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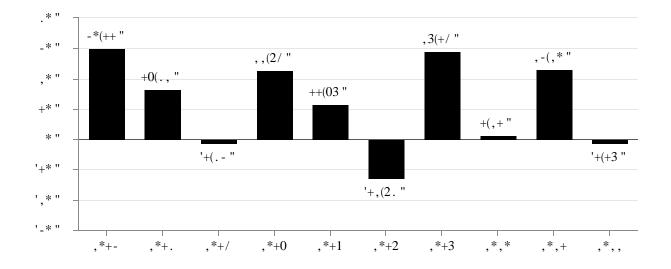
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- j **BMLMUX\0WV B0[S** mJWT Ud]S \ Ph]TTS c^ bT[[bTRdaXcXTb Pc cX \ Tb Xc f^d[S]^c ^cWTa f XbT S^ b^ X] ^aSTa c^ \ TTc bWPaTW^[STa aTST _cX^] aT`dTbcb(IT[[X]V bTRdaXcXTb c^ \ TTc bdRW aTST _cX^]b \ Ph RPdbT cWT Ud]S c^ Tg_TaXT]RT P [^bb ^a X]RaTPbT cWT Ud]Spb caP]bPRcX^] R^bcb(J^ cWT TgcT]c cWPc P] X]bdaP]RT R^ _P]h WPb P [PaVT _^bXcX^] X] cWT Ud]St cWT Ud]S \ Ph Tg_TaXT]RT aT[PcXeT[h [PaVT aTST _cX^]b XU bdRW X]bdaP]RT R^ _P]h aTP[[^RPcTb Xcb PbbTcb(

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K]STa]^a \ P[\ PaZTc R^]SXcX^]bk cWT _^acU^[X^ \ P]PVTab fX[[X] eTbc Pc [TPbc 2* " ^U cWT Ud]Spb]Tc PbbTcb X] $U \setminus TSXd \setminus bXiT R^ \setminus P]XTb(JWT Ud]S \setminus Ph RWP]VT cWXb 2* " _^[XRh ^][h d_] 0* SPhbp _aX^a f aXcT]]^cXRT c^ bWPaTW^[STab(JWT _^acU^[X^ \ P]PVTab R^]bXSTa \ TSXd \ bXiT R^ \ _P]XTb c^ X]R[dST cW^bT f W^bT \ PaZTc RP_XcP[XiPcX^] Pc cWT cX \ T ^U _daRWPbT Xb f XcWX] cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-**** ?]STgt TgR[dSX]V cWT [PaVTbc +** bdRW R^ \ _P]XTb(JWT _^acU^[X^ \ P]PVTab X]cT]S c^ \ P]PVT cWT Ud]S b^ cWPc Xcb f TXVWcTS RP_XcP[XiPcX^] UP[[b f XcWX] cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[CXSRP_k ?]STgt TgR[dSX]V cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[CXSRP_k ?]STgt TgR[dSX]V cWT [PaVTbc +** k^ + cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-***k ?]STgt TgR[dSX]V cWT [PaVTbc +** cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-***k ?]STgt TgR[dSX]V cWT [PaVTbc +** cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-***k ?]STgt TgR[dSX]V cWT [PaVTbc +** cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-***k ?]STgt TgR[dSX]V cWT [PaVTbc +** cWT RP_XcP[XiPcX^] aP]VT ^U cWT HdbbT[[-***k ?]STgt TgR[dSX]V cWT [PaVTbc +** R^ \ _P]XTbt P]S cWT HdbbT[[CXSRP_k ?]STgt f TaT P__a^gX \ PcT[h !/(. \ X[[X^] c^ !11(2 QX[[X^] P]S !-3.(. \ X[[X^] c^ !11(2 QX[[X^] F]S !-3.(. \ X[[X^] c^ !/0(/ QX[[X^] & aTb_TRcXeT[h($

