /-/.) VUgYX cb h\Y; GKG Wf]hYf]U+

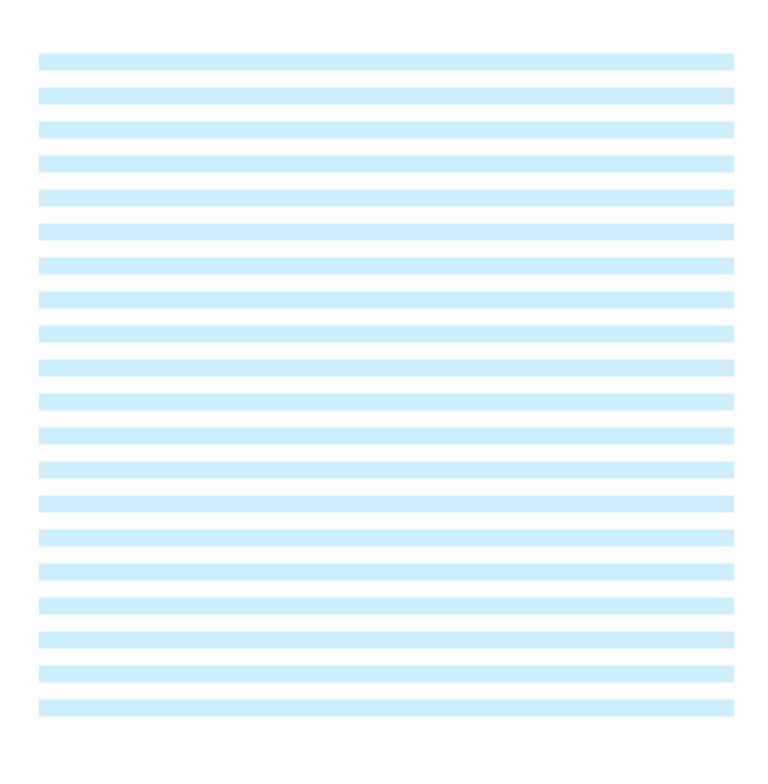
 $9 g ]bX]WUhYX ]b hY UWWc a dUbm]b[ E UbU[Y a Ybh|g JYdcfh cb AbhYfbU`; cbhfc` cjYf>]bUbW]U` JYdcfh]b[) a UbU[Y a Ybh|g UggYgg a Ybh cZ UbX WcbW`ig]cb cb hY YZZYWh]jYbYgg cZ ]bhYfbU` Wcbhfc` cjYf Z]bUbW]U` fYdcfh]b[ X]X bch ]bW`iXY hY ]bhYfbU` Wcbhfc`g cZ E cfh[U[Y; \c]WY) @ E @ : cc_g $ E YX]U UbX A: <) k \]W\ UfY ]bW`iXYX ]b h\Y /-/. Wcbgc`]XUhYX Z]bUbW]U` ghUhY a Ybhg cZ FYkg; cfdcfUh]cb UbX Wcbgh]hihY Uddfcl] a UhY`m 4 # cZ hchU` UggYhg Ug cZ BibY O-) /-/. UbX `Ygg h\Ub . # cZ hchU` fYjYbiYg Zcf h\Y mYUf h\Yb YbXYX+ Gif UiX]h cZ ]bhYfbU` Wcbhfc` cjYf Z]bUbW]U` fYdcfh]b[ cZ FYkg; cfdcfUh]cb U`gc X]X bch ]bW`iXY Ub YjU`iUh]cb cZ h\Y ]bhYfbU` Wcbhfc` cjYf Z]bUbW]U` fYdcfh]b[ cZ E cfh[U[Y; \c]WY) @ E @ : cc_g UbX E YX]U UbX A: <+$ 

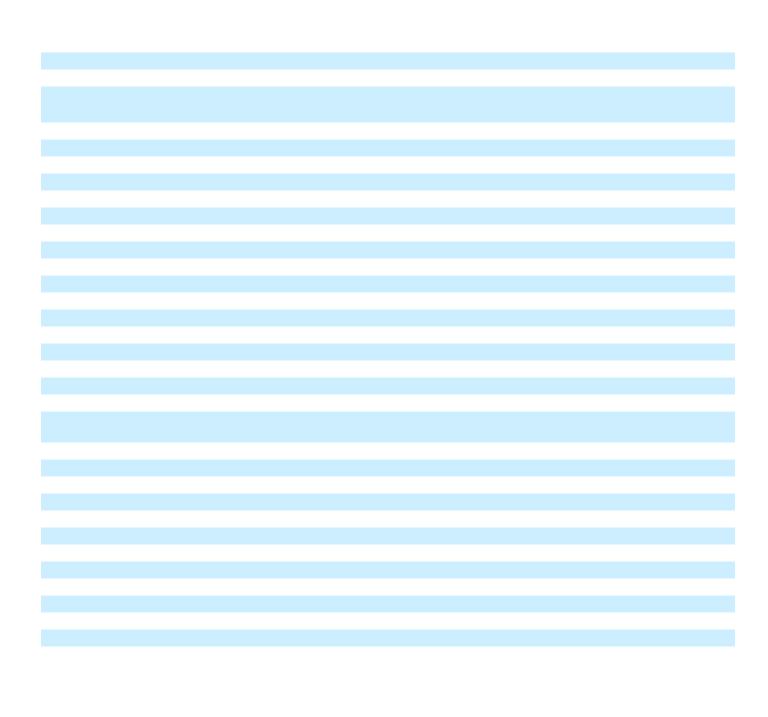
 $OY\ U^*gc\ VU^*yV\ U^*iX]hYX)\ ]b\ UWWcfXUbWY\ k]h\ h^Y\ ghUbXUfXg\ cZ\ h^Y\ H^*iV^*]W\ ;c\ a\ dUbm\ 9\ WWc\ ibh]b\ [GjYfg][\ h\ :cUfX\ \&Mb]hYX\ KhUhYg' \&H;9G:')\ h^Y\ Wcbgc^*]XUhYX\ VU^*UbWY\ g^Yhg\ cZ\ FYkg\ ;cfdcfUh]cb\ Ug\ cZ\ BibY\ O-)\ /-/.\ UbX\ /-/-)\ h^Y\ fY^*UhYX\ Wcbgc^*]XUhYX\ ghUhY\ a\ Ybhg\ cZ\ cdYfUh]cbg)\ Wc\ a\ dfY^Ybg]jY\ ]bWc\ a\ Y\ \&^cgg')\ Yei]hm\ UbX\ WUg\ Z^ckg\ Zcf\ YUW\ cZ\ h^Y\ h^fYY\ mYUfg\ ]b\ h^Y\ dYf]cX\ YbXYX\ BibY\ O-)\ /-/.\ YldfYggYX\ Ub\ ibeiU^*]Z|YX\ cd]b]cb\ h^YfYcb+$ 

 $L\YgYZ]bUbW]U`\ ghUhY\ a\ Ybhg\ UfY\ h\Y\ fYgdcbg]V]`]hm\ cZ\ FYkg\ ;\ cfdcfUh]cb\ |g\ a\ UbU\[Y\ a\ Ybh+\ Gif\ fYgdcbg]V]`]hm\ ]g\ hc\ Yl\ dfYgg\ Ub\ cd]b]cb\ cb\ h\Y\ ;\ c\ a\ dUbm\ |g\ Z]bUbW]U`\ ghUhY\ a\ Ybhg\ VUgYX\ cb\ cif\ UiX]hg+\ OY\ UfY\ U\ di\V`]W\ UWWcibh]b\[Z]f\ a\ fY\[]ghYfYX\ k\]h\ h\Y\ H\ ;\ 9\ G\ :\ UbX\ UfY\ fYei\]fYX\ hc\ YY\ JbXYdYbXYbh\ k\]h\ fYgdYWh\ hc\ h\Y\ ;\ c\ a\ dUbm\ ]b\ UWWcfXUbWY\ k\]h\ h\Y\ M+K+\ ZYXYfU`\ gYWif]h]Yg\ `Ukg\ UbX\ h\Y\ Udd`]WUV`Y\ fi`Yg\ UbX\ fY\[i`Uh]cbg\ cZ\ h\Y\ KYWif]h]Yg\ UbX\ =\ 1W\Ub\[Y\ ;\ c\ a\ a\ ]gg]cb\ UbX\ h\Y\ H\ ;\ 9\ G\ :\ +$ 

 $O Y \ WcbXi \ WhYX \ cif \ UiX]hg \ ]b \ UWWcfXUbWY \ k \ ]h \ h \ Y \ ghUbXUfXg \ cZ \ h \ Y \ H \ ; 9 \ G : + L \ cgY \ ghUbXUfXg \ fYei \ ]fY \ h \ Uh \ k \ Y \ d`Ub \ UbX \ dYfZcf \ a \ h \ Y \ UiX]h \ hc \ cVhU]b \ fYUgcbUV Y \ UggifUbWY \ UVcih \ k \ Yh \ Yf \ h \ Y \ Z]bUbW]U \ ghUhY \ a \ Ybhg \ UfY \ ZfYY \ cZ \ a \ UhYf]U \ a \ ]gghUhY \ a \ Ybh) \ k \ Yh \ Yf \ XiY \ hc \ Yffcf \ cf \ ZfUiX \ dYfZcf \ a \ ]b \ [ \ dfcWYXifYg \ hc \ UggYgg \ h \ Y \ f]g_g \ cZ \ a \ UhYf]U \ a \ ]gghUhY \ a \ Ybh \ cZ \ h \ Y \ Z]bUbW]U \ ghUhY \ a \ Ybhg) \ k \ Yh \ Yf \ XiY \ hc \ Yffcf \ cf \ ZfUiX) \ UbX \ dYfZcf \ a \ ]b \ [ \ dfcWYXifYg \ h \ h \ YgdcbX \ hc \ h \ cgY \ f]g_g \ KiW \ dfcWYXifYg \ ]bW \ iXYX \ Y1U \ a \ ]b]b \ [ \ cb \ UhYgh \ VUg]g) \ Yj \ JYYbWY \ fY \ [UhYyb \ UhYgh \ cibh] \ [ \ df]bW]UhYg \ igYX \ UbX \ g] \ [ \ b] \ Y \ Z]bUbW]U \ ghUhY \ a \ Ybhg + Gif \ UiX]hg \ U \ gc \ ]bW \ iXYX \ Yj U \ iUh]b \ [ \ h \ Y \ UWWc \ ibh]b \ [ \ df]bW]d \ Yg \ igYX \ UbX \ g] \ [ \ b] \ Yg \ 2]bUbW]bY \ Yg \ igYX \ UbX \ g] \ [ \ b] \ Yg \ W \ W$ 

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FYh]bWcaY&`cgg'	" 056	" &.)212'	" //5
Gh\Yf Wc a dfY\Ybg]jY]bWc a Y &`cgg'7			
>cfY][b WiffYbWm hfUbg`Uh]cb UX^igh a Ybhg	135	&/'	&/14'
$FYh \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	&/'	å6'	/
: YbYZ]h d`Ub UX^i gh a Ybhg) bYh <sup>&amp;V'</sup>	/	&1/'	&10'
Gh\Yf Wc a dfY\Ybg]jY ]bWc a Y &`cgg'	135	&/2.'	&/55'
; c a dfY\Ybg]jY ]bWc a Y &`cgg'	524	&.)463'	&3 - '
$DYgg7 \ FYh \ \&]bWc \ a \ Y' \ `cgg \ Uhhf]VihUV`Y \ hc \ bcbWcbhfc``]b[\ ]bhYfYghg$	&26'	/43	&40'
DYgg7 Gh\Yf Wc a dfY\Ybg]jY &]bWc a Y'`cgg Uhhf]VihUV`Y hc bcbWcbhfc``]b[ ]bhYfYghg***  †	&45'	10	25
; c a dfY\Ybg]jY]bWc a Y &`cgg' Uhhf]VihUV`Y hc FYkg; cfdcfUh]cb ghcW_\c`XYfg	" 4/-	" &.)144'	" &42'





"./5 a ]``]cb UbX ".20 a ]``]cb) fYgdYWh]jY`m) k\]W\]g bch fYUX]`m UWWYgg]V`Y Vm h\Y; c a dUbm Ug ]h ]g \Y`X Vm J=9 ?fcid D] a ]hYX &y J=9 ?fcidz') U a U^cf]hm c k bYX Vih gYdUfUhY`m `]ghYX diV`]W Wc a dUbm+ J=9 ?fcid a igh XYW`UfY U X]j ]XYbX ]b cfXYf Zcf h\Y; c a dUbm hc \Uj Y UWWYgg hc ]hg g\UfY cZ J=9 ?fcid|g WUg\ VU`UbWY+ L\Y; c a dUbm \W`Ugg]Z]Yg WUg\ Ug fYghf]\WhYX k\Yb h\Y \WUg\ ]g ibUjU\`UY`Y Zcf igY ]b ]hg [YbYfU` cdYfUh]cbg+ L\Y; c a dUbm \UX bc fYghf]\WhYX \WUg\ Ug cZ BibY 0-) /-/. UbX /-/-+

## - ONDFNTRBTJON OG DRFEJT RJSK

;  $Ug \setminus UbX \setminus Vei] U'Ybhg UfY a U]bhU]bYX k]h a i`h]d`Y Z]bUbW]U`]bgh]hih]cbg+ L \ Y ; c a dUbm \ Ug XYdcg]hg \ Y`X k]h \ VUb_g h \ Uh Y 1 \ WYYX h \ Y U a c i bh c Z ]bgifUbWY dfcj]XYX cb giW \ XYdcg]hg+ ? YbYfU`m) h \ YgY XYdcg]hg a Um VY fYXYY a YX i dcb XY a UbX UbX UfY a U]bhU]bYX k]h \ Z]bUbW]U`]bgh]hih]cbg c Z fYdihUV`Y \ WfYX]h UbX) h \ YfYZcfY) VYUf a ]b] a U` \ WfYX]h f]g +$ 

## ; FDFJVBCLFS\$ NFT

JYWY]jUV`Yg) bYh Wcbg]gh cZ7

	_		
J YWY] j UV`Yg	"	.)236	" .)/43
DYgg7 U``c k UbWYg		&4.'	å40'
JYWY]jUV`Yg) bYh	"	.)165	" .)/-0

## 3NVFNTORY\$ NFT

 $Abj\ Ybhcfm\ df]\ a\ Uf]\ ``m\ Webg]ghg\ cZ\ dfc\ [fU\ a\ a\ ]b\ [f]\ [\hg\ Vcc\_g)\ bYkgdf]bh\ UbX\ df]bh]b\ [\]b_+\ Ab\ UWWcfXUbWY\ k\ ]h\ 9K\ ;\ 6/-)$   $y=bhYfhU]b\ a\ Ybh\ x\ :\ fcUXWUghYfg)z\ dfc\ [fU\ a\ a\ ]b\ [f]\ [\hg\ UbX\ h\ Y\ Y\ UhYX\ ]UV]\ ]h]Yg\ UfY\ fYWcfXYX\ Uh\ h\ Y\ [fcgg\ U\ a\ ci\ bh\ cZ\ h\ Y\ ]UV]\ ]h]Yg\ k\ h\ Y\ [fcgg\ U\ a\ ci\ bh\ cZ\ h\ Y\ UgYY\ Cf\ Ug]f]b\ [+\ Hfc\ [fU\ a\ a\ ]b\ [Wcghg\ UfY\ U\ a\ cfh]nYX\ VUgYX\ cb\ h\ Y\ Y1dYWhYX\ dUhhYfb\ cZ\ Wcbgi\ a\ dh]cb\ ej\ Yf\ h\ Y\ ]WYbgY\ dYf]cX\ ef\ Y1dYWhYX\ igYZi\ `\ ]ZY\ cZ\ YUW\ dfc\ [fU\ a\ +\ L\ Y\ dUhhYfb\ cZ\ Wcbgi\ a\ dh]cb\ ej\ Yf\ h\ Y\ g\ h\ DJCf\ a\ Uh]cb\ Ug\ k\ Y\ Ug\ Ch\ Yf\ ZUWhcfg+\ L\ Y\ ;\ c\ a\ dUbm\ fY[\ i\ Uf'\ m\ fYj]Ykg\ ]hg\ dfc\ [fU\ a\ a\ ]b\ [UggYh\ h\ Ym\ Wcbh]b\ i\ Yh\ TU]f\ jU\ i\ Y+\ ;\ VUb\ [Yg\ ]b\ W]fWi\ a\ ghUbWYg\ a\ Um\ fYgi\ h\ UggYh\ h\ ZU]f\ jU\ i\ Y+\$ 