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 $9^{P}XTb \ Ph \ QT \ d] STaeP[dTS \ SdT \ c^{PaZTc} STR[X] Tbt \ -^a \ TR^]^{XR} \ R^] SXcX^] bt \ PRcdP[\ a \ P] cXRX_PcTS \ QPS \]T \ f \ b \ aTVPaSX] \ v \ wT \ xbbdTa \ a \ xcb \ X] \ Sdbcaht \ a \ QTRPdbT \ wTh \ WPeT \ QTT] \ eTa[^ZTS \ Qh \ cWT \ PaZTc(\ J^XST] \ cXUh \ cWT \ R^{P}] \ XTbt \ cWT \ -acU^{X^{P}} \ P] \ VTabt \ CWT \ P] \ PVTabt \ P] \ VTabt \ R^{P} \ P] \ VTabt \ P] \ PVTabt \ PVTabt \ P] \ PVTabt \ PVTabt \ P] \ PVTabt \ PVT$

j P bc^RZ]^ [^]VTa $\ TTcb \ eP[dPcX^] Ra%TaXP5$

j P bc^RZpb aXbZ _PaP \ TcTab ^dc f TXVW Xcb aTcda] ^__^acd]Xch5

j \ ^aT PccaPRcXeT P[cTa]PcXeTb PaT XST]cXUXTS5 ^a

j b_TRXUXR TeT]cb P[cTa P bc^RZpb _a^b_TRcb(

?] cWT TeT]c ^U PSeTabT \ PaZTc& TR^]^ \ XR& _{[XcXRP[& ^a ^cWTa R^]SXcX^]b& cWT Ud]S \ Ph cPZT cT \ _^aPah STUT]bXeT _^bXcX^]b cWPc PaT X]R^]bXbcT]c f XcW cWT Ud]Spb _aX]RX_P[X]eTbc \ T]c bcaPcTVXTb(J^ cWT TgcT]c cWT Ud]S Pbbd \ Tb P STUT]bXeT _^bXcX^]& Xc \ Ph]^c PRWXTeT Xcb X]eTbc \ T]c ^QYTRcXeT(

7 STbRaX_cX^] ^U cWT _^[XRXTb P]S _a^RTSdaTb f XcW aTb_TRc c^ cWT SXbR[^bdaT ^U cWT Ud]Spb _^acU^[X^ bTRdaXcXTb Xb PePX[PQ[T X] cWT bcPcT \ T]c ^U PSSXcX^]P[X]U^a \ PcX^](

GPI\ IZM \PM XZQVKQXIT ZQ[S[WN QV^M[\QVO QV \PM N]VL1

 $B^{bb ^U ^{Th Xb P aXbZ ^U X} eTbcX V X cWT Ud S^{P} P P VXeT cX ^T h^{d} bWPaTb ^P QT f^{acW} [Tbb cWP] cWT _aXRT h^{d} _PXS U^{a} cWT (7] X eTbc ^T c X cWT Ud S Xb]^{C} P QP Z ST_^bXck P S Xc Xb]^{C} X b daTS ^a VdPaP cTTS Qh cWT <TSTaP[: T_^bXc ?]bdaP RT 9^a_aPcX^] $<: ?9% ^a P h^{C}WTa V^eTa ^T c PVT Rh($

 $C \ XS \ RP_bc^RZb \ \ Ph \ X] e^[eT \ VaTPcTa \ aXbZb \ QTRPdbT \ cWT \ eP[dT \ \ VbTRdaXcXTb \ \ V \ \ TSXd \ \ bXiT\& \ [Tbb \ fT[['Z]^f] \ R^ \ P]XTb \ RP] \ QT \ \ \ aTerrighter$

 $\label{eq:linear_state} \end{tabular} \en$

 $C PaZTc _TaU^a \ P RT cT Sb c^ QT RhR[XRP[\& P Sk X] cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ U UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ Ph UP[[X] P S^dc \ U cWT ePaX^db RhR[Tbk RTacPX] UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tb \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tbk \ UPe^a(\ U cWT ePaX^db RhR[Tbk RTacPX] X] eTbc \ T c bch[Tbk \ UPe^a(\ U cWT ePaX^db RhR[Tbk \ UPe^a(\$

= IVIOMUMV\

GPW UIVIOM[\PM N]VL1

JWT 8^PaS ^U : $xaTRc^abt X]eTbc \ T]c PSeXb^a P]S Ud]S \ P]PVT \ T]c cTP \ [Ph ZTh a^[Tb X] cWT \ P]PVT \ T]c ^U cWT Ud]S($

DPM 3WIZL WN 5QZMK\WZ[

JWT 8^PaS ^U : XaTRc^ab Xb aTb_]bXQ[T U^a ^eTabTTX] V cWT PSeXb^apb PPVT $T_c P_S ^TaPcX^]b^U cWT Ud_S _dabdP]c c^ cWT <math>P_PVT T_c P_PVT P_PVT T_c P_PVT T$

DPM :V^M[\UMV\ 2L^Q[WZ

JWT Ud]Spb T cWT \ c^ QT R^]b J	\ c	^ Q T	Wi	‰‰
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3ZQIV GWOTWU

2 LLQ\QWVIT @WTQKQM[2 NNMK\QVO HW]Z:V^M[\UMV\

@]ZKPI[M IVL BMLMUX\@WV WN CPIZM[

7ZMY]MV\ DZILQVO @ZIK\QKM[

<aT`dT]c caPSX]V P]S ^cWTa PQdbXeT caPSX]V _aPRcXRTb \ Ph SXbad_c _^acU^{X^ \ P]PVT \ T]c bcaPcTVXTb P]S WPa \ Ud]S _TaU^a \ P]RT(?U cWT Rd \ d[PcXeT P \ ^d]c ^U UaT`dT]c caPSX]V PRcXeXch Xb bXV]XUXRP]c aT[PcXeT c^ P Ud]Spb]Tc PbbTcbk cWT Ud]S \ Ph X]Rda caPSX]V R^bcb cWPc PaT WXVWTa cWP]]TRTbbPah Pb bTRdaXcXTb PaT UXabc _daRWPbTS cWT] `dXRZ[h b^[S c^ \ TTc cWT aTST \ _cX^] aT`dTbc(?] bdRW RPbTk cWT Ud]Spb _TaU^a \ P]RT R^d[S QT]TVPcXeT[h X \ _PRcTS Qh cWT X]RaTPbTS caPSX]V R^bcb RaTPcTS Qh UaT`dT]c caPSX]V XU cWT PSSXcX^]P[caPSX]V R^bcb PaT bXV]XUXRP]c(

j f XcWX] bTeT] SPhb ^U cWT _daRWPbT5 ^a

J WT UaT`dT]c caPSX]V [X \ XcPcX^]b S^]^c P__[h c^ cWT U^[[^ f X]V ch_Tb ^U caP]bPRcX^]b4

j _daRWPbTb ^U bWPaTb cWa^dVW aTX]eTbcTS SXbcaXQdcX^]b \$SXeXST]Sb P]S RP_XcP[VPX]b%5

j aTST \ _cX^] ^U bWPaTb c^ _Ph Ud]S ^a PRR^d]c UTTb5

 $j \ caP] bPRc^{1} b \ cWa^{dVW} \ Pdc^{ \ Pc^{1} R} \ daRWPbT^{a} \ aTST \ c^{1} [P] b($

?] PSSXcX^]& 7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb aTbTaeTb cWT aXVWc c^ PRRT_c _daRWPbTb P]S TgRWP]VTb X] TgRTbb ^U cWT caPSX]V aTbcaXRcX^]b SXbRdbbTS PQ^eT XU Xc QT[XTeTb cWPc bdRW caP]bPRcX^]b f ^d[S]^c QT X]R^]bXbcT]c f XcW cWT QTbc X]cTaTbcb ^U Ud]S bWPaTW^[STab ^a cWXb _^[XRh(