 $L\y \; c\ a\ dUbm\|g\ dfc\ [fU\ a\ a\ ]b\ [\ f]\ [\ hg\ UfY\ g\ i\ VghUbh\]U^m\ U^a\ a\ cbYh\]nYX\ Ug\ U\ Z\] a\ [\ fci\ d+L\Y\ U\ a\ cfh\]nUh\]cb\ Y\ l\ dYbg\ y\ cZ\ dfc\ [\ fU\ a\ a\ ]b\ [\ Wcghg\ )\ k\ Ug\ ''/3/a\ ]^a\ ]^b\ Cd\ fV\ Z\]gWU^m\ YUf\ YbXYX\ BibY\ O-)/-/-/9\ UbX\ ''/4a\ ]^a\ ]^b\ Ug\ CZ\ h\Y\ IbU\ a\ cfh\]nYX\ dfc\ [\ fU\ a\ a\ ]b\ [\ Wcghg\ Ug\ cZ\ BibY\ O-)/-/-/9\ UbX\ /'-/1)\ fYgdYWh\]j\ Ym+$ 

AbjYbhcfm Zcf Vcc\_g UbX bYkgdf]bh UfY jU`iYX Uh h\Y`ckYf cZ Wcgh cf bYh fYU`]nUV`Y jU`iY+; cgh Zcf bcb\*dfc[fU a a]b[]bjYbhcfm]g XYhYf a]bYX Vm h\Y kY][\hYX UjYfU[Y Wcgh aYh\cX+L\Y; cadUbm fYWcfXg U fYgYfjY Zcf Y1WYgg UbX cVgc`YhY]bjYbhcfm VUgYX idcb U WU`Wi`Uh]cb ig]b[h\Y \]ghcf]WU` igU[Y fUhYg) gU`Yg dUhhYfbg cZ]hg dfcXiWhg UbX gdYW]Z]WU``m]XYbh]Z]YX cVgc`YhY]bjYbhcfm+

## 3NVFSTMFNTS

 $VYbYZ]hg\ Zfc\ a\ h\Y\ NA=h\Uh\ Wc\ i\X\ dchYbh]U\mbox{$^X$ hc} u\mbox{$^X$ dchYbh]U\mbox{$^X$ hc} u\mbox{$^X$ hc} u\$ 

 $AbjYgh\ a\ Ybhg\ ]b\ UbX\ UXj\ UbWYg\ hc\ Ye\ i\ ]hm\ ]bjYgh\ a\ Ybhg\ cf\ ^c]bh\ j\ Ybh\ ifYg\ ]b\ k\ |W\ h\ Y\ ;c\ a\ dUbm\ \ Ug\ g][b]Z]WUbh\ ]bZ\ i\ YbWY)\ Vih\ ]g\ bch\ h\ Y\ df]\ a\ Yh\ UbX\ Ug\ `Ygg\ h\ Ub\ U\ Wcbhfc``]b[\ j\ ch]b[\ ]bhYfYgh)\ UfY\ UWWc\ i\ bhYX\ Zcf\ i\ g]b[\ h\ Y\ Ye\ i\ ]hm\ a\ Yh\ cX\ K\ ][b]Z]WUbh\ ]bZ\ i\ YbWY)\ h\ Y\ ;c\ a\ dUbm\ ck\ bg\ Ub\ ]bhYfYgh\ VYhk\ YYb\ /\ -\ \#\ UbX\ 2\ -\ \#\ cf\ k\ Yb\ h\ Y\ ;c\ a\ dUbm\ VHk\ YYb\ /\ -\ \#\ UbX\ 2\ -\ \#\ cf\ k\ Yb\ h\ Y\ ;c\ a\ dUbm\ ]bW\ i\ XYg\ ]hg\ ]bj\ Ygh\ a\ Ybhg\ UbX\ Ua\ ci\ bhg\ Xi\ Y\ hc\ UbX\ Zfc\ a\ gi\ W\ ]bj\ Ygh\ a\ Ybhg\ ]b\ ]hg\ :\ U`UbWY\ K\ YYhg+\ L\ Y\ ;c\ a\ dUbm\ [g\ KhUhY\ a\ Ybhg\ cZ\ ;Ug\ >\ ck\ g\ ]bW\ i\ XY\ U`\ WUg\ fYWY]j\ YX\ Zfc\ a\ cf\ dU]X\ hc\ h\ Y\ ]bj\ YghYYg\ YUfb]b\ [g\ \&\ cggYg'\ UbX\ h\ Y\ ;c\ a\ dUbm\ [g\ KhUhY\ a\ Ybhg\ cZ\ ;Ug\ >\ ck\ g\ ]bW\ i\ XY\ U`\ WUg\ fYWY]j\ YX\ Zfc\ a\ cf\ dU]X\ hc\ h\ Y\ ]bj\ YghYYg\$ 

 $L\Y\ X]ZZYfYbWY\ VYh\ k\ YYb\ h\Y\ ; c\ a\ dUbm\ [g\ ]bj\ Ygh\ a\ Ybh\ UbX\ ]hg\ g\UfY\ cZ\ h\Y\ ZU]f\ j\ U`i\ v\ cZ\ h\Y\ i\ bXYf\ m]b\ [b\ h\ h\ Ub\ ]V\Y\ Ugg\ hg\ cZ\ h\Y\ ]bj\ Ygh\ YY\ i\ dcb\ UWe\ i\ ]gl\ h\ U``c\ WUhYX\ hc\ Y]h\Yf\ Z]b\ h\Yf\ Z]b\ h\Yf\ Z]b\ h\Yf\ Z]b\ h\Yf\ Z]b\ h\Yf\ Z]b\ h\Yf\ UbX\ Gh\Yf\ Ugg\ Yhg\ UbX\ h\Y\ VU`UbWY\ ]g\ Uhhf\Vi\ h\Yf\ hc\ [ccXk\]``+L\Y\ ; c\ a\ d\ Ubm\ Zc``c\ kg\ 9K\ ;\ O2-)\ y\ h\ h\Ub\ []V\Yg\ x\ ?\ ccXk\]``\ UbX\ Gh\Yfz\ \&y\ 9K\ ;\ O2-z')\ k\ M\Yf\ Yfe\ i\ g\ Yg\ h\ h\ Yfe\ i\ g\ Yg\ h\ h\ Yfe\ i\ g\ Yg\ h\ h\ Yfe\ i\ g\ Yg\ YY\ U\ a\ cfh\ n\ YX\ g\ h\ Ygh\ a\ UhYX\ i\ g\ YZ\ i\ h\ Y\ g\ Yg\ b\ h\ Y\ KhUhY\ a\ Ybhg\ cZ\ Gd\YfUh\ ]cbg+\ AbXYZ\]b\ h\Yf\ Yg\ UbX\ [ccXk\]`\ UfY\ bch\ U\ a\ cfh\ n\ YX+$ 

 $Abj Ygh a Ybhg ]b k \]W \land Y ; c a dUbm \Ug bc g] [b]Z] WUbh \]bZ i YbWY \& [YbYfU^m `Ygg h \Ub U /- \# ckbYfg \]d ]bhYfYgh' cf XcYg bch \Uj Y h \Y UV] h h c Y 1 YfW] g Y g] [b]Z] WUbh \]bZ i YbWY UfY UWWci bhYX Zcf ]b UWWcfXUbWY k |h \ 9K; 5/2*.-) y J YWc [b]h]cb UbX E YUg i fY a Ybh cZ$ 

#### 1 HZO MSV^ OLKNLZ

; Ug\ Z'ck \YX[Yg UfY igYX hc a]h][UhY h\Y ; cadUbm|g Y1dcgifY hc jUf]UV]`]hm ]b WUg\ Z'ckg h\Uh ]g Uhhf]VihUV`Y hc dUfh]Wi`Uf f]g\_ UggcW]UhYX k]h\ U \][\`m dfcVUV`Y ZcfYWUghYX hfUbgUWh]cb cf U fYWc[b]nYX UggYh cf `]UV]`]hm k\]W\ Wci`X UZZYWh ]bWc a Y cf Y1dYbgYg+ L\Y YZZYWh]jY dcfh]cb cZ h\Y [U]b cf `cgg cb h\Y \YX[]b[]bghfi a Ybh ]g fYWc[b]nYX X]fYWh`m ]b 9 WWi a i`UhYX ch\Yf Wc a dfY\Ybg]jY `cgg+ 9 a cibhg fYWcfXYX ]b 9 WWi a i`UhYX ch\Yf Wc a dfY\Ybg]jY `cgg UfY fYWc[b]nYX ]b h\Y KhUhY a Ybhg cZ GdYfUh]cbg k\Yb h\Y \YX[YX ZcfYWUghYX hfUbgUWh]cb ]a dUWhg ]bWc a Y cf ]Z h\Y ZcfYWUghYX hfUbgUWh]cb ]g bc `cb[Yf Y1dYWhYX hc cWWif+

# 4HPY JHS\L OLKNLZ

 $> UJf \ jU^i iY \ YX[Yg \ UfY \ igYX \ hc \ a \ ]h][UhY \ h\ Y \ ; c \ a \ dUbm \ |g \ Yl \ deg \ ifY \ hc \ W\ Ub[Yg] \ b \ h\ Y \ ZUJf \ jU^i iY \ cZ \ U \ fYWc[b]nYX \ UggYh \ cf `]UV]`]hm) \ cf \ Ub \ [XYbh]Z]YX \ defh]eb \ h\ YfYcZ \ h\ Uh \ ]g \ Uhhf]VihUV`Y \ hc \ U \ dUfh]Wi`Uf \ f]g_ UbX \ Wci`X \ UZZYWh \ ]bWc \ a Y \ cf \ Yl \ dYbgYg+ \ L\ Y \ YX[YX]hY \ a \ ]g \ UX^i \ ghYX \ Zef \ [U]bg \ UbX \ cggYg \ Uhhf]VihUV`Y \ hc \ h\ Y \ f]g_ VY]b[ \ YX[YX \ UbX \ h\ Y \ XYf]jUh]jY \ ]g \ fY \ a \ YUgi \ fYX \ c \ a \ dUbm \ fYWcfXg \ h\ Y \ W\ Ub[Yg]b \ h\ Y \ ZU]f \ jU^i iY \ cZ \ h\ YgY \ ]hY \ a \ g \ ]b \ h\ Y \ KhUhY \ a \ Ybhg \ cZ \ GdYfUh]cbg+$ 

#### 3JVUVTPJ OLKNLZ

 $< Yf]jUh]jYg bch XYg][bUhYX Ug UWWcibh]b[ \YX[Y fY`Uh]cbg \]dg cf Zcf k \]W \YX[Y UWWcibh]b[ \Ug VYYb X]gWcbh]biYX UfY fYZYffYX hc Ug YWcbc a ]W \YX[Yg \Ly fY \Ly g UfY h \cgY XYf]jUh]jYg k \]W h\Y ; c a dUbm igYg hc a ]h][UhY ]hg Y1dcgifY hc jUf]UJ] hm ]b h\Y WUg \ Z c k g cZ U ZcfYWUghYX hfUbgUWh]cb cf h\Y ZU]f jU^iY cZ U fYWc[b]nYX UggYh cf `]UV]`]hm) Vih k \]W \ Xc bch e iU^]Zm Zcf \YX[Y UWWcibh]b[ ]b UWWcfXUbWY k]h\ 9K; 5.2+ O \Yb U XYf]jUh]jY ]g XYhYf a ]bYX bch hc VY \][\`m YZZYWh]jY Ug U \YX[Y cf h\Y ibXYf^m]b[ \YX[YX hfUbgUWh]cb ]g bc `cb[Yf dfcVUV`Y) h\Y ; c a dUbm X]gWcbh]biYg \YX[Y UWWcibh]b[ dfcgdYWh]jY^m+ L\Y YWcbc a ]W \YX[Yg UfY UX^ighYX hc ZU]f jU^iY YUW\ dYf]cX]b Gh\Yf) bYh ]b h\Y KhUhY a Ybhg cZ GdYfUh]cbg+$ 

: ROPFRTY\$ PLBNT BNE FOUJPMFNT

#### - BPJTBLJZFE SOGTWBRF

Ab UWWcfXUbWY k]h\ 9K;  $02^{-1}$ -) yAbhYfbU`\*igY KcZhkUfY)z h\Y; c a dUbm WUd]hU`]nYg WYfhU]b Wcghg ]bWiffYX ]b WcbbYWh]cb k]h\ XYjY`cd]b[ cf cVhU]b]b[ ]bhYfbU`\*igY gcZhkUfY+; cghg ]bWiffYX ]b h\Y dfY`] a ]bUfm dfc^YWh ghU[Y UfY Y1dYbgYX+ 9`` X]fYWh Wcghg ]bWiffYX hc XYjY`cd ]bhYfbU`\*igY gcZhkUfY Xif]b[ h\Y XYjY`cd a Ybh ghU[Y UfY WUd]hU`]nYX UbX U a cfh]nYX ig]b[ h\Y ghfU][\h\*]bY a Yh\cX cjYf h\Y Ygh] a UhYX igYZi``]ZY) [YbYfU``m / hc .0 mYUfg+; cghg giW\ Ug a U]bhYbUbWY UbX hfU]b]b[ UfY Y1dYbgYX Ug ]bWiffYX+ J YgYUfW\ UbX XYjY`cd a Ybh Wcghg UfY U`gc Y1dYbgYX Ug ]bWiffYX+

Ab UWWcfXUbWY k]h\ 9 K;  $02^{-*}/1$ ) y; ighc a Yf|g 9WWcibh]b[ Zcf A a d'Y a YbhUh]cb; cghg AbWiffYX]b U; `ciX; c a dih]b[ 9ffUb[Y a Ybh h\Uh]g U KYfj]WY; cbhfUWhz) h\Y; c a dUbm YjU`iUhYg idZfcbh Wcghg) ]bW`iX]b[] a d'Y a YbhUh]cb) gYh\*id cf ch\Yf Wcghg &Wc``YWh]jY`m) y] a d'Y a YbhUh]cb Wcghgz') Zcf \cgh]b[ UffUb[Y a Ybhg ibXYf h\Y]bhYfbU`\*igY gcZhkUfY ZfU a Ykcf\_+; cghg fY`UhYX hc dfY`]a]bUfm dfc^YWh UWh]j]h]Yg UbX dcgh] a d'Y a YbhUh]cb UWh]j]h]Yg UfY Y1dYbgYX Ug]bWiffYX) k\YfYUg Wcghg]bWiffYX]b h\Y XYjY`cd a Ybh ghU[Y UfY [YbYfU``m WUd]hU`]nYX Ug dfYdU]X UggYhg k]h\]b Gh\Yf; iffYbh 9ggYhg]b h\Y; U`UbWY K\YYh+; Ud]hU`]nYX] a d'Y a YbhUh]cb Wcghg UfY U a cfh]nYX cb U ghfU][\h\*`]bY VUg]g cjYf h\Y Y1dYWhYX hYf a cZ h\Y \cgh]b[ UffUb[Y a Ybh) k\]W\]bW`iXYg Wcbg]XYfUh]cb cZ h\Y bcb\* WUbWY``UV`Y WcbhfUWhiU` hYf a UbX fYUgcbUV`m WYfhU]b fYbYkU`g+ 9 a cfh]nUh]cb cZ WUd]hU`]nYX] a d'Y a YbhUh]cb Wcghg]g]bW`iXYX]b h\Y gU a Y`]bY]hY a ]b h\Y KhUhY a Ybhg cZ GdYfUh]cbg Ug h\Y Y1dYbgY Zcf ZYYg Zcf h\Y UggcW]UhYX \cgh]b[ UffUb[Y a Ybh+