7 \ TaXRP] 9T]cdah ?]eTbc \ T]cbp _(XRXTb S^]^c _Ta \ Xc db c^ T]cTa X]c^ PaaP]VT \ T]cb f XcW Ud]S bWPaTW^[STab cWPc _Ta \ Xc bdRW bWPaTW^[STab c^ T]VPVT X] UaT dT]c _daRWPbTb P]S aTST \ _cX^]b ^U Ud]S bWPaTb(IWPaTb ^U cWT Ud]S PaT]^c b^[S XXaTRc[h c^ cWT _dQ[XR4 Qdc aPcWTa c^ X]bdaP]RT R^ \ _P]h bT_PaPcT PRR^d]cb U^a cWT _da_bT ^U ^UUTaX]V cWT Ud]S Pb P] X]eTbc \ T]c ^_cX^] d]STa ePaXPQ[T P]]dXch ^a ePaXPQ[T [XUT X]bdaP]RT _a^SdRcb(FdaRWPbTb P]S aTST \ _cX^]b ^U Ud]S bWPaTb WT[S X] ^]X[Qdb PaaP]VT \ T]cb f XcW X]bdaP]RT R^ \ _P]XTb PaT PVVaTVPcTS P]S _aTbT]cTS c^ cWT Ud]S ^] P]Tc QPbXbk X]WTaT]c[h \ PZX]V Xc \ ^aT SXUUXRd[c U^a cWT Ud]S c^ XST]cXUh PQbXeT caPSX]V _aPRcXRTb ^a cWT bWPaTW^[STa f W^ Xb TUUTRcX]V cWT caP]bPRcX^](7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb \ ^]Xc^ab PVVaTVPcT caPSTb _[PRTS X] X]bdaP]RT R^ \ _P]h bT_PaPcT PRR^d]cbt P]S f ^aZb f XcW TPRW X]bdaP]RT R^ \ _P]h c^ XST]cXUh X]eTbc ^ab T]VPVX]V X] PQdbXeT caPSX]V _aPRcXRTb P]S X \ _bT aTbcaXRcX^]b c^ SXbR^daPVT bdRW _aPRcXRTb(FdabdP]c c^ Hd[T , , R' , d]STa cWT ?]eTbc \ T]c 9^ \ _P]h 7Rc ^U +3. *k 7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb P]S TPRW X]bdaP]RT R^ \ _P]h cWPc dbTb P] 7 \ TaXRP] 9T]cdah LPaXPQ[T F^acU^[X^bk ?]R(^a 7 \ TaXRP] 9T]cdah LPaXPQ[T F^acU^[X^b ??k ?]R(Ud]S Pb P] d]STa[hX]V X]eTbc \ T]c eTWXR[T WPb T]cTaTS X]c^ P] X]U^a \ PcX^] bWPaX]V PVaTT \ T]c cWPc ^Q[XVPcTb cWT X]bdaP]RT R^ \ _P]h c^4 \$XW _a^eXST RTacPX] X]U^a \ PcX^] aTVPaSX]V bWPaTW^[STa caP]bPRcX^]b c^ 7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb d_] Xcb aT` dTbc5 P]S \$XXW X \ _bT aTbcaXRcX^]b] bWPaTW^[STa caP]bPRcX^]b f WT] X]bcadRcTS Qh 7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb (8TRPdbT 7 \ TaXRP] 9T]cdah ?]eTbc \ T]c b aT[XTb] TPRW X]bdaP]RT R^ \ _P]h c^ _a^eXST X]U^a \ PcX^] P]S X \ _^bT

CUITT 50[\Z0J]\0WV[IVL EVKI[PML 50[\Z0J]\0WV 4PMKS[

=T]TaP[[hk SXeXST]Sb P]S SXbcaXQdcX^]b RP]]^c QT _PXS Qh RWTRZ U^a P] P \ d]c [Tbb cWP] !/*(7]h bdRW P \ d]c f X[[QT Pdc^ \ PcXRP[[h aTX] eTbcTS X] PSSXcX^]P[bWPaTb(JWT Ud]S aTbTaeTb cWT aXVWc c^ aTX] eTbc P]h SXeXST]S ^a SXbcaXQdcX^] P \ d]c h^d T[TRc c^ aTRTXeT Qh RWTRZ XU h^da RWTRZ Xb aTcda]TS Pb d]ST[XeTaPQ[T ^a XU h^d S^]c RPbW h^da RWTRZ f XcWX] bXg \]cWb(?]cTaTbc f X[[]c PRRadT ^] cWT P \ d]c ^U h^da d]RPbWTS RWTRZ(MT f X[[aTX] eTbc h^da RWTRZ X]c^ h^da PRR^d]c Pc cWT D7 L ^] cWT SPh ^U aTX]eTbc \ T]c(MWT] aTX] eTbcTSk cW^bT P \ d]cb PaT bdQYTRc c^ cWT aXbZ ^U [^bb [XZT P]h ^cWTa Ud]S X]eTbc \ T]c(MT P[b^ aTbTaeT cWT aXVWc c^ RWP]VT h^da T[TRcX^] c^ aTRTXeT SXeXST]Sb P]S SXbcaXQdcX^]b X] RPbW PUcTa P RWTRZ Xb aTcda]TS d]ST[XeTaPQ[T ^a d]RPbWTS U^a cWT bXg \]cW _TaX^Sk P]S fT \ Ph Pdc^ \ PcXRP[[h aTX]eTbc P[[UdcdaT SXeXST]Sb P]S SXbcaXQdcX^]b Pc cWT D7 L ^] cWT SPcT ^U cWT _Ph \ T]c(

4 IVKMTQVO I DZIV[IK\QWV

7 \ TaXRP] 9T]cdah ?]eTbc \ T]cb f X[[dbT Xcb QTbc TUU^acb c^ W^]^a h^da aT`dTbc c^ aTe^ZT P caP]bPRcX^] X]bcadRcX^] XU h^da aTe^RPcX^] aT`dTbc Xb aTRTXeTS _aX^a c^ cWT R[^bT ^U caPSX]V ^] cWT DT f O^aZ Ic^RZ ; gRWP]VT \$DOI ; % \$VT]TaP[[h . _(\(; PbcTa] cX \ T% ^] cWT caPST SPcT ^U cWT caP]bPRcX^](E]RT _a^RTbbX]V WPb QTVd]& ^a cWT DOI ; WPb R[^bTS ^] cWT caPST SPcT& cWT caP]bPRcX^] RP]]^[^]VTa QT RP]RT[TS(; PRW Ud]S aTbTaeTb cWT aXVWc c^ bdb_T]S cWT ^UUTaX]V ^U bWPaTb U^a P _TaX^S ^U cX \ T P]S c^ aTYTRc P]h b_TRXUXR X]eTbc \ T]c \$X]R[dSX]V P _daRWPbT Qh TgRWP]VT%(7SSXcX^]P[[h& fT \ Ph aTUdbT P _daRWPbT XU& X] ^da YdSV \ T]c& Xc Xb ^U P bXiT cWPc f ^d[S SXbad_c cWT \ P]PVT \ T]c ^U P Ud]S(

BOOP \W 4PIVOM @WTOKOM[

MT aTbTaeT cWT aXVWc c^ RWP]VT P]h bcPcTS X] eTbc $\ T$]c aT dXaT $\ T$]c & X]R[dSX]V cW^bT cWPc aT[PcT c^ _daRWPbTbk TgRWP]VTb P]S aTST $\ cX^]b(?]$ PRR^aSP]RT fXcW P__[XRPQ[T [P f & fT P[b^ \ Ph P[cTak PSS ^a SXbR^]cX]dT P]h bTaeXRT ^a _aXeX[TVT(9WP]VTb \ Ph PUUTRc P[[X] eTbc^ab ^a ^][h cW^bT X] RTacPX] R[PbbTb ^a Va^d_b(?] PSSXcX^]& Ua^ $\ cX \ T \ c^ \ cX \ T \ T \ Ph \ fPXeT P _^[XRh ^] P RPbT'Qh'RPbT QPbXbk Pb cWT PSeXb^a STT <math>\ P_a^a$

CPIZM @ZQKM\$ 5Q[\ZQJ]\QWV[IVL DI`M[

CPIZM @ZQKM

 $7 \ x^{RP} \ 9T \ cdah \ ?eTbc \ T \ cb \ fx \ axr \ cwT \ ud \ sb \ wPaTb \ h^d \ daR \ WPbTt \ TgRWP \ VT \ ^a \ aTSTT \ QPbTS \ cwT \ space{1} \ STcTa \ x \ TST \ bar{x} \ space{1} \ space{1}$

$5 \left(\left| Z \right| \right) \right)$

<TSTaP[cPg [P f b aT`dXaT cWT Ud]S c^ \PZT SXbcaXQdcX^]b c^ Xcb bWPaTW^[STab X] ^aSTa c^ `dP[XUh Pb P aTVd[PcTS X] eTbc \T]c R^ _P]h(GdP[XUXRPcX^] Pb P aTVd[PcTS X] eTbc \T]c R^ _P]h \TP]b cWT Ud]S bW^d[S] c QT bdQYTRc c^ bcPcT ^a UTSTaP[X]R^ \T cPg ^] P \^d]cb SXbcaXQdcTS(JWT SXbcaXQdcX^]b VT]TaP[[h R^]bXbc ^U SXeXST]Sb P]S X]cTaTbc aTRTXeTS Qh cWT Ud]S& Pb f T[[Pb aTP[XiTS Qh cWT Ud]S ^] cWT bP[T ^U Xcb X] eTbc \T]c bTRdaXcXTb(JWT Ud]S VT]TaP[[h Tg_TRcb c^ _Ph SXbcaXQdcX^]b ^U bdQbcP]cXP[[h P[[^U Xcb X]R^ \ T& UP]hk `dPacTa[h(: XbcaXQdcX^]b Ua^ \ aTP[XiTS RP_XcP[VPX]bk XU P]hk PaT _PXS ^]RT P hTPa X] CPaRW(JWT Ud]S \Ph \PZT \^aT UaT`dT]c SXbcaXQdcX^]bk XU]TRTbbPahk c^ R^ _[h f XcW ?]cTa]P[HTeT]dT 9^ST _a^eXbX^]b(