#### ; OYBLTY BEVBNDFS TO BUTIORS

 $J \ cmU^hm \ UXj UbWYg \ UfY \ JbJh]U^m \ W UdJhU^]nYX \ UbX \ gi VgYe i Ybh^m \ Y1 dYbgYX \ Ug \ fY^UhYX \ fYj Ybi Yg \ UfY YUfbYX \ cf \ k \ h \ f \ k \ h \ Y \ ; c \ a \ dUbm \ Yg U \ cb[ \ \]ghcfm \ cZ \ dfcj]XJb[ \ Uih\ cfg \ k \ h \ fcmU^hm \ UXj UbWYg) \ UbX \ ]h \ hfUW_g \ YUW \ UXj UbWY \ YUfbYX \ k \ h \ fYgdYWh \ h \ h \ Y \ gU^Y \ cZ \ h \ Y \ fY^UhYX \ di V^]WUh]cb+ @]ghcfJWU^m) \ h \ Y \ cb[ Yf \ h \ Y \ ibYUfbYX \ defh]cb \ cZ \ h \ Y \ UXj UbWY \ fY \ a \ U]bg \ c \ ihghUbX]b[) \ h \ Y \ Ygg \ ]_Y^m \ ]h \ ]g \ h \ Uh \ h \ Y \ ; c \ a \ dUbm \ k \ ]^m \ fYWcj Yf \ h \ Y \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ di V^]WUh]cb+ \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ di V^]WUh]cb+ \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ di V^]WUh]cb+ \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ di V^]WUh]cb+ \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ di V^]WUh]cb+ \ UXj UbWY \ h \ fci[ \ h \ Y \ gU^Y \ cZ \ h \ Y \ gU^Y \ gUV \ h \ fY \ gU^Y \ gUV \ h \ fY \ gU^Y \ gUV \ gUV \ h \ gU^Y \ gUV \ h \ h \ gU^Y \ gUV \ gUV \ h \ h \ h \ gU^Y \ gUV \$ 

 $XYgWf]VYX\ UVcjY)\ h\ Y\ ;\ c\ a\ dUbm\ a\ YUgifYg\ UggYhg\ UbX\ `]UV]`jh]Yg\ b\ UWWcfXUbWY\ k\ ]h\ 9\ K\ ;\ 5/-)\ ig]b[\ ]bdihg\ Zfc\ a\ h\ Y\ Zc``c\ k\ ]b[\ h\ fYY\ YjY`g\ cZ\ h\ Y\ ZUJf\ jU`iY\ \]yfUfW\ m^7\ \&']\ ]bdihg\ h\ Uh\ UfY\ e\ ichYX\ df]WYg\ ]b\ UWh]jY\ a\ Uf\_Yhg\ Zcf\ ]XYbh]WU\ UggYhg\ cf\ `]UV]`]h]Yg\ \&yDYjY`\ /z'8\ UbX\ \&]]]'\ ibcVgYfjUV`Y\ ]bdihg\ h\ Uh\ fYei]fY\ h\ Y\ Ybh]hm\ hc\ igY\ ]hg\ ck\ b\ VYgh\ Ygh\ a\ UhYg\ UVcih\ a\ Uf\_Yh\ dUfh]W]dUbh\ Uggi\ a\ dh]cbg\ \&yDYjY`\ Oz'+\ KYY\ FchY\ ...\ x\ >]bUbW]U\ Abghfi\ a\ Ybhg\ UbX\ >U]f\ NU`iY\ E\ YUgifY\ a\ Ybhg+$ 

 $L\y \ ; c\ a\ dUbm\|g\ UggYhg\ a\ YUgifyX\ UggYhg\ ) \ bXYZ\] b\|hY*\] j\ YX \ UggYhg\ b\ YUgifyY\ UggYhg\ UbX\ [ccXk]^+ L\y \ ; c\ a\ dUbm\ fYj\]Yk\ g\ h\Y\ WUffm\] b\[U\ a\ ci\ bhg\ cZ\ gi\W\ UggYhg\ k\ YbYj\ Yf\ Yj\ Ybhg\ cf\ W\Ub\[Yg\] b \ W\]fWi\ a\ ghUbWYg\ ]bX\]WUhY\ h\Uh\ h\Y\ WUffm\] b\[U\ a\ ci\ bhg\ a\ Um\ bch\ VY\ fYWcj\ YfUV\ Y\ cf\ Uh\ YUgh\ Ubb\ iU^m\ Xi\ f\] b\[h\ h\Y\ Zci\ fh\ e\ iUfh\Yf\ Zcf\ ]bXYZ\] b\]hY*\]j\ YX\ \]bhUb\[U\ ggYhg\ UbX\ [ccXk]^+ 9\ bm\ fYgi\ h\] a\ dU\]f\ a\ YUg\ UbB\ iU^m\ Y\ Ygi\ h\]hY\ VY\ fYWcfXYX\ Uh\ ]hg\ ZU\]f\ jU^i\ Y+\ L\Y\ fYgi\ h\]b\[U\ ggYhg\ UfY\ Wcbg\]XYfYX\ hc\ VY\ DY\ jY\ O\ a\ YUgi\ Y\ b\] +\ Ybhg\ +$ 

# +SSFT JMPBJRMFNTS

# 7U]LZ[TLU[Z

 $= ei \lim_{n \to \infty} a \ Yh \ CX \ | bj \ Ygh \ a \ Ybhg \ UfY \ fY \ [i \ Uf \ m \ fY \ ] \ Yk \ YX \ hc \ XYhYf \ a \ ]bY \ k \ Yh \ Yf \ Ug \ [b] \ Z] \ WUb \ Yj \ Ybh \ cf \ W \ Ub \ [Y \ ]b \ W] \ fWi \ a \ gh \ Ub \ Ygh \ a \ Ybh \ AZ \ h \ Y \ ZU]f \ jU \ i Y \ cZ \ h \ Y \ ]bj \ Ygh \ a \ Ybh \ Vg \ Ck \ h \ YWUffm]b \ [U \ a \ ci bh) \ a \ Ub \ Ug \ Xfc \ dY \ Ygh \ Yf \ g \ Yj \ YfU \ ZUWhcfg \ k \ Yb \ XYhYf \ a \ ]b]b[\ k \ Yh \ Yf \ Ub \ ch \ Yf \ Ub \ ch \ Yf \ A \ dcf \ Ufm \ XYW \ ]by \ ]b \ a \ Uf \ Yh \ jU \ i Y \ Ug \ CWWiffYX) \ ]bW \ i X]b[\ h \ Y \ Yb \ [h \ CZ \ h] \ a \ Y \ UbX \ YlhYbh \ hc \ k \ ]W \ h \ Y \ 2Uh \ Yf \ Ug \ VYYb \ VY \ ck \ Wegh) \ h \ Y \ Z]bUbW]U \ WebX]h]eb \ UbX \ bYUf* \ hYf \ a \ dfcgdYWhg \ cZ \ h \ Y \ ]ggi \ Yf \ A \ Y \ ]bhYbh \ UbX \ UV] \ ]hm \ cZ \ h \ Y \ ;c \ a \ dUb \ hc \ fYhU]b \ ]hg \ ]b \ h \ Y \ ZU]f \ a \ Uf \ Yh \ jU \ i Y) \ gi \ W \ Ug \ [YbYfU \ a \ Uf \ Yh \ JU \ i Y) \ gi \ W \ Ug \ [YbYfU \ a \ Uf \ Yh \ JU \ i Y) \ gi \ W \ Ug \ [YbYfU \ a \ Uf \ Yh \ JU \ i Y) \ gi \ W \ Ug \ [YbYfU \ a \ Uf \ Yh \ Yh \ WebX]h]cbg+$ 

# : VUN%SP JLK HZZL[Z

 $9\,K;\ 03-)\ yHfcdYfhm)\ H`Ubh)\ UbX=ei]d\ a\ Ybhz\ \&y\ 9\,K;\ 03-z'\ UbX\ 9\,K;\ 02-fYei]fY\ h\ Y\ ;\ c\ a\ dUbm\ hc\ dYf]cX]WU``m\ fYj]Yk\ h\ Y\ WUffm]b[\ U\ a\ ci\ bhg\ cZ\ ]hg\ `cb[*]jYX\ UggYhg)\ ]bW`iX]b[\ dfcdYfhm)\ d`Ubh\ UbX\ Yei]d\ a\ Ybh\ UbX\ Z]b]hY*]jYX\ ]bhUb[]V`Y\ UggYhg)\ hc\ XYhYf\ a]bY\ k\ Yh\ Yf\ WiffYbh\ Yj\ Ybhg\ cf\ W]fWi\ a\ ghUbWYg\ ]bX]WUhY\ h\ Uh\ giW\ WUffm]b[\ U\ a\ ci\ bh\ a\ Um\ bch\ VY\ fYWcj\ YfUV`Y+\ AZ\ h\ Y\ WUffm]b[\ U\ a\ ci\ bh\ cZ\ h\ Y\ UggYh\ ]g\ [fYUhYf\ h\ Ub\ h\ Y\ Yl\ dYWYXg\ ]bg\ Zo\ kg\ hc\ VY\ [YbYfUhYX\ Vm\ giW\ UggYh)\ Ub\ ]\ a\ UJf\ a\ Ybh\ UX^igh\ a\ Ybh\ [g\ Ym\ Cb]nYX\ ]Z\ h\ Y\ WUffm]b[\ jU`iY\ cZ\ dUgyYhg\ Cc\ kg\ ig]b[\ Ub\ Uddfcdf]UhY\ X]gWcibh\ fUhY+\ ;\ cbg]XYfUv`Y\ a\ UbU[Y\ a\ Ybh\ ^iX[\ a\ Ybh\ ]g\ bYWYggUfm\ hc\ Ygh]\ a\ UhY\ h\ Y\ Zlf\ jU`iY\ cZ\ UggYhg\ UWwcfX]b[`m)\ UWhiU`\ fYgi`hg\ Wci`X\ jUfm\ g][\ b]Z]WUbh`m\ Zfc\ a\ giW\ Ygh]\ a\ UhYg+\ 9\,ggYhg\ hc\ VY\ X]gdcgYX\ cZ\ UfY\ WUff]YX\ Uh\ h\ Y\ ck\ Yf\ cZ\ h\ Yff\ Z]bUbW]U`\ ghUhY\ a\ Ybh\ WUffm]b[\ U\ a\ ci\ bh\ cf\ Zu]f\ jU`iY\ Ygg\ h\ Y]f\ Wcghg\ hc\ gY``+$ 

# =RFBSURY <TODK

### ; FVFNUF RFDOHNJTJON

#### $1 \text{ PYJ} \setminus SH(\text{PVU HUK Z} \setminus \text{IZJYPW}(\text{PVU YL})LU \setminus LZ$

; ]fWi`Uh]cb UbX giVgWf]dh]cb fYjYbiYg ]bW`iXY giVgWf]dh]cb UbX g]b[`Y\*Wcdm gU`Yg cZ X][]hU` UbX df]bh bYkg dfcXiWhg) ]bZcf a Uh]cb gYfj]WYg giVgWf]dh]cb fYjYbiYg UbX dUm hY`Yj]g]cb VfcUXWUgh UbX ghfYU a ]b[ giVgWf]dh]cb fYjYbiYg+; ]fWi`Uh]cb fYjYbiYg UfY VUgYX cb h\Y bi a VYf cZ Wcd]Yg cZ h\Y df]bhYX bYkg dfcXiWhg &h\fci[\ \c a Y\*XY`]jYfm giVgWf]dh]cbg UbX g]b[`Y\*Wcdm gU`Yg' UbX,cf X][]hU`

J Y j Y bi Y [Y bY fU hY X Z fc a g i V g W f] d h c f y W y] j Y d U m h Y Y j ] g c b V f c U X W U g ) b [) V f c U X V U b X d \ c b Y g Y f j ] W Y g Z c f f Y g] X Y bh J U b X W c a a Y f W J U g i V g W f J V Y f g ] g f Y W c [b] n Y X c j Y f h] a Y c b U a c bh \ m V U g J g U g h Y g Y f j ] W Y g U f Y d f c j ] X Y X + H U m a Y bh ] g [Y b Y f U m f Y W Y] j Y X a c bh \ m ] b U X j U b W Y c Z d f c j ] X J b [ g Y f j ] W Y g ) U b X ] g X Y Z Y f f Y X i d c b f Y W Y J d h + K i W \ U a c i b h g U f Y f Y W c [b] n Y X U g f Y j Y b i Y U g h \ Y f Y U h Y X g Y f j | W Y g U f Y d f c j | X Y X +

# /K]LY[PZPUN YL]LU\LZ

 $J Y j Y b i Y Z f c a d f ] b h U X j Y f h ] g | f Y w c [b] n Y X U h h \ Y d c ] b h ] a Y h \ Y d f ] b h ] a Y h \ Y d f ] b h U X j Y f h ] g d i V`] g \ Y X + : f c U X W U g h U X j Y f h ] g b [ f Y j Y b i Y g f Y w c [b] n Y X c j Y f h \ Y h ] a Y h \ U h h \ Y V f c U X W U g h U X j Y f h ] g U ] f Y X + > c f ] a d f Y g g ] c b g * V U g Y X X ] [ ] h U U X j Y f h ] g b [ ] f Y W c [b] n Y X U g ] a d f Y g g ] c b g U f Y X Y`] j Y f Y X c j Y f h \ Y h Y f a c Z h \ Y U f f U b [ Y a Y b h ) k \]`Y f Y j Y b i Y Z f c a b c b * ] a d f Y g g ] c b g * V U g Y X X ] [ ] h U U X j Y f h ] g b [ ] g f Y W c [b] n Y X c j Y f h \ Y d Y f ] c X h \ U h \ Y U X j Y f h ] g Y a Y b h g U f Y X ] g d` U m Y X + K i W \ U a c i b h g U f Y f W c [b] n Y X b Y h c Z U [ Y b W m W c a a ] g g ] c b g U b X d f c j ] g | c b g Z c f Y g h ] a U h Y X g U Y y g ] b W Y b h ] j Y g ) ] b W` i X ] b [ f Y V U h Y g ) f U h Y U X i g h a Y b h g c f X ] g W c i b h g +$ 

9XjYfh]g]b[ fYjYbiYg YUfbYX Zfc a ]bhY[fUhYX aUf\_Yh]b[ gYfj]WYg UfY fYWc[b]nYX Uh h\Y dc]bh ]b h] a Y k \Yb ZfYY\*ghUbX]b[ ]bgYfhg UfY di V`]g\YX+ JYjYbiYg YUfbYX Zfc a ]b\*ghcfY aUf\_Yh]b[ gYfj]WYg UfY dUfh]U``m fYWc[b]nYX idcb ]bghU``Uh]cb) k]h\ h\Y fY aU]b]b[ fYjYbiY fYWc[b]nYX cjYf h\Y ]b\*ghcfY WU a dU][b+

: ]``]b[g hc W`]Ybhg UbX dUm a Ybhg fYWY]jYX ]b UXjUbWY cZ dYfZcf a UbWY cZ gYfj]WYg cf XY`]jYfm cZ dfcXiWhg UfY fYWcfXYX Ug XYZYffYX fYjYbiY ibh]` h\Y gYfj]WYg UfY dYfZcf a YX cf h\Y dfcXiWh ]g XY`]jYfYX+ HUm a Ybh Zcf UXjYfh]g]b[ gYfj]WYg ]g hmd]WU``m XiY g\cfh`m UZhYf h\Y ; c a dUbm \Ug gUh]gZ]YX ]hg dYfZcf a UbWY cV`][Uh]cb hc df]bh) VfcUXWUgh cf d`UWY h\Y UXjYfh]g]b[ gdYW]Z]YX ]b h\Y WcbhfUWh+ >cf UXjYfh]g]b[ WU a dU][bg h\Uh Y1hYbX VYmcbX cbY a cbh\) h\Y ; c a dUbm [YbYfU``m ]bjc]WYg h\Y UXjYfh]gYf]b UffYUfg VUgYX cb h\Y bi a VYf cZ UXjYfh]gY a Ybhg h\Uh k YfY df]bhYX) VfcUXWUgh cf d`UWYX) cf ] a dfYgg]cbg XY`]jYfYX Xif]b[ h\Y a cbh\+