6F: >B8F:6G:G >B H=: J6WI:G C; 86D>H6W 6GG:HG! GI8= 6G GHC8?G CF 7CB9G!; FCA H=: H>A: H=: 6GG:HG 6F:

DIF8=6G:9#

 $O^{d} f X[[_PaXRX_PcT X] Ud]S SXbcaXQdcX^]bt f WT] cWTh PaT STR[PaTSt bcPacX]V^] cWT]Tgc QdbX]Tbb SPh PUcTa h^da _daRWPbT Xb TUUTRcXeT(<^a TgP _[Tt XU h^d _daRWPbT bWPaTb ^] P SPh cWPc P SXbcaXQdcX^] Xb STR[PaTSt h^d f X[[]^c aTRTXeT cWPc SXbcaXQdcX^](?U h^d aTSTT \ bWPaTbt h^d f X[[aTRTXeT P]h SXbcaXQdcX^] STR[PaTS ^] cWT SPh h^d aTSTT \ (?U h^d aTSTT \ P[[bWPaTbt fT f X[[X]R[dST P]h SXbcaXQdcX^]b aTRTXeTS f XcW h^da aTST \ _cX^] _a^RTTSb($

Fa^eXSTS cWPc P[[bWPaTW^[STab PVaTT& cWT Ud]S \ Ph dcX[XiT cWT R^]bT]c SXeXST]S _a^eXbX^] ^U ?]cTa]P[HTeT]dT 9^ST ITRcX^] /O/ f WXRW caTPcb cWT X]R^ \ T TPa]TS Qh cWT Ud]S Pb SXbcaXQdcTS c^ cWT bWPaTW^[STab Pb ^U cWT T]S ^U cWT cPgPQ[T hTPa(

DI`M[

9^]bd[c cWT _a^b_TRcdb ^U h^da X]bdaP]RT R^ \ _P]h bT_PaPcT PRR^d]c U^a P SXbRdbbX^] ^U cWT cPg bcPcdb ^U h^da ePaXPQ[T R^]caPRc(

=]T\ $QXTM 4TI[[:VNWZUI\QWV$

 $JWT Ud]S \land UUTab \land d[cx_[T R[PbbTb \land U bWPaTb(7[[R[PbbTb PaT \land UUTaTS TgR[dbXeT[h c^ X]bdaP]RT R^ \land P]XTb c^ Ud]S cWTXa \land Q[XVPcX^]b d]STa cWT ePaXPQ[T P]]dxch P]S ePaXPQ[T [XUT R^]caPRcb _daRWPbTS Qh cWTXa R[XT]cb($

9[Pbb ? P]S 9[Pbb ?? bWPaTb WPeT SXUUTaT]c UTTb P]S Tg_T]bTb(: XUUTaT]c UTTb P]S Tg_T]bTb f X[[PUUTRc _TaU^a \ P]RT(

; gRT_c Pb STbRaXQTS QT[^ f & P[[R[PbbTb ^U bWPaTb ^U cWT Ud]S WPeT XST]cXRP[e^cX]V& SXeXST]S& [X` dXSPcX^] P]S ^cWTa aXVWcb& _aTUTaT]RTb& cTa \ b P]S R^]SXcX^]b(JWT ^][h SXUUTaT]RTb QTc f TT] cWT R[PbbTb PaT \$P% TPRW R[Pbb \ Ph QT bdQYTRc c^ SXUUTaT]c Tg_T]bTb b_TRXUXR c^ cWPc R[Pbb5 \$Q% TPRW R[Pbb WPb P SXUUTaT]c XST]cXUhX]V STbXV]PcX^] ^a]P \ T5 \$R% TPRW R[Pbb WPb TgR[dbXeT e^cX]V aXVWcb f XcW aTb_TRc c^ \ PccTab b^[T[h PUUTRcX]V cWPc R[Pbb5 P]S \$S% TPRW R[Pbb \ Ph WPeT SXUUTaT]c TgRWP]VT _aXeX[TVTb(

B]TM ()**J**%(7MM[

?] eTbc $\ T_c 9^{-}Ph 7 Rc Hd[T +, Q' + _Ta \ kb \ dcdP[Ud] Sb cWPc PS^_c P fa%cT] _[P] c^ _Ph RTacPX] Tg_T]bTb Pbb^RXPcTS f %cW cWT SXbcaXQdcX^] ^U cWTXa bWPaTb ^dc ^U Ud] S PbbTcb(JWT Ud] Spb 9[Pbb ?? bWPaTb WPeT P +, Q' + _[P](K]STa cWT _[P] & cWT Ud] Spb 9[Pbb ?? _Phb cWT SXbcaXQdcA^ P] P]]dP[UTT ^U *(, / " ^U 9[Pbb ?? PeTaPVT]Tc PbbTcb U^a SXbcaXQdcX^] bTaeXRTbk X]R[dSX]V _Pbc SXbcaXQdcA^] bTaeXRTb(JWT SXbcaXQdcA^ Phb P[[^a P _^acX^] ^U bdRW UTTb c^ cWT X]bdaP]RT R^ \ _P] XTb cWPc \ PZT 9[Pbb ?? bWPaTb PePX[PQ[T(8 TRPdbT cWTbT UTTb PaT dbTs c^ _Ph U^a bTaeXRTb cWPc PaT]^c aT[PcTS c^ _a^b_TRcXeT bP[Tb ^U cWT Ud]Sk cWT R[Pbb f %[[R^]cX]dT c^ \ PZT _Ph \ T]cb d]STa %cb _[P] TeT] XU %c %b R[^bTS c^]T f %] eTbc^ab(8 TRPdbT cWTbT UTTb PaT _PXS ^dc ^U cWT Ud]Spb PbbTcb ^] P] ^]V^X]V QPb%bk ^eTa cX \ T cWTbT UTTb f %[[X]RaTPbT cWT R^bc ^U h^da X] eTbc \ T]c P] S \ Ph R^bc h^d \ ^aT cWP] _Ph%]V ^cWTa ch_Tb ^U bP[Tb RWPaVTb(<^a PSS%cX^]P[%]U^a \ PcX^] PQ^dc cWT _[P] P]S %cb cTa \ bk bTT / I@D0: *@6GG 2#IFI8HIF: X] cWT bcC \ T]c ^U PSS%cX^]P[%]U^a \ PcX^]($

70VIVK0IT 900PT00P\[EVLMZ[\IVL0V0 \PM 70VIVK0IT 900PT00P\[

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G PMZM \W **7**{VL = WZM :VNWZUI\QWV

2 VV] IT IVL CMUQIVV] IT BMXWZ \[

 $7 SSXcX^]P[X]U^a \setminus PcX^] PQ^dc cWT Ud]Spb X]eTbc \setminus T]cb Xb PePX[PQ[T X] cWT Ud]Spb P]]dP[P]S bT \setminus XP]]dP[aT_acb c^ bWPaTW^[STab(?] cWT Ud]Spb P]]dP[aT_acb h^d fX[[UX]S P SXbRdbbX^] ^U cWT \setminus PaZTc R^]SXcX^]b P]S X]eTbc \ T]c bcaPcTVXTb cWPc bXV]XUXRP]c[h PUUTRcTS cWT Ud]Spb __TaU^a \ P]RT SdaX]V Xcb [Pbc UXbRP[hTPa(JWXb _a^b_TRcdb X]R^a_aPcTb Qh aTUTaT]RT cWT HT_ac ^U ?]ST_T]ST]c HTVXbcTaTS FdQ[XR 7 RR^d]cX]V <Xa \ P]S cWT UX]P]RXP[bcPcT \ T]cb X]R[dSTS X] cWT Ud]Spb P]]dP[aT_acc ^b bWPaTW^[STabk SPcTS : TRT \ QTa -+k ,*, ($