# $1VUZ \setminus TLY YLJLU \setminus LZ$

JYjYbiY]g fYWc[b]nYX bYh cZ Ubm U a cibhg V]``YX hc Wighc a Yfg Zcf hUlYg fY a ]hhYX hc [cjYfb a Ybh Uih\cf]h]Yg+ HUm a Ybhg Zcf h\Y gU`Y cZ d\mg]WU` Vcc\_g UbX Y\*Vcc\_g UfY [YbYfU``m Wc``YWhYX k]h\]b cbY hc h\fYY a cbh\g cZ gU`Y cf XY`]jYfm UbX UfY VUgYX cb h\Y bi a VYf cZ d\mg]WU` Vcc\_g cf Y\*Vcc\_g gc`X+

# @LHS 3Z[H[L YL]LU\LZ

JYU` YghUhY fYjYbiYg UfY XYf]jYX Zfc a h\Y gU`Y cZ X][]hU` fYU` YghUhY`]gh]b[ UbX `YUX [YbYfUh]cb dfcXiWhg UbX UXjUbWYX W`]Ybh a UbU[Y a Ybh UbX fYdcfh]b[ dfcXiWhg) Ug kY`` Ug gYfj]WYg hc U[Ybhg) Vfc\_Yfg UbX XYjY`cdYfg+ JYjYbiY]g hmd]WU``m fYWc[b]nYX cjYfh\Y wcbhfUWhiU` dYf]cX Xif]b[ k\]W\ h\Y gYfj]WYg UfY dfcj]XYX+ HUm a Ybhg UfY [YbYfU``m XiY a cbh\`m cjYfh\Y giVgWf]dh]cb hYf a+

# $=[OLY\ YL\ ]LU\setminus LZ$

Gh\Yf fYjYbiYg UfY fYWc[b]nYX k\Yb h\Y fY`UhYX gYfj]WYg UfY dYfZcfa YX cf h\Y dfcXiWh \Ug VYYb XY`]jYfYX+

# 1 VU[YHJ[Z ^P[O T \S[PWSL WLYNVYTHUJL VISPNH[PVUZ

# $7KLU[PMPJH[PVU\ VM\ H\ J\ Z[VTLY\ HUK\ NYVZZ\ ]LYZ\ Z\ UL[\ YL\ ]LU\ L\ YLJVNUP[PVU\ VM\ H\ J\ YLJVNUP]PVU$

Ab h\Y bcf a U \WcifgY cZ Vig]bYgg) h\Y ; c a dUbm UWhg Ug cf igYg Ub ]bhYf a YX]Ufm cf U[Ybh ]b Y1YWih]b[ hfUbgUWh]cbg k]h\ h\]fX dUfh]Yg+ O\Yb h\Y ]bhYf a YX]Ufm cf U[Ybh ]g XYhYf a ]bYX hc VY h\Y ; c a dUbm|g Wighc a Yf) h\Y ; c a dUbm fYWcfXg fYjYbiY VUgYX cb h\Y U a c i bh ]h Y1dYWhg hc fYWY]jY Zfc a h\Y U[Ybh cf]bhYf a YX]Ufm+

Ab ch\Yf W]fWi a ghUbWYg) h\Y XYhYf a ]bUh]cb cZ k\Yh\Yf fYjYbiY g\ci`X VY fYdcfhYX cb U [fcgg cf bYh VUg]g ]g VUgYX cb Ub UggYgg a Ybh cZ k\Yh\Yf h\Y ; c a dUbm ]g UWh]b[ Ug h\Y df]bW]dU` cf Ub U[Ybh ]b h\Y hfUbgUWh]cb+ AZ h\Y ; c a dUbm ]g UWh]b[ Ug U df]bW]dU` ]b U hfUbgUWh]cb) h\Y ; c a dUbm fYdcfhg fYjYbiY cb U [fcgg VUg]g+ AZ h\Y ; c a dUbm ]g UWh]b[ Ug Ub U[Ybh ]b U hfUbgUWh]cb) h\Y ; c a dUbm fYdcfhg fYjYbiY cb U bYh VUg]g+ L\Y XYhYf a ]bUh]cb cZ k\Yh\Yf h\Y ; c a dUbm ]g UWh]b[ Ug U df]bW]dU` cf Ub U[Ybh ]b U hfUbgUWh]cb ]bjc`jYg^iX[ a Ybh UbX ]g VUgYX cb Ub YjU`iUh]cb cZ h\Y hYf a g cZ h\Y UffUb[Y a Ybh+ L\Y ; c a dUbm gYfjYg Ug h\Y df]bW]dU` ]b hfUbgUWh]cbg ]b k\]W\] h Wcbhfc`g h\Y [ccXg cf gYfj]WYg df]cf hc VY]b[ hfUbgZYffYX hc h\Y i`h] a UhY Wighc a Yf+

# $AHSLZ YL[\YUZ]$

; YfhU]b cZ h\Y ; c a dUbm|g dfcXiWhg) giW\ Ug Vcc\_g UbX bY k gdUdYfg) UfY gc`X k]h\ h\Y f][\h cZ fYhifb+ L\Y ; c a dUbm fYWcfXg h\Y Ygh] a UhYX ] a dUWh cZ giW\ fYhifbg Ug U fYXiWh]cb cZ fYjYbiY+ Lc Ygh] a UhY dfcXiWh gU`Yg h\Uh k]` VY fYhifbYX UbX h\Y fY`UhYX dfcXiWhg h\Uh UfY Y1dYWhYX hc VY d`UWYX VUW\_]bhc ]bjYbhcfm) h\Y ; c a dUbm UbU`mnYg \]ghcf]WU` fYhifbg) WiffYbh YWcbc a ]W hfYbXg) W\Ub[Yg ]b Wighc a Yf XY a UbX UbX UWWYdhUbWY cZ h\Y ; c a dUbm|g dfcXiWhg+ : UgYX cb h\]g ]bZcf a Uh]cb) h\Y ; c a dUbm fYgYfjYg U dYfWYbhU[Y cZ YUW\ Xc``Uf cZ dfcXiWh gU`Yg h\Uh dfcj]XY h\Y Wighc a Yf k]h\ h\Y f][\h cZ fYhifb+

# <UCSDRJCFR BDQUJSJTJON DOSTS

; cghg fY`UhYX hc h\Y UWei]g]h]cb cZ giVgWf]dh]cb j]XYc gYfj]WY Wighc a Yfg df] a Uf]`m Wcbg]gh cZ U a cibhg dU]X Zcf h\]fX\*dUfhm Wighc a Yf UWei]g]h]cbg) k\]W\ Wcbg]gh cZ h\Y Wcgh cZ Wc a a ]gg]cbg dU]X hc Uih\cf]nYX fYhU]`Yfg UbX XYU`Yfg Zcf giVgWf]VYfg UXXYX h\fci[\ h\Y]f fYgdYWh]jY X]ghf]Vih]cb W\UbbY`g UbX h\Y Wcgh cZ \UfXkUfY UbX ]bghU``Uh]cb giVg]X]Yg Zcf giVgWf]VYfg+ 9`` Wcghg) ]bW`iX]b[\ \UfXkUfY) ]bghU``Uh]cb UbX Wc a a ]gg]cbg) UfY Y1dYbgYX idcb UWh]jUh]cb) Y1WYdh k\YfY`Y[U` ckbYfg\]d cZ h\Y Yei]d a Ybh ]g fYhU]bYX) ]b k\]W\ dY \U1]b \]Yg+  $O \setminus I$  \| h\\ ighc a |\| h\ X \ gh\Y \f]Vh\Y

9 WWi a i`UhYX ch\Yf Wc a dfY\Ybg]jY`cgg+?U]bg UbX`cggYg Zfc a ZcfY][b WiffYbWm hfUbgUWh]cbg UfY [YbYfU``m ]bW`iXYX]b ]bWc a Y Zcf h\Y dYf]cX+

#### 3NDOMF TBXFS

#### / BRNJNHS "LOSS# PFR SIBRF

: Ug]W YUfb]b[g &`cgg' dYf g\UfY Zcf; `Ugg 9; caacb KhcW\_ UbX; `Ugg:; caacb KhcW\_]g WU`Wi`UhYX Vm X]j]X]b[ FYh ]bWcaY &`cgg' Uhhf]VihUV`Y hc FYkg; cfdcfUh]cb ghcW\_\c`XYfg Vm h\Y kY][\hYX UjYfU[Y biaVYf cZg\UfYg cZ;`Ugg 9; caacb KhcW\_UbX;`Ugg:; caacb KhcW\_cihghUbX]b[ Xif]b[ h\Y dYf]cX+ <]`ihYX YUfb]b[g &`cgg' dYf g\UfY Zcf;`Ugg 9; caacb KhcW\_UbX;`Ugg:; caacb KhcW\_]g WU`Wi`UhYX g]a]`Uf`m) Y1WYdh h\Uh h\Y WU`Wi`Uh]cb]bW`iXYg h\Y X]`ih]jY YZZYWh cZh\Y UggiaYX]ggiUbWY cZg\UfYg ]ggiUV`Y ibXYf h\Y; cadUbm|g Yei]hm\*VUgYX WcadYbgUh]cb d`Ubg+ KYY FchY. 1 x = Ufb]b[g &Dcgg' HYf K\UfY+

# / QUJTY%CBSFE DOMPFNSBTJON

=ei]hm\*VUgYX UkUfXg UfY UWWcibhYX Zcf]b UWWcfXUbWY k]h\ 9K; 4.5) y; cadYbgUh]cbx KhcW\_; cadYbgUh]cbz &y 9K; 4.5z'+ 9K; 4.5 fYei]fYg h\Uh h\Y Wcgh fYgi`h]b[ Zfca U` g\UfY\*VUgYX dUmaYbh hfUbgUWh]cbg VY fYWc[b]nYX]b h\Y; cbgc`]XUhYX >]bUbW]U` KhUhYaYbhg+ 9K; 4.5 YghUV`]g\Yg ZU]f jU`iY Ug h\Y aYUgifYaYbh cV^YWh]jY]b UWWcibh]b[ Zcf g\UfY\*VUgYX dUmaYbh UffUb[YaYbhg UbX fYei]fYg U`` WcadUb]Yg hc Udd`m U ZU]f\*jU`iY\*VUgYX aYUgifYaYbh aYh\cX]b UWWcibh]b[ Zcf [YbYfU``m U``g\UfY\*VUgYX dUmaYbh

; c a dUbm UXcdhYX h\Y U a YbX a Ybhg ]b 9 KM /-.6\*-/ cb U dfcgdYWh]jY VUg]g Ug cZ Bi`m .) /-/-+ L\Y UXcdh]cb X]X bch \UjY U a UhYf]U` YZZYWh cb h\Y ; c a dUbm\g ; cbge`]XUhYX >]bUbW]U` KhUhY a Ybhg+ J YZYf hc FchY /. x 9 XX]h]cbU` >]bUbW]U` AbZcf a Uh]cb Zcf Zi fh\Yf X]gWi gg]cb+

# $7ZZ \setminus LK$

Ab < YWY a VYf /-.6) h Y > 9K: ]ggiYX 9KM /-.6\*./) yAbWc a Y LU1Yg &Lcd]W 41-'7K] a d`]Zm]b[ h Y 9WWcibh]b[ Zcf AbWc a Y LU1Ygz &y 9KM /-.6\*./z'+L Y U a YbX a Ybhg ]b 9KM /-.6\*./ fY a c j Y WYfhU]b Y1WYdh]cbg hc h Y [YbYfU` df]bW]d`Yg ]b Lcd]W 41- UbX g] a d`]Zm ch Yf UfYUg cZ Lcd]W 41- ]bW`iX]b[ h Y UWWcibh]b[ Zcf UbX fYWc[b]h]cb cZ ]bhfUdYf]cX hU1 U``cWUh]cb) XYZYffYX hU1 `]UV]`]h]Yg

JYjYbiYg7														
;]fWi`Uh]cbUbXgiVgWf]dh]cb	"	16	"	.)6/3	"	.)./-	"	X	"	.)5	"		"	1)1
9XjYfh]g]b[		.//		/.2		060		X		/)4				/)405
; cbgi a Yf		X		X		X		.)346		X		X		.)346
J YU` YghUhY		6-5		X		X		X		X		X		6-5
$Gh \setminus Yf$		5-		3.		03		42		06/				312
LchU JYjYbiYg	"	.).26	"	/)/-/	"	.)216	"	.)421	"	0)1-4	"	0	"	)-41

 $\begin{tabular}{ll} Wcbg]XYfUh]cb cjYf h\Y ZU]f jU`iYg cZ h\Y bYh hUb[]V`Y UbX ]bhUb[]V`Y UggYhg cZ Uddfc1] a UhY`m ".33 a]``]cb k Ug fYWcfXYX Ug [ccXk]`` cb h\Y hfUbgUWh]cb+ \\ \end{tabular}$ 

 $L\Y \WUffm]b[\ jU`iYg\ cZ\ h\Y\ ; c\ a\ dUbm\|g\ ]bhUb[\]V`Y\ UggYhg\ UbX\ fY`UhYX\ UWWi\ a\ i`UhYX\ U\ a\ cfh]nUh]cb\ Zcf\ h\Y\ Z]gWU`\ mYUfg\ YbXYX\ BibY\ O-) /-/- k\ YfY\ Ug\ Zc``c\ k\ g7$ 

AbhUb[]VY 9ggYhg Fch KiV^YWh hc 9 a cfh]nUh]cb		
LfUXY a Uf_g UbX hfUXYbU a Yg	" 056	" 0/.
FYkgdUdYf aUgh\YUXg	/5/	/5.
A $a df$ ] $bhg$	/2-	//1
JUX]c VfcUXWUgh `]WYbgYg	.03	./.
LchU`]bhUb[]V`Y UggYhg bch giV^YWh hc U a cfh]nUh]cb	.)-24	614
AbhUb[]VY 9ggYhg KiV^YWh hc 9 a cfh]nUh]cb		
$HiV^{\ }[g]b[f][hg^{U'}]$	050	/3.
; $ighc a Yf fY^Uh]cbg \setminus ]dg^{kV'}$	364	314
$Gh \setminus Yf^{sh^{v}}$	1/	6
LchU`]bhUb[]V`Y UggYhg giV^YWh hc U a cfh]nUh]cb) bYh	.).//	6.4
LchU` AbhUb[]V`Y UggYhg) bYh	" /).46	" .)531

- &U' FYh cZ UWWi a i`UhYX U a cfh]nUh]cb cZ "/42 a]``]cb UbX "/2/ a]``]cb Ug cZ BibY 0-) /-/. UbX /-/-) fYgdYWh]j Y`m+ L\Y igYZi` `]j Yg cZ di V`]g\]b[ f][\hg fUb[Y Zfc a O hc O- mYUfg df] a Uf]`m VUgYX cb h\Y kY][\hYX\*Uj YfU[Y fY a U]b]b[ WcbhfUWhi U` hYf a g cZ h\Y ibXYf m]b[ di V`]g\]b[ WcbhfUWhg UbX h\Y ; c a dUbm|g Ygh] a UhYg cZ h\Y dYf]cX k]h\]b h\cgY hYf a g h\Uh h\Y UggYh ]g Y1dYWhYX hc [YbYfUhY U a U^cf]hm cZ ]hg Zihi fY WUg\  $\mathcal{T}$  c k g+
- &V' FYh cZ UWWi a i`UhYX U a cfh]nUh]cb cZ "360 a]``]cb UbX "26/ a]``]cb Ug cZ BibY 0-) /-/. UbX /-/-) fYgdYWh]jY`m+ L\Y igYZi`
  `]j Yg cZ Wighc a Yf fY`Uh]cbg\]dg fUb[Y Zfc a 0 hc /2 mYUfg+ L\Y igYZi``]j Yg cZ h\YgY UggYhg UfY Ygh] a UhYX Vm Udd`m]b[
  \]ghcf]WU` Uhhf]h]cb fUhYg UbX XYhYf a]b]b[ h\Y fYgi`h]b[ dYf]cX cj Yf k\]W\ U a U^cf]hm cZ h\Y UWWi a i`UhYX ibX]gWcibhYX WUg\
  Z`ckg fY`UhYX hc h\Y Wighc a Yf fY`Uh]cbg\]dg UfY Y1dYWhYX hc VY [YbYfUhYX+
- &W' FYh cZ UWWi a i`UhYX U a cfh]nUh]cb cZ "5. a]``]cb UbX "46 a]``]cb Ug cZ BibY O-) /-/. UbX /-/-) fYgdYWh]jY`m+ L\Y igYZi`
  `]j Yg cZ ch\Yf ]bhUb[]V`Y UggYhg fUb[Y Zfc a / hc .2 mYUfg+ L\Y igYZi``]j Yg fYdfYgYbh h\Y dYf]cXg cj Yf k\]W\ h\YgY ]bhUb[]V`Y UggYhg UfY Y1dYWhYX hc Wcbhf]VihY X]fYWh`m cf ]bX]fYWh`m hc h\Y; c a dUbm|g ZihifY WUg\ Z`ckg+

9 a cfh]nUh]cb Y1dYbgY fY`UhYX hc U a cfh]nUV`Y ]bhUb[]V`Y UggYhg kUg " . . / a ]``]cb UbX " . /3 a ]``]cb Zcf h\Y Z]gWU` mYUfg YbXYX BibY 0-) / - / . ) / - / - UbX / - . 6) fYgdYWh]jY`m+

 $: UgYX cb h\Y WiffYbh Uacibh cZ Uacfh]nUVY ]bhUb[]VY UggYhg) h\Y Ygh] a UhYX Uacfh]nUh]cb Y1dYbgY Zcf YUW\ cZ h\Y gi WWYYX]b[ Z]jY Z]gWU` mYUfg ]g Ug Zc``c kg7 /-// x ".0- a]``]cb8 /-/0 x "./1 a]``]cb8 /-/1 "..5 a]``]cb8 /-/2 x "..2 a]``]cb8 UbX /-/3 x "..0 a]``]cb+$ 

$L\Y \W \Ub[Yg ]b \h\Y \WUffm]b[ jU`iY cZ [ccXk]``) \Vm gY[ a Ybh) \UfY \Ug \Zc``c kg7$				

$L\Y\ ; c\ a\ dUbm g\ hchU^\ Veffc\ k\]b\[g\ Webg\]gh\ eZ\ h\Y\ Zc``c\ k\]b\[7]$					

; c a dUbm a Um fYXYY a id hc 1- # cZ h\Y U[[fY[UhY df]bW]dU` U a c i bh cZ h\Y /-/. KYb]cf F chYg k]h\ h\Y bYh WUg\ dfcWYYXg cZ WYfhU]b Ye i]hm cZZYf]b[g Uh h\Y fYXY a dh]cb df]WY gYh Zcfh\ ]b h\Y AbXYbhifY) d`ig Ubm UWWfiYX UbX ibdU]X ]bhYfYgh+ Ab h\Y Yj Ybh cZ gdYW]Z]YX W\Ub[Y cZ Wcbhfc` Yj Ybhg) h\Y ; c a dUbm a igh cZZYf hc difW\UgY h\Y c ihghUbX]b[ /-/. KYb]cf F chYg Zfc a h\Y \c`XYfg Uh U difW\UgY df]WY Ye iU` hc .-. #

# $A \setminus TTHY$ VM SLHZLZ

; YfhU]b cZ hY;  $cadUbm|g YUgYg]bW^iXY fYbh UX^igh a Ybhg k]W a Um VY]bXY1YX hc jUf]cig a Yhf]Wg] ]bW^iX]b[ hY Wcbgi a Yf df]WY] ]bXY1 cf chYf]bZ^Uh]cbUfm]bXY1Yg+ 9g U [YbYfU^ a UhhYf) hY ; <math>cadUbm|g fYU^ YghUhY YUgY UffUb[YaYbhg hmd]WU^m fYei]fYUX^igh a Ybhg fYgi^h]b[ Zfc a WVb[Yg]b fYU^ YghUhY hU1Yg UbX chYf Wcghg hc cdYfUhY hY YUgYX UggYh+$ 

# $= [OLY YLX \setminus PYLK SLHZL KPZJSVZ \setminus YLZ]$

L\Y hchU` `YUgY Wcgh Zcf cdYfUh]b[ UbX Z]bUbWY `YUgYg ]bW` i XYX ]b h\Y KhUhY a Ybhg cZ GdYfUh]cbg kUg Ug Zc``c kg7

			_
GdYfUh]b[`YUgY Wcghg	KY``]b[) [YbYfU` UbX UX a]b]ghfUh]jY	" .02	" .06
GdYfUh]b[ `YUgY Wcghg	GdYfUh]b[YldYbgYg	04	31
>]bUbWY`YUgY Wcghg	<ydfyw]uh]cb a="" cfh]nuh]cb<="" td="" u="" ubx=""><td>/4</td><td>3</td></ydfyw]uh]cb>	/4	3
>]bUbWY`YUgY Wcghg	AbhYfYgh Y1dYbgY) bYh	1	
K\cfh hYf a `YUgY Wcghg	GdYfUh]b[YldYbgYg	.2	6
NUf]UV`Y `YUgY Wcghg	KY``]b[) [YbYfU` UbX UX a ]b]ghfUh]jY	/5	1.
LchU` `YUgY Wcghg		" /13	" /3-

 $9\,XX]h]cbU`]bZcf\,a\,Uh]cb\,fY`UhYX\,hc\,h\Y\ ;\,c\,a\,dUbm|g\,cdYfUh]b[\,\,UbX\,\,Z]bUbWY\,`YUgYg\,\,i\,bXYf\,\,9\,KM\,\,/\,-\,.\,3^*-/7\,\,L^2$ 

$OY][\hYX*UjYfU[YfYaU]b]b[\YUgYhYfa$	+5 mYUfg	O+4 mYUfg	./+/ mYUfg	1+4 mYUfg
OY][\hYX*UjYfU[Y]bWfYaYbhU\Vcffck]b[fUhY	0+21 #	0+31 #	0+16 #	0+31 #

> i h i fY  $\,$  a ]b] a i a `YUgY dUm a Ybhg Ug cZ B i bY 0-) /-/ . UfY Ug Zc``c k g7

>]gWU^ /-//	"	.52	"	0.
$>$ ]gWU $^{\prime}$ /-/0		.4.		/6
>]g\U\ /-/1		.23		/6
>]g\U\ /-/2		.10		.4
>]gWU^ /-/3		./4		X
$L \setminus YfYUZhYf$		45-		X
LchU ZihifY a]b]aia `YUgY dUmaYbhg	"	.)23/	"	3
DYgg <sup>7</sup> ]bhYfYgh		&O-O'		&3'
HfYgYbh jU iY cZ a]b]a i a dUm a Ybhg	"	.)/26	"	

MbXYf 9K; 5/-) WYfhU]b UggYhg UbX`]UV]`]h]Yg UfY fYei]fYX hc VY fY a YUgifYX hc ZU]f jU`iY Uh h\Y YbX cZ YUW\ fYdcfh]b[ dYf]cX+ L\Y Zc``ck]b[ hUV`Y gi a a Uf]nYg h\cgY UggYhg UbX`]UV]`]h]Yg a YUgifYX Uh ZU]f jU`iY cb U fYWiff]b[ VUg]g7

9 ggYhg7																
;fcgg*WiffYbWm]bhYfYghfUhY XYf]jUh]jYgxZU]fjU`iY \YX[Yg	"	X	"	.5	"	X	"	.5	"	X	,,	/1	"	X	"	/1
; fcgg*WiffYbWm ]bhYfYgh fUhY XYf]jUh]jYg x WUg\Z`ck \YX[Yg		X		X		Х		X		X		65		X		65
; fcgg*WiffYbWm ]bhYfYgh fUhY XYf]jUh]jYg <sup>&amp;U'</sup>		x		40		X		40		X		X		X		X
$=ei]hm gYWif]h]Yg^{\&V'}$		.31		X		3		/5-		21		X		./0		.44
LchU`UggYhg	"	.31	"	6.	"	3	"	04.	"	21	"	.//	"	./0	"	/66
D]UV]`]h]Yg7																
$\begin{array}{c} > cfY] \hbox{ [b WiffYbWm XYf]jUh]jYg x} \\ \text{WUg} \backslash \hbox{ $\mathcal{T}$ ck } \backslash YX \hbox{ [Yg} \end{array}$	"	x	"	X	"	X	"	X	"	X	"	0	"	X	"	0
$ \begin{array}{c} {\it AbhYfYgh\ fUhY\ XYf]j\ Uh]j\ Yg\ x\ WUg \setminus \\ {\it Z\ ck\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $		X		6		X		6		X		.3		X		.3
; fcgg*WiffYbWm ]bhYfYgh fUhY XYf]jUh]jYg x WUg\Zck \YX[Yg		X		X		X		X		X		.5		x		.5
; fcgg*WiffYbWm ]bhYfYgh fUhY XYf]jUh]jYg <sup>&amp;U'</sup>		x		.0		Х		.0		Х		X		Х		X
LchU``]UV]`]h]Yg	"	X	"	//	"	X	"	//	"	X	"	04	"	X	"	04

<sup>&</sup>amp;U' L\Y ; c a dUbm XYhYf a ]bYX h\Uh ]hg Wfcgg\*WiffYbWm ]bhYfYgh fUhY XYf]jUh]jYg UfY bc `cb[Yf Wcbg]XYfYX \][\`m YZZYWh]jY Ug cZ <YWY a VYf 0.) /-/- df] a Uf]`m XiY hc W\Ub[Yg ]b ZcfY][b Y1W\Ub[Y UbX ]bhYfYgh fUhYg+

 $< if]b[ h\Y h\fYY a cbh\g YbXYX < YWY a VYf 0.) /-/-) h\Y ; c a dUbm fYW`Ugg]Z]YX ]hg ]bj Ygh a Ybh ]b LfY a cf Zfc a DYjY` 0 hc DYjY` . k ]h\Jb h\Y ZU]f jU`iY \]YfUfW\m) Ug h\Y gU`Y fYghf]Wh]cbg UfY Y1dYWhYX hc `UdgY k ]h\]b ./ a cbh\g+$ 

 $L\Y\ZU]f\ j\U^i\Yg\ cZ\ Yei\]hm\ gYWif\]h]Yg\ k\]h\ \ eichYX\ df]WYg\ ]b\ UWh\]j\Ya\ u\Uf\YYhYf\ a\]bYX\ VUgYX\ cb\ h\Y\ W^cg\]b\ [\ df]WY\ Uh\ h\Y\ YbX\ cZ\ YUW\ fYdcfh]b[\ dYf]cX+\ L\YgY\ gYWif\]h]Yg\ UfY\ W^Ugg\]Z]YX\ Ug\ DYj\Y^.\ .\]b\ h\Y\ ZU]f\ j\U^i\Y\ JYfUfW\m\ cih^]bYX\ UVcj\Y+\ L\Y\ ZU]f\ j\U^i\Yg\ cZ\ Yei\]hm\ gYWif\]h]Yg\ k\]h\cih\ fYUX]^m\ XYhYf\ a\]bUV^Y\ ZU]f\ a\ Uf\_YhYf\ a\]bYX\ VUgYX\ cb\ Wcgh)\ Ygg\ Ubm\ ]\ a\ UJ\ f\ g\ a\ Ybh\ cZ\ h\YgUb\ [Yg\ b\ gYWif\]h]Yg\ UfY\ W^Ugg\]Z]YX\ Ug\ DYj\Y^O\]b\ h\Y\ ZU]f\ j\U^i\Y\ JYfUfW\m\ cih^]bYX\ UVcj\Y+$ 

<sup>&</sup>amp;V' KYY FchY 3 x Ab j Ygh a Ybhg+

 $9\ fc``Zcfk\,UfX\ cZ\,h\Y\ ;c\ a\ dUbm\g\ Ye\,i\ Jhm\ gYW\,i\,f]h]Yg\ W`Ugg]Z]YX\ Ug\ DY\,j\,Y`\ 0\ ]g\ Ug\ Zc``c\,k\,g7$ 

 $\begin{tabular}{ll} $$ /-/.) $ h(Y; c a dUbm Ygh] a UhYg h(Uh Uddfc1] a UhYm ". a]``]cb cZ bYh XYf]jUh]jY `cggYg fY`UhYX hc ]hg ZcfY][b WiffYbWm WcbhfUWh XYf]jUh]jY WUg(Zck \YX[Yg]bW`iXYX]b 9 WWi a i`UhYX ch\Yf Wc a dfY\Ybg]jY `cgg k]`` VY fYW`Ugg]Z]YX ]bhc h\Y KhUhY a Ybhg cZ GdYfUh]cbg k]h\]b h\Y bYlh ./ a cbh\g+ \\ a cbh\g+ \\ \end{tabular} \]$ 

# 1 HZO MSV^ KLYP JH/P JLZ

l a HhV

# 4HPY JHS\L OLKNLZ

 $L\Y hchU` bch]cbU` jU`iY cZh\Y ZU]f jU`iY \YX[Yg kUg Uddfc1] a UhY`m "4-a]``]cb Ug cZ BibY 0-) /-/.+L\Y a U1] a i a \YX[YX hYf a cjYf k\]W\ h\Y ; c a dUbm ]g \YX[]b[ Y1dcgifY hc jUf]UV]`]hm ]b ]bhYfYgh dUm a Ybhg ]g hc Bi`m /-/1+$ 

<iif]b[ Z]gWU^ /-/.) /-/- UbX /-.6) h\Y U a c i bh fYWc[b]nYX ]b h\Y KhUhY a Ybhg cZ GdYfUh]cbg cb XYf]jUh]jY ]bghfi a Ybhg XYg][bUhYX Ug ZU]f jU^iY \YX[Yg fY^UhYX hc h\Y ]bYZZYWh]jY dcfh]cb k Ug b] UbX h\Y ; c a dUbm Y1W^iXYX h\Y WiffYbWm VUg]g Zfc a h\Y W\Ub[Yg ]b ZU]f jU^iY cZ h\Y XYf]jUh]jY ]bghfi a Ybhg Zfc a h\Y UggYgg a Ybh cZ \YX[Y YZZYWh]jYbYgg+</pre>

L Y Z C c k b [gYhg Z c fh h Y YZZYWh c Z Z U] f j U i Y YX [b [fY Uh] c b YX [YX ] h Y a g ] b h Y : U UbWY K YYhg Ug c Z B i b Y O -) / -/. UbX / -/ -7

: cffc k ]b[g7			
;Uffm]b[UacibhcZ\YX[YX]hYa	"	4. "	4.
; i a i`Uh]jY \YX[]b[ UX^igh a Ybhg ]bW`iXYX ]b h\Y WUffm]b[ U a c i bh		2	3

Ab UXX]h]cb hc UggYhg UbX `]UV]`]h]Yg h\Uh UfY fY a YUgifYX Uh ZU]f jU`iY cb U fYWiff]b[ VUg]g) h\Y ; c a dUbm \Ug WYfhU]b UggYhg) df] a Uf]`m [ccXk]``) ]bhUb[]V`Y UggYhg) Yei]hm a Yh\cX ]bjYgh a Ybhg UbX dfcdYfhm) d`Ubh UbX Yei]d a Ybh) h\Uh UfY bch fYei]fYX hc VY fY a YUgifYX hc ZU]f jU`iY Uh h\Y YbX cZ YUW\ fYdcfh]b[ dYf]cX+ Gb Ub cb[c]b[ VUg]g) h\Y ; c a dUbm a cb]hcfg k\Yh\Yf YjYbhg cWWif cf W]fWi a ghUbWYg W\Ub[Y h\Uh kci`X a cfY`]\_Y`m h\Ub bch fYXiWY h\Y ZU]f jU`iYg cZ h\YgY UggYhg VY`ck h\Y]f WUffm]b[ U a cibhg+ AZ h\Y ; c a dUbm XYhYf a ]bYg h\Uh h\YgY UggYhg UfY] a dU]fYX) h\Y ; c a dUbm kci`X kf]hY Xckb h\YgY UggYhg hc ZU]f jU`iY+ L\YgY bcbfYWiff]b[ ZU]f jU`iY a YUgifY a Ybhg UfY Wcbg]XYfYX hc VY DYjY`O]b h\Y ZU]f jU`iY\]YfUfW\m+

 $< if]b[ h\Y Zcifh\ eiUfhYf cZ Z]gWU^{-/-}h\Y ; cadUbm fYWc[b]nYX bcb*WUg\] adU]f aYbh W\Uf[Yg cZ ''/-0 a]``]cb fY`UhYX hc Z]1YX UggYhg ]b h\Y M+C+ UbX 9 ighfU`]U+ KYY FchY 4 x HfcdYfhm) H`Ubh UbX =ei]d aYbh+L\Y WUffm]b[ jU`iYg cZ dfcdYfhm) d`Ubh UbX Yei]d aYbh giVgYeiYbh hc h\Y ] adU]f aYbh W\Uf[Yg Uh h\Y 9 ighfU`]Ub UbX M+C+ bYkgdUdYfg fYdcfh]b[ ib]hg kYfY ''/02 a]``]cb UbX '''/-4 a]``]cb) fYgdYWh]jYm+$ 

 $< if]b[ h\Y h\]fX e i UfhYf cZ Z]gWU^{-/-/} h\Y ; c a dUbm fYWc[b]nYX bcb*WUg\] a dU]f a Ybh W\Uf[Yg cZ "55/ a]``]cb UbX "16 a]``]cb fY`UhYX hc [ccXk]`` UbX ]bXYZ]b]hY*`]jYX ]bhUb[]V`Y UggYhg) fYgdYWh]jY`m) Uh ]hg >c1hY` fYdcfh]b[ ib]h+ L\Y WUffm]b[ jU`iY cZ [ccXk]`` Uh >c1hY` XYWfYUgYX Zfc a ".)335 a]``]cb hc "453 a]``]cb UbX h\Y jU`iY cZ ]bXYZ]b]hY*`]jYX ]bhUb[]V`Y UggYhg XYWfYUgYX Zfc a ".56 a]``]cb hc ".1- a]``]cb+ KYY FchY 5 x ?ccXk]`` UbX Gh\Yf AbhUb[]V`Y 9ggYhg+$ 

 $< if]b[ h\Y Z]fgh e i UfhYf cZ Z]gWU^{-/-} h\Y ; c a dUbm fYWc[b]nYX bcb*WUg\] a dU]f a Ybh W\Uf[Yg cZ ".// a]^`]cb UbX "..0 a]^`]cb fY`UhYX hc [ccXk]^` UbX ]bXYZ]b]hY*^]jYX ]bhUb[]V`Y UggYhg) fYgdYWh]jY`m) Uh h\Y FYkg 9 a Yf]WU EUf_Yh]b[ fYdcfh]b[ ib]h+ L\Y WUffm]b[ jU`iY cZ [ccXk]^` Uh FYkg 9 a Yf]WU EUf_Yh]b[ XYWfYUgYX Zfc a ".// a]^`]cb hc b]^ UbX h\Y jU`iY cZ ]bXYZ]b]hY*^]jYX ]bhUb[]V`Y UggYhg XYWfYUgYX Zfc a "0-5 a]^`]cb hc ".62 a]^`]cb+ KYY FchY 5 x ?ccXk]^` UbX Gh\Yf AbhUb[]V`Y 9ggYhg+$ 

9 g cZ BibY O-) /-/.) h\Y WUffm]b[ jU`iY cZ h\Y ; c a dUbm|g cihghUbX]b[ Vcffck]b[g Uddfc1] a UhYg h\Y ZU]f jU`iY+L\Y /-/. KYb]cf FchYg UbX h\Y M+K+ df]jUhY d`UWY a Ybh Vcffck]b[g UfY W`Ugg]Z]YX Ug DYjY` / UbX h\Y fY a U]b]b[ Vcffck]b[g UfY W`Ugg]Z]YX Ug DYjY` O |b h\Y ZU]f jU`iY \]YfUfW\m+

 $AOHYLZ = \\ [Z[HUKPUN \times 9g \text{ cZ BibY } 0-) /-/.) \text{ h/Y }; \text{ ca dUbm } \text{ UX Uddfc1} \text{ a UhY`m } 06. \text{ a }]``] \text{ cb g} \text{ UfYg cZ }; \text{ `Ugg } 9 \text{ ; ca a cb KhcW\_cihghUbX]b}[ \text{ Uh U dUf jU iY cZ "-+-. dYf g} \text{ UfY UbX Uddfc1} \text{ a UhY`m } /-- \text{ a }]``] \text{ cb g} \text{ UfYg cZ }; \text{ `Ugg }: \text{ ; ca a cb KhcW\_cihghUbX]b}[ \text{ Uh U dUf jU iY cZ "-+-. dYf g} \text{ UfYy bX Uddfc1} \text{ a UhY`m } /-- \text{ a }]``] \text{ cb g} \text{ UfYg cZ }; \text{ `Ugg }: \text{ ; ca a cb KhcW\_cihghUbX]b}[ \text{ Uh U dUf jU iY cZ "-+-. dYf g} \text{ UfYy } 9g \text{ cZ BibY } 0-) /-/.) \text{ h/Y }; \text{ ca dUbm } \text{ UX bc g} \text{ UfYg cZ KYf]Yg }; \text{ ca a cb KhcW\_cf HfYZYffYX KhcW\_cihghUbX]b}[ +-- \text{ check } \text{ under the check } \text{ check } \text{ under the check } \text{ under$ 

 $2PJPKLUKZ\ c\ L\Y\ Zc``c\ k\]b\[hUV`Y\ gi\ a\ a\ Uf]nYg\ h\Y\ X]j\]XYbXg\ XYW`UfYX\ UbX\ dU]X\ dYf\ g\UfY\ cb\ Vch\ h\Y\ ; c\ a\ dUbm\|g\ ;`Ugg\ 9\ ; c\ a\ a\ cb\ KhcW_UbX\ ;`Ugg\ :\ ; c\ a\ a\ cb\ KhcW_7$ 

# ; Ug\X] j |XYbXg dU|X dYf g\UfY

 $i c\t h\t h\t C$ 

L\Y h] a ]b[) XYW`UfUh]cb) U a c i bh UbX dUm a Ybh cZ ZihifY X]j]XYbXg hc ghcW\_\c`XYfg) ]Z Ubm) ]g k ]h\]b h\Y X]gWfYh]cb cZ h\Y; c a dUbm|g: cUfX cZ <]fYWhcfg &h\Y y: cUfX cZ <]fYWhcfgz'+ L\Y: cUfX cZ <]fYWhcfg|XYW]g]cbg fY[UfX]b[h\Y dUm a Ybh cZ ZihifY X]j]XYbXg k]`` XYdYbX cb a Ubm ZUWhcfg) ]bW`iX]b[h\Y; c a dUbm|g Z]bUbW]U` WcbX]h]cb) YUfb]b[g) WUd]hU` fYei]fY a Ybhg UbX XYVh

ZUW]`|hm WcjYbUbhg) ch\Yf WcbhfUWhiU` fYghf|Wh|cbg) Ug kY`` Ug `Y[U` fYei]fY a Ybhg) fY[i`Uhcfm WcbghfU]bhg) ]bXighfm dfUWh]WY) a Uf Yh

 $DV[PUN @PNO[Z \times @c`XYfg \ cZ \ h\ Y \ ; \ c \ a \ dUbm\ | g \ ; \ Ugg \ 9 \ ; \ c \ a \ a \ cb \ KhcW\_UfY \ Ybh]h`YX \ hc \ j \ chY \ cb`m \ ]b \ h\ Y \ ]a \ ]hYX \ W]fWi \ a \ ghUbWYg \ gYh \ Zcfh\ ]b \ h\ Y \ ; \ c \ a \ dUbm\ | g \ ; \ Ugg \ 2 \ h\ Y \ ; \ c \ a \ dUbm\ | g \ ; \ Ugg \ 2 \ h\ Y \ ; \ c \ a \ dUbm\ | g \ ; \ Ugg \ 2 \ h\ Y \ y; \ UfhYfz'+ @c`XYfg \ cZ \ h\ Y \ ; \ c \ a \ dUbm\ | g \ ; \ Ugg \ 2 \ ; \ c \ a \ a \ cb \ KhcW\_UfY \ Ybh]h`YX \ hc \ cbY \ j \ chY \ cZ \ fYWcfX \ cb \ U` \ a \ UhYfg \ giV \ a \ ]hhYX \ hc \ U \ j \ chY \ cZ \ fYWcfX \ cb \ U` \ a \ UhYfg \ giV \ a \ ]hhYX \ hc \ U \ j \ chY \ ghcW\_\ c`XYfg+$ 

L\Y Zc``ck]b[ hUV`Y gi a aUf]nYg h\Y	; c a dUbm g Yei]hm*VUgYX	Wc a dYbgUh]cb Y1dYbgY fY	dcfhYX ]b h\Y KhUhY a Ybhg	cZ GdYfUh]cbg7

### ; FSTRJDTFE <TODK >NJTS

 $J \ KMg \ UfY \ [fUbhg \ h\ Vh \ Ybh]h`Y \ h\ Y \ c`XYf \ hc \ g\ UfYg \ cZ \ h\ Y \ ; c \ a \ dUbm\ | g \ ; `Ugg \ 9 \ ; c \ a \ a \ cb \ KhcW\_ \ cf \ h\ Y \ WUg\ Yei]j\ U`iY \ cZ \ gi \ W \ g\ UfYg \ L\ Y \ ZU]f \ jU`iY \ cZ \ J \ KMg \ ]g \ VUgYX \ i \ dcb \ h\ Y \ ZU]f \ a \ Uf\_Yh \ jU`iY \ cZ \ h\ Y \ g\ UfYg \ i bXYf \ m]b[\ h\ Y \ U k \ UfXg \ cb \ h\ Y \ [fUbh \ XUhY \ UbX \ Y1dYbgYX \ ig]b[\ U \ ghfU][\ h*']bY \ a \ Yh\ cX \ cj Yf \ h\ Y \ Udd`]WUV`Y \ j \ Ygh]b[\ dYf]cX+ \ 9 \ bm \ dYfgcb \ k\ c \ c`Xg \ J \ KMg \ g\ U`` \ UjY \ bc \ ck \ bYfg\ ]d \ ]bhYfygh \ ]bhY \ g\ UfYg \ cf \ WUg\ h\ Y \ h\ Y \ c`XYf+ = UW\ J \ KM \ ]g \ Ybh]h`YX \ hc \ fYWY]j \ YX]j \ XYbX \ Yei]jU`Ybhg \ Zcf \ YUW\ fY[\ i`Uf \ WUg\ X]j \ XYbX \ cb \ h\ Y \ ; `Ugg \ 9 \ ; c \ a \ a \ cb \ KhcW\_ \ dU]X \ Vm \ h\ Y \ ; c \ a \ dUbm \ Xif]b[\ h\ Y \ Uk \ UfX \ dYf]eX) \ gi \ V^YWh \ hc \ h\ Y \ gUa \ Y \ h\ f \ a \ g \ UbX \ WcbX]h]cbg \ Ug \ Udd`m \ hc \ h\ Y \ ibXYf`m]b[\ Uk \ UfX+$ 

 $< if]b[\ Z]gWU^{`}/-/.)/-/-\ UbX/-.6)\ WYfhU]b\ dUfh]w]dUbhg]\ b\ h\ Y/-.0\ DLAH\ fYWY]jYX \ [fUbhg\ cZ\ h\ Y\ Uk\ UfXg]g\ giV^YWh\ hc\ h\ Y\ dUfh]w]dUbhg|\ Wcbh]biYX\ gYfj]wY\ k\ h\ h\ h\ Y\ ;\ c\ a\ dUbm\ h\ fci\ [\ h\ Y\ Udd^]wUV^Y\ jYgh]b[\ XUhY+<if]b[\ h\ Y\ Z]gWU^MYUfg\ YbXYX\ BibY\ 0-)/-/.)/-/- UbX\ /-.6)\ 0+1\ a\ ]^`]cb\ UbX\ .+.\ a\ ]^`]cb\ JKMg)\ fYgdYwh]jY^m)\ k\ YfY\ [fUbhYX\ hc\ dUfh]w]dUbhg+\ GZ\ h\ Y\ Uk\ UfXg\ [fUbhYX\ Xif]b[\ Z]gWU^/-/-. UbX\ Z]gWU^/-/-)\ Uddfcl]\ a\ UhY^m\ .+-\ a\ ]^`]cb\ UbX\ -+6\ a\ ]^`]cb\ JKMg)\ fYgdYwh]jY^m)\ k\ YW\ [fUbhYX\ hc\ Y\ a\ d^cmYYg\ ]b\ WYfhU]b\ ZcfY][b\ cwUh]cbg)\ k\ J^``\ YY\ gYhh`YX\ ]b\ WUg\ )\ k\ h\ h\ Y\ Y\ a\ U]b]b[\ JKMg\ c\ ihghUbX]b[\ VY]b[\ gYhh`YX\ ]b\ ;\ Ugg\ 9\ ;\ c\ a\ a\ c\ KhcW_+\ L\ YgY\ JKMg\ UjY\ [fUXYX\ jYgh]b\ [\ df]\ a\ Uf]^m\ c\ jYf\ h\ YY\ mYUfg+$ 

<if]b[ Z]gWU` /-/.) Uddfc1] a UhY`m .+3 a ]``]cb J KMg j YghYX) cZ k \]W\ Uddfc1] a UhY`m -+0 a ]``]cb J KMg k YfY gYhh`YX ]b WUg\ Zcf Uddfc1] a UhY`m "1 a ]``]cb VYZcfY ghUhihcfm hU1 k]h\\c`X]b[g+

 $L\Y\Zc``c\k\]b[\hUV`Y\gi\ a\ a\Uf]nYg\h\Y\UWh]j]hm\ fY`UhYX\hc\h\Y\hUf[Yh\ HKMg\ UbX\ J\KMg\ [fUbhYX\hc\ dUfh]W]dUbhg\h\Uh\k\]``\ VY\ gYhh`YX\]b g\UfYg\ cZ\h\Y\ ; c\ a\ dUbm\ \&HKMg\ UbX\ J\KMg\]b\ h\cigUbXg'7$ 

:<>S BNE ;<>S						
$MbjYghYXib]hgUhVY[]bb]b[cZh\backslash YmYUf$	4)4.4 "	.0+06	)/5-	" .0+4-	6)01.	" .1+21
? fUbhYX <sup>&amp;U'</sup>	0)213	.2+26	1)135	./+46	2)112	./+65
NYghYX <sup>&amp;V'</sup>	&0)343'	.0+0-	&2)232'	.1+./	&0)201'	.1+4/
; UbWY``YX <sup>&amp;W'</sup>	&232'	.2+-2	&.)133'	+64	&64/'	.1+-/
$MbjYghYXib]hgUhh\backslash YYbXcZh\backslash YmYUf$	4)-// "	. 1+3.	4)4.4	" .0+06	)/5-	" .0+4-

- &U' > cf Z]gWU^ /-/.) ]bW`iXYg -+5 a ]``]cb hUf[Yh HKMg UbX /+1 a ]``]cb J KMg [fUbhYX UbX U dUmcih UX^igh a Ybh cZ -+0 a ]``]cb HKMg XiY hc h\Y UWhiU` dYfZcf a UbWY `YjY` UW\]YjYX Zcf HKMg [fUbhYX ]b Z]gWU^ /-.5 h\Uh jYghYX Xif]b[ Z]gWU^ /-..+
  - $> cf \ Z]gWU^-/-/-) \ ]bW^i XYg .+. \ a ]``]cb \ hUf [Yh HKMg \ UbX \ 0+0 \ a ]``]cb \ J KMg \ [f UbhYX \ UbX \ U \ dUmcih \ UX^igh a \ Ybh \ cZ -+. \ a ]``]cb \ HKMg \ XiY \ hc \ h\Y \ UWhiU^ \ dYfZcf a \ UbWY \ Yj Y` \ UW\]Yj YX \ Zcf \ HKMg \ [f UbhYX \ ]b \ Z]gWU^-/-.6 \ h\ Uh \ j \ YghYX \ Xif]b[\ Z]gWU^-/-/-+$
  - >cf Z]gWU^ /-.6) ]bW^iXYg 0+5 a ]``]cb hUf[Yh HKMg UbX .+. a ]``]cb J KMg [fUbhYX UbX U dUmcih UX^igh a Ybh cZ -+2 a ]``]cb HKMg XiY hc h\Y UWhiU^ dYfZcf a UbWY `YjY` UW\]YjYX Zcf HKMg [fUbhYX ]b Z]gWU^ /-.5 h\Uh jYghYX Xif]b[ Z]gWU^ /-.6+
- &V' L\Y ZU]f jU`iY cZ HKMg UbX J KMg \Y`X Vm dUfh]W]dUbhg h\Uh jYghYX Xif]b[ h\Y Z]gWU` mYUfg YbXYX BibY 0-) /-/. UbX /-.6 kUg "16 a]``]cb) "46 a]``]cb UbX "2/ a]``]cb) fYgdYWh]jY`m+
- &W' >cf Z]gWU` /-/.) ]bW`iXYg -+0 a]``]cb cZ hUf[Yh HKMg UbX -+0 a]``]cb J KMg WUbWY``YX+
  - >cf Z]gWU^ /-/-) ]bW^iXYg -+1 a ]``]cb cZ hUf[Yh HKMg UbX -+4 a ]``]cb J KMg WUbWY`YX UbX U dUmcih UX^igh a Ybh cZ -+1 a ]``]cb HKMg XiY hc h\Y UWhiU^ dYfZcf a UbWY `YjY` UW\]YjYX Zcf HKMg [fUbhYX]b Z]gWU^ /-.4 h\Uh jYghYX Xif]b[ Z]gWU^ /-/-+
  - >cf Z]gWU^ /-.6) ]bW^iXYg -+3 a ]``]cb cZ hUf[Yh HKMg UbX -+. a ]``]cb J KMg WUbWY``YX UbX U dUmcih UX^igh a Ybh cZ -+0 a ]``]cb HKMg XiY hc h\Y UWhiU^ dYfZcf a UbWY `YjY` UW\]YjYX Zcf HKMg [fUbhYX]b Z]gWU^ /-.3 h\Uh jYghYX Xif]b[ Z]gWU^ /-.6+

 $L\Y\Zc``c\ k\]b\[\ h\UV`Y\ g\ i\ a\ a\ Uf]nYg\ ]bZcf\ a\ Uh]cb\ UVc\ i\ h\ ghc\W\_\ cdh]cb\ hfUbgU\Wh]cbg\ Zcf\ h\Y\ Y\ a\ d\cmYY\ ghc\W\_\ cdh]cb\ d\Ubg\ \&cdh]cbg\ ]b\ h\c\ i\ g\UbXg\ '7$ 

$GihghUbX]b[Uhh\YVY[]bb]b[cZh\YmYUf$	/0/	" 5+12	002	" 5+-1	140	" 4+3.
=1YfW]gYX	&.2-'	5+32	åO'	5+/2	&.03'	3+25
; UbWY``YX	X	X	X	X	&/'	2+6-
GihghUbX]b[ Uh h\Y YbX cZ h\Y mYUf <sup>MU'</sup>	5/	" 5+	/0/	" 5+12	002	" 5+-1
$= 1  YfW]gUV`Y Uh h \setminus Y YbX cZ h \setminus Y mYUf^{kU`}$	5/		/0/		002	

 $L \ Y \ Zc``c \ k \ ] b \ [ \ hUV`Y \ gYhg \ Zcfh \ h \ Y \ U \ a \ c \ i \ bh \ cZ \ fYWY] j \ UV`Yg \ X \ i \ Y \ Zfc \ a \ UbX \ dUmUV`Yg \ X \ i \ Y \ hc \ fY`UhYX \ dUfh] Yg \ c \ i hghUbX] b \ [ \ cb \ h \ Y \ : U`UbWY \ K \ YYhg7$ 

9 WWcibhg fYWY]jUV`Y Zfca fY`UhYX dUfh]Yg	"	5 "	1
9 WWc i bhg dUmUV`Y hc fY`UhYX dUfh]Yg		/	1

 $\begin{tabular}{ll} $WUbbch dfYX]Wh $$k \Uh $h Y Y j Ybh i U^c i h Wc a Y c Z d Yb X]b[ a Uhh Y fg k]^* V Y c f $h Y h ] a ]b[ c Z h Y i^h] a Uh Y f Ygc^i h] c b C Z h YgY a Uhh Y fg + > YYg) Y 1 d Ybg Yg) Z ]b Yg) d Yb U^h ] Yg) ^i X [ a Ybhg c f g Yhh Y a Ybh Wcghg k \ ]W\ a ][ \h VY ]b Wiff YX V m h Y ; c a d Ubm ]b Wcbb Y Wh]c b k ]h \ h Y j Uf ]c ig d f c W Y Y X ]b [ g W c i X U X j Y f g Y m U Z Z Y Wh ] hg f Yg i hg c Z c d Y f Uh ] c bg Ub X Z ]b Ub W ]U^W b X Z ]b Ub W ]U^h C b X |h C b Y h Y g Y h Y$ 

# <L^Z / TLYPJH ; HYRL[PUN]

Ab EUm/-/-)hY; cadUbm gc'X ]hg FYkg 9 a Yf]WU  $EUf_Yh]b[Vig]bYgg+AbhY<-]gdcg]h]cb)hY; cadUbm fYhU]bYX WYfhU]b']UV]']h]Yg)]bW'iX]b[h\cgYUf]g]b[ZfcahY'Y[U'dfcWYYX]b[gk]h\Abg][b]UUbX NU'Ugg]g XYgWf]VYX VY'ck+$ 

# 7UZPNUPH A`Z[LTZ\$ 7UJ&

Gb Bi`m . . ) / - . 6) Abg][b]U Z]`YX U Wc a d`U]bh ]b h\Y M+K+ < ]ghf]Wh ; cifh Zcf h\Y < ]ghf]Wh cZ E]bbYgchU U[U]bgh FYkg 9 a Yf]WU EUf\_Yh]b[ Ab\*KhcfY KYfj]WYg D+D+; + &yF9 E Ab\*KhcfYz' UbX FYkg ; cfdcfUh]cb &hc[Yh\Yf) h\Y yF9 E HUfh]Ygz' U``Y[]b[ j]c`Uh]cbg cZ ZYXYfU` UbX ghUhY Ubh]hfigh `Ukg UbX Wc a a cb `Uk Vig]bYgg hcfhg+L\Y Wc a d`U]bh gYY\_g hfYV`Y XU a U[Yg) ]b^ibWh]j Y fY`]YZ UbX UhhcfbYmg| ZYYg UbX Wcghg+ Gb 9 i [ igh . 1) / - . 6) h\Y F9 E HUfh]Yg Ubg k YfYX h\Y Wc a d`U]bh UbX UggYfhYX U Wc ibhYfW`U] a U[U]bgh Abg][b]U Zcf VfYUW\ cZ WcbhfUWh) U``Y[]b[ h\Uh Abg][b]U j]c`UhYX U df]cf

# $C\&9\&< L^ZWHWLY$ ; H[[LYZ]]

# <UMMBRY OG OUNEFE <TBTUS

					_											
			_				_									
Gh\Yf bcb*WiffYbh UggYhg	"	X	"	X	"	./-	"	61	"	X	"	X	"	./-	"	61
Gh\Yf WiffYbh`]UV]`]h]Yg		&.'		X		&/'		&/'		&5'		å6'		&'		å'
J Yh]fY a Ybh VYbYZ]h cV`][Uh]cbg		&20'		å62'		&5 - '		&5/'		&45'		å'		&/'		&/44'
FYh U a c i bh fYWc[b]nYX	"	&21'	"	å62'	"	05	"		"	å53'	"	å6'	"	å/'	"	&.61'

 $L\Y\Zc``c\ k\]b\[\ h\UV\Y\ g\Yhg\ Zcfh\ h\Y\ W\Ub\[Y\]b\ h\Y\ dfc^Y\WhYX\ V\YbYZ]h\ cV`]\[Uh\]cb)\ W\Ub\[Y\]b\ h\Y\ ZU\]f\ j\ U`i\ Y\ cZ\ h\Y\ ; c\ a\ dUbm\|g\ d`Ub\ Ugg\Yhg\ UbX\ Zi\ b\XYX\ ghUh\ i\ g\?$ 

LchU`

<b>‰</b> ‰
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Hfc^YWhYX VYbYZ VY[]bb]b[ cZ	]h cV`][ h\Y mYU	[Uh]cb) Jf	,,	020	"	02-	"	.)-2.	,,	.)-/2	"	6	"	6	".719 <u>9</u> 70T07.8	.)151
KYfj]WY Wcgh				х	Е	х		/		/		х		X	/	/
AbhYfYgh Wcgh				4				.3	Yf	/-		/		0	/2 E	01
: YbYZ]hg dU]X				&.5'		&.4'		å12'		å06'		å5'		&5'	&4%6%o	&31'
KYhh`Y a Ybhg <sup>&amp;U'</sup>	Zi	<b>‰</b> ‰		&./'		&O <del>-</del> %	‰	9 & '	C	&/4'	/	X				

9 a c i bhg fYWc [b]nYX ]b 9 WWi a i 'UhYX ch\Yf Wc a dfY\Ybg]jY 'cgg Wcbg]gh cZ/ 9WhiUf]U``cggYg .0-.20 1-0 035 206 2/4 Hf]cfgYfj]WY Wcgh &VYbYZ]h' 6 5 &03' &/4' &.1' X X FYh U a c i bhg fYWc [b]nYX " " " " " &O-' " &.3' " .0-20 043 2.0  $9 \text{ WW i a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'']cb) fYgdYWh]jY'm+ was a i'UhYX dYbg]cb VYbYZ]h cV'][Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'']cb UbX ".)064 a]'' [Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/. UbX /-/- kYfY ".)124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/- kYfY ".]124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/- kYfY ".]124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/- kYfY ".]124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/- kYfY ".]124 a]'' [Uh]cbg Ug cZ BibY 0-) /-/- kYfY ".]124 a]''$ : Y`ck ]g ]bZcf a Uh]cb UVcih ZibXYX UbX ibZibXYX dYbg]cb d`Ubg7 Hfc^YWhYX VYbYZ]h cV`][Uh]cb 00-010 006 6 020 9 WWi a i`UhYX VYbYZ]h cV`][Uh]cb 00-010 6 006 020 >U]f jU`iY cZ d`Ub UggYhg /52 /25 X /52 /25 Hfc^YWhYX VYbYZ]h cV`][Uh]cb .)-10 " 645 5. 40 .)./1 .)-2. 9 WWi a i`UhYX VYbYZ]h cV`][Uh]cb .)-04 64. 5. 40 .)..5 .)-11 >U]f jU`iY cZ d`Ub UggYhg .).3/ .).3/ .)-3. X X .)-3. L\Y UWWi a i`UhYX VYbYZ]h cV`][Uh]cb Y1WYYXg h\Y ZU]f jU`iY cZ d`Ub UggYhg Zcf U`` Xc a Ygh]W dYbg]cb d`Ubg+  $: Y`ck ] g ] bZcfaUh] cb UVcih ZcfY] [b dYbg] cb d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k \\] W \land h Y UWWiai`UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y d`Ubg ] b k Y UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y UhYX VYbYZ] h cV`] [Uh] cb Y1WYYXg h Y ZU] f jU`iY cZh Y UhYX VYbYZ] h cV`] ch Y UhYX VYbYZ] h cV`] f jU`iY cZh Y UhYX VYbYZ] h cV`] f jUhYX VYbYZ] h cV`] f jU`$ UggYhg7 Hfc^YWhYX VYbYZ]h cV`][Uh]cb 40 26 /26 5. .1-00/ 9 WWi a i`UhYX VYbYZ]h cV`][Uh]cb /26 5. 40 . 1 -00/ 26 >U]f jU`iY cZ d`Ub UggYhg 25 25 /16 X /16 X <UMMBRY OG 8 FT : FRJOEJD , FNFGJT - OSTS</p> ‰ ‰ †  $L \setminus Y$ ; c & Kd g

 $L Y U a cfh]nUh]cb cZ U a cibhg fY`UhYX hc ibfYWc[b]nYX df]cf gYfj]WY Wcghg \&WfYX]hg') XYZYffYX `cggYg UbX gYhh`Y a Ybhg) WifhU]` a Ybhg UbX ch\Yf kYfY fYW`Ugg]Z]YX cih cZ Gh\Yf Wc a dfY\Ybg]jY ]bWc a Y Ug U Wc a dcbYbh cZ bYh dYf]cX]W VYbYZ]h Wcghg+ L\Y Wc a dcbYbhg cZ bYh dYf]cX]W VYbYZ]hg VYbYZ]hg$ 

L\Y Ze``c k]b[ hUV`Y gYhg Zcfh\ h\Y Ygh] a UhYX VYbYZ]h dUm a Ybhg Zcf h\Y bY1h Z]j Y Z]gWU` mYUfg) UbX ]b U[[fY[UhY Zcf h\Y Z]j Y Z]gWU` mYUfg h\YfYUZhYf+ L\Y Y1dYWhYX VYbYZ]hg UfY Ygh] a UhYX VUgYX cb h\Y gU a Y Uggi a dh]cbg igYX hc a YUgifY h\Y ; c a dUbm g VYbYZ]h cV`][Uh]cb Uh h\Y YbX cZ h\Y Z]gWU` mYUf UbX ]bW`iXY VYbYZ]hg Uhhf]VihUV`Y hc Ygh] a UhYX ZihifY Y a d`cmYY gYfj]WY7

L Y h UV Y VY c k g Y h Z c f h U g i a a U f m c Z W U b [Y g ] b h Y Z U ] f j U i Y c Z ] b j Y g h a Y b h g f Y Z Y W h Y X U g D Y j Y O U g g Y h g U g c Z B i b Y O - ) / - / . U b X / - / - 7

: U`UbWY) BibY O-) /6	"	6
9WhiU`fYhifb cb d`Ub UggYhg7		
JY`Uh]b[ hc UggYhg gh]``\Y`X Uh YbX cZ dYf]cX		
JY`Uh]b[ hc UggYhg gc`X Xif]b[ h\Y dYf]cX		х
HifW\UgYg) gU`Yg) gYhh`Y a Ybhg UbX ]ggiUbWYg		&.'
LfUbgZYfg]bUbXcihcZDYjY 0		х
: U`UbWY) BibY O-) /-/-	"	6
9WhiU`fYhifb cb d`Ub UggYhg7		
JY`Uh]b[ hc UggYhg gh]`` \Y`X Uh YbX cZ dYf]cX		
JY`Uh]b[ hc UggYhg gc`X Xif]b[ h\Y dYf]cX		X
HifW\UgYg) gU`Yg) gYhh`Y a Ybhg UbX ]ggiUbWYg		X
LfUbgZYfg]bUbXcihcZDYjY 0		X
: U`UbWY) BibY O-) /-/.	"	

L\Y; cadUbm|g VYbYZ]hd`Ub kY][\hYX\*UjYfU[Y UggYh U`cWUh]cbg) Vm UggYh WUhY[cfm) UfY Ug Zc``ckg7

=ei]hm gYWif]h]Yg	.6 #	/- #
<YVh gYW i f]h]Yg	40 #	35 #
; Ug\ UbX ch\Yf	5 #	./#
LchU	#	#

; iffYbh7			
M+K+			
>YXYfU`	" 2	" &1'	" 2
KhUhY \$ DcWU`	6	0	/
>cfY][b	.00	/	5
LchU` WiffYbh hUl	.14		./2
<yzyffyx7< td=""><td></td><td></td><td></td></yzyffyx7<>			
M+ $K$ +			
>YXYfU`	&O - '	å12'	/3
KhUhY \$ DcWU`	&.'	&1'	2
>cfY][b	&22'	åO.'	&O-'
LchU` XYZYffYX hU1	å53'	&5 - '	
LchU`]bWc a Y hU1 Y1dYbgY	" 3.	" /.	" ./3

 $L\ Y\ fYWcbW]`]Uh]cb\ VYh\ k\ YYb\ h\ Y\ ;\ c\ a\ dUbm\ |\ g\ UWhi\ U`\ YZZYWh]j\ Y\ hU1\ fUhY\ UbX\ h\ Y\ ghUh\ i\ hcfm\ M+K+ > YXYfU`\ ]bWc\ a\ Y\ hU1\ fUhY\ k\ Ug\ Ug\ Zc``c\ k\ g7$ 

M+K+ZYXYfU ]bWc a Y hU1 fUhY	/. #	/. #	/. #
KhUhY UbX `cWU` hU1Yg) bYh	≠U		/
=ZZYWh cZ ZcfY][b cdYfUh]cbg <sup>&amp;U'</sup>	./	&/'	6
; $\Ub[Y]bjU`iUh]cbU``ckUbWY^{\&V'}$	&.3'	X	X
Fcb*XYXiWh]V`Y [ccXk]`` UbX UggYh ] a dU]f a Ybhg &W'		&//'	2
Fcb*XYXiWh]V`Y Wc a dYbgUh]cb UbX VYbYZ]hg	1	x	
JYaYUgifYaYbh cZXYZYffYX hU1 UggYhg <sup>&amp;X'</sup>			

gi V^YWh hc `] a ]hUh]cbg Ug dfc a i` [UhYX ibXYf KYWh]cb 05 / cZ h\Y AbhYfbU` JYjYbiY ; cXY cZ .653) Ug U a YbXYX &h\Y y ; cXYz'+ KYWh]cb 05 / cZ h\Y ; cXY`] a ]hg h\Y U a cibh cZ FGDg h\Uh kY WUb igY cb Ub UbbiU` VUg]g hc cZZgYh Wcbgc`]XUhYX M+K+ hU1UV`Y ]bWc a Y+ L\Y FGDg UfY U`gc gi V^YWh hc fYj]Yk Vm fY`YjUbh hU1 Uih\cf]h]Yg ]b h\Y ^if]gX]Wh]cbg hc k\]W\ h\Ym fY`UhY+

Gb h\Y VUg]g cZ h\]g YjU`iUh]cb) jU`iUh]cb U``c kUbWYg cZ "/-3 a ]``]cb UbX "/36 a ]``]cb \UjY VYYb YghUV`]g\YX hc fYXiWY h\Y XYZYffYX hU1 UggYh UggcW]UhYX k]h\ h\Y ; c a dUbm|g FGDg hc Ub U a c i bh h\Uh k]`` a cfY `]\_Y`m h\Ub bch VY fYU`]nYX Ug cZ B i bY 0-) ///. UbX

@UfdYf) O]``]Ua Ecffck) @UfdYf; c``]bg; \]`XfYb|g: cc\_g) 9 j cb) @UfYei]b UbX; \f]gh]Ub diV`]g\Yfg RcbXYfjUb UbX L\caUg FY`gcb) UbX diV`]g\Yg kcf\_g Vm kY`\*\_bckb Uih\cfg giW\ Ug @UfdYf DYY) ?Ycf[Y GfkY``) 9 [Uh\U; \f]gh]Y UbX RcfU FYU`Y @ifghcb) Ug kY`` Ug [`cVU` Uih\cf VfUbXg ]bW`iX]b[ B+J+J+Lc`\_]Yb); +K+ DYk]g) <Ub]Y` K]`jU) CUf]b K`Ui[\hYf UbX <f+ EUfh]b Dih\Yf C]b[) Bf+ Ah ]g U`gc \cay hc a Ubm VY`cjYX W\]`XfYb|g Vcc\_g UbX Uih\cfg UbX U g][b]Z]WUbh; \f]gh]Ub diV`]g\]b[ Vig]bYgg+

[ 8FWS 7FEJB x L\Y FYkg EYX]U gY[a Ybh Wcbg]ghg df] a Uf]`m cZ FYkg; cfd 9 i ghfU`]U) FYkg MC UbX h\Y <L^ GVYR >VZ[UbX]bW`iXYg) U a cb[ch\Yf diV`]WUh]cbg) BOL /\Z[YHSPHU\$ BOL 2 HPS` BL\$LNYHWO\$ 6 LYH\$K A\U\$ BOL 1 V\YPLY; HP\$ UbX BOL /K]LY[PZLY]b 9 i ghfU`]U UbX BOL BPTLZ\$ BOL A\UKH` BPTLZ\$ BOL A\U UbX BOL A\U UbX BOL A\U VU A\UKH`

JYjYbiYg7							
<][]hU`JYU`=ghUhY KYfj]WYg	i Yg	"	.)060	"	.)-32	"	.).26
KiVgWf]dh]cb N]XYc KYfj]WYg			/)-4/		.)551		/)/-/
<ck bcbyg<="" td=""><td></td><td></td><td>.)4-/</td><td></td><td>.)26-</td><td></td><td>.)216</td></ck>			.)4-/		.)26-		.)216
: cc_HiV`]g\]b[			.)652		.)333		.)421
FYkg EYX]U			/)/-2		/)5		0)1-4
$Gh \setminus Yf$					/		0
LchU JYjYbiYg		"	6)025	"	6)5	"	)-41
KY[aYbh = : AL < 97							
<][]hU`JYU`=ghUhYKYfj]WYg		"	2.1	"	012	"	045

; Ud]hU YldYbX]hifYg7						
<][]hU`JYU`=ghUhY KYfj]WYg	"	45	"	5-	"	45
Ki VgWf]dh]cb N]XYc KYfj]WYg		.1/		.66		0-4
<ck bcbyg<="" td=""><td></td><td>3/</td><td></td><td>26</td><td></td><td>33</td></ck>		3/		26		33
: cc_ HiV`]g\]b[		.3		./		4
FYkg EYX]U		51		43		3
Gh\Yf		5		./		5
LchU ; Ud]hU Y1dYbX]hifYg	"	06-	"	105	"	24/
LchU` UggYhg7						
$<][]hU^ JYU^ =ghUhY KYfj]WYg$			"	0).13	"	/)0//
KiVgWf]dh]cb N]XYc KYfj]WYg				0)2.2		0)126
<ck bcbyg<="" td=""><td></td><td></td><td></td><td>/)465</td><td></td><td>/)15-</td></ck>				/)465		/)15-
: cc_HiV]g\]b[				/)4.0		/)/./
FYkg EYX]U				/)/-6		.)661
$\mathbf{G}$ h\Y $\mathbf{f}^{\mathtt{tU'}}$				/)-06		.)164
Ab j Ygh a Ybhg				02.		/64
LchU` UggYhg			"	. 3)44 .	"	.1)/3.
&U' L\Y Gh\Yf gY[ a Ybh df] a Uf]`m ]bW`i XYg ; Ug\ UbX WUg\ Ye i] jU`Ybhg+						
?ccXk]``UbX]bhUb[]V`Y UggYhg) bYh7						
<pre></pre> <pre>&lt;][]hU` JYU` =ghUhY KYfj]WYg</pre>			"	.)54.	"	.)222
Ki VgWf]dh]cb N]XYc KYfj ]WYg				.)34.		.)2.2
<ck bcbyg<="" td=""><td></td><td></td><td></td><td>.)662</td><td></td><td>.)4//</td></ck>				.)662		.)4//
: cc_ HiV`]g\]b[				.)-13		415
FYkg EYX]U				0-5		/44
Gh\Yf				X		
LchU`?ccXk]``UbX]bhUb[]V`Y UggYhg) bYh				3)50/	-,-	2)5.2

JYjYbiYg7 <sup>kU'</sup>			
$M+K+UbX$ ; $UbUXU^{AV'}$	" 0)22-	" 0)430	" 1)-11
$=ifcdY^{kW}$	.)34/	.)2-/	.)331
9 i ghfU`Ug]U UbX Gh\Yf <sup>tX'</sup>	1).03	0)410	1)033
LchU` JYjYbiYg	" 6)025	" 6)5	")-41

<sup>&</sup>amp;U' JYJXHFZYgWWFY Uhhf]VihYX hc fY[]cb VUgYX cb`cWUh]cb cZ Wighc a Yf+

<sup>&</sup>amp;V' JYjYbiYg ]bW`iXY Uddfc1] a UhY`m "0+2 V]``]cb Zcf Z]gWU` /-/.) "0+4 V]``]cb Zcf Z]gWU` /-/- UbX "0+6 V]``]cb Zcf Z]gWU` /-.6 Zfc a Wighc a Yfg ]b h\Y M+K+

<sup>&</sup>amp;W' JYjYbiYg ]bW`iXY Uddfc1] a UhY`m ".+O V]``]cb Zcf Z]gWU` /-/.) ".+/ V]``]cb Zcf Z]gWU` /-/- UbX

## 971FR - URRFNT 6JBCJLJTJFS $L\Y Zc``c k]b[\hUV`Y gYhg Zcfh\h\Y Wc a dcbYbhg cZ Gh\Yf WiffYbh`]UV]`]h]Yg7$

## +DDUMULBTFE 9TIFR - OMPRFIFNSJVF 6OSS

Z hU17										
g7										
				"		X	"	х "	//	
						X		X	&//'	
						X		X	X	
						/		3	1	
						&/'		å1'	/	Y
X	W	W	i	a	i Y	$\mathbf{x}^{U}$	i`	] / n	Y X3	₩iia <b>%</b> ‰
						&O&		<b>‰</b> ‰		
٤	g7	g7	g7	g7	g7 "	g7 "	" X X X X X X X X X X X X X X X X X X X	" X "  x  x  x  X  X  X	" X " X " X " X X X X X X X X X X X X X	"

$ L \   \ b \ cfa \ Uh] cb \ f \ Yei \ ] f \ YX \ Vm \ h \   \ g \   \ h \ f \ Ygd \ YWh \ hc \ h \ Y \ ; c \ a \ d \ Ubm \   \ g \ < ] f \ YWh \ cfg \ ] g \ Wcbh \ U] b \ Y \ H f \ c \ 1m \ Kh \ Uh \ Y \ a \ c \ a \ d \ Ubm \   \ g \ / \ - \ / \ . $	Ybh Zcf h\Y

 $L\Y \] bZcfaUh]cbfYei]fYXVmh\] g \] hYa \] g \WcbhU]bYX \] bh\Y \Hfclm KhUhYaYbh \ ibXYfh\Y \YUX]b[g y>YYg \HU]Xhc \AbXYdYbXYbh \] hYa \] g \WcbhU]bYX \] bh\Y \Hfclm KhUhYaYbh \ibXYfh\Y \YUX]b[g y>YYg \HU]Xhc \AbXYdYbXYbh \] hYa \] g \WcbhU]bYX \] hYa \] hYa \] g \WcbhU]bYX \] hYa \] hYa \] g \WcbhU]bYX \] hYa \]$ 

 $. + / \quad \underline{9 \text{ a YbXYX UbX J YghUhYX}} = \text{a d`cm a Ybh 9 [fYY a Ybh) XUhYX BibY .5)} / - / -) \text{ VYh k YYb FY kg ; cfdcfUh]cb UbX KigUb}$ 

- L\Y Zc``c k]b[ Z]bUbW]U` ]bZcf a Uh]cb Zfc a h\Y JY[]ghfUbh|g 9bbiU` JYdcfh cb>cf a .-\*C Zcf h\Y Z]gWU` mYUf YbXYX BibY 0-) /-/. Zcf a UhhYX ]b Ab`]bY P: J D7 &]' ; cbgc`]XUhYX KhUhY a Ybhg cZ GdYfUh]cbg Zcf h\Y Z]gWU` mYUfg YbXYX BibY 0-) /-/.) /-/- UbX /-.68 &]]' ; cbgc`]XUhYX KhUhY a Ybhg cZ ; c a dfY\Ybg]j Y AbWc a Y &Dcgg' Zcf h\Y Z]gWU` mYUfg YbXYX BibY 0-) /-/.) /-/- UbX /-.68 &]]' ; cbgc`]XUhYX : U`UbWY K\YYhg Ug cZ BibY 0-) /-/. UbX /-/-8 &]j' ; cbgc`]XUhYX KhUhY a Ybhg cZ ; Ug\ >`ckg Zcf h\Y Z]gWU` mYUfg YbXYX BibY 0-) /-/.) /-/- UbX /-.68 &j' ; cbgc`]XUhYX KhUhY a Ybhg cZ =ei]hm Zcf h\Y Z]gWU` mYUfg YbXYX BibY 0-) /-/.) /-/- UbX /-.68 UbX &j]' FchYg hc h\Y ; cbgc`]XUhYX >]bUbW]U` KhUhY a Ybhg+(
- .-1 L\Y WcjYf dU[Y Zfc a FYkg ; cfdcfUh]cblg 9bbiU` JYdcfh cb>cfa .-\*C Zcfh\Y Z]gWU` mYUf YbXYX BibY 0-) /-/.) Zcfa UhhYX ]b Ab`]bY P: JD &]bW` iXYX Ug = 1\]V]h .-.'+(
- >]`YX \YfYk]h\
- ((  $>ifb]g\YX\YfYk]h$
- v EUbU[Y a Ybh WcbhfuWh cf Wc a dYbgUhcfm d`Ub cf UffUb[Y a Ybh

FcbY+

 $HifgiUbh\ hc\ h\Y\ fYei]fY\ a\ Ybhg\ cZ\ KYWh]cb\ .0\ cf\ .2\&X'\ cZ\ h\Y\ KYWif]h]Yg=1\\W\Ub[Y\ 9\ Wh\ cZ\ .601)\ h\Y\ fY[]ghfUbh\ \Ug\ Xi\m\ WUigYX\ h\]gfYdcfh\ hc\ VY\ g][bYX\ cb\ ]hg\ VY\U^Z\ Vm\ h\Y\ i\ bXYfg][bYX)\ h\YfYibhc\ Xi\m\ Uih\cf]nYX+$ 

F = OK; GJHGJ9LAGF & JY[]ghfUbh'

: m <sup>7</sup> ,g, KigUb HUbiWW]c
-------------------------------------

<UhY7 9 i [ i gh . -) / -/.

 $HifgiUbh\ hc\ h\Y\ fYei]fY\ a\ Ybhg\ cZ\ h\Y\ KYWif]h]Yg=1\\W\ b[Y\ 9\ Wh\ cZ\ .601)\ h\]g\ fYdcfh\ \ \ \ Ug\ VYYb\ g][bYX\ VY\ ck\ Vm\ h\Y\ Zc\ ck\]b[\ dYfgcbg\ cb\ VY\ U\ Z\ cZ\ h\Y\ fY[\ ]ghfUbh\ UbX\ ]b\ h\Y\ WUdUW]h]Yg\ UbX\ cb\ h\Y\ XUhYg\ ]bX]WUhYX7$ 

,g, C+ JidYfh EifXcW\ 9i[**igHY**WiH]jY;.\U]£aU**)** / - / . 9i[igh .-)/-/.