! "#\$%& '()! *+ ', \$"&#-.)

/')0"(\$'&1#,)2#3*4+5&*')6*")57#)8"*6#--&*'\$4) 9*":\$5&*')*6);4#<5"&<\$4);'(&'##"-"

!

NO"; P%3Q"NPO!

"#\$!:\$&'()*\$+)!, -!./\$0)(10'/!.+21+\$\$(1+2!')!)#\$!3+14\$(51)6!, -!7, 8)#!9/, (1: '!C379E!#'5! >\$\$+!0, **1))\$:!), !(\$-, (*'!+:!1*&/\$*\$+)'1, +!, -!1++, 4')14\$!1:\$'5!-, (!)#\$!0, +)1+8, 85! 1*&(, 4\$*\$+)!, -!)#\$!&(, -\$551, +'/!-, (*')1, +!, -!, 8(!5)8:\$+)5<!!"#15!15!\$41:\$+)!1+!)#\$!'*>1)1, 85!; .%! &(, 2('*!8+:\$()'B\$+!1+!)#\$!-'/!, -!]RJRK!!A(\$0\$:1+2!)#\$!5)'()!, -!)#\$!; .%!&(, 2('*!H'5!'!*8/)16\$'(!(\$41\$H!'+:!>\$+0#*'(B1+2!, -!)#\$!G7...!:\$2(\$\$!(\$S81(\$*\$+)5L!)#')!/\$:!), !'!+\$H!08((108/8*!/*8+0))*!)!!+!]RC45%2(!C3)/'8+0#\$:!!///%2(]TJE(\$)\$)(')01U1+!/\$*-'//\$10.2((*)1)0.2(0.2(/)0.2(!.)0.2(+2Q6.24000)))

 $\%8(1+2!)\#\$!-1(5)!6\$'(!,-!)\#\$!; . \%!\&(,2('*L!))\#\$!H1(\$/\$55!565)\$*5!"9FG!\#'5!0,+)1+8\$:!1)5!'0)141)1\$5! \\ '+:!\#\$/:!1)5!'++8'/!5)8:\$+)!/\$:!'+:!5)8:\$+)!, (2'+1U\$:!-,(8*L!H\#10\#!\#':!),!>\$!,(2'+1U\$:!1+!'!) \\ 41()8'/!*,:\$!:8\$!), !QP [N\%<!!"\#\$!B\$6!\#12\#/12\#)5!,-!)\#\$!,+\$0:'6!-,(8*!'(\$V!))$

- P(2'+lU\$:!>6!2(':8')\$!'+:!8+:\$(2(':8')\$!5)8:\$+)5!)'B1+2!/\$':\$(5#1&!(,/\$5!)
- O\$'(/6!JRR!'))\$+:\$\$5!&'()101&')\$:!1+!)#\$!*\$\$)1+2!
-] 10(,5,-)!". F] 7!H'5!)#\$!#,5)1+2!&/')-,(*I!'+!1+)\$('0)14\$!&:-!'2\$+:'!H'5!0(\$')\$:!),!

5)8:\$+)5!H\$(\$!!+41)\$:`5\$/\$0)\$:!),!&'()10!&')\$<!!"#\$!5)8:\$+)5!H\$(\$!5\$/\$0)\$:!>'5\$:!,+!0\$()'1+!0(1)\$(1'!)#')!!+0/8:\$!'0':\$*10!&\$(-,(*'+0\$!'+:!&(1,(!0,*&/\$)1,+!,-!)#\$!0,8(5\$5!)#\$6!'(\$!!+14)\$:!),! \$4'/8')\$`(\$41\$H<!!"#\$!5\$/\$0)1,+!0(1)\$(1'!/15)!15!\$4,/41+2L!'+:!)#\$!1+)\$+)!15!),!'/5,!(\$41\$H!)#\$! 5)8:\$+)5X!,4\$('//!\$+2'2\$*\$+)!)#(,82#!\$?)('08((108/'(!'0)141)1\$5<!!O,!(\$58/)5!'(\$!'4'1/'>/\$! 08((\$+)/6!'5!)#\$!-1(5)!5)8:\$+)!(\$&,()5!'(\$!8+:\$(!&(\$&'(')1,+`(\$41\$H<!

; \$58/)5!-(, *!)#\$!-1(5)!6\$'(@\$+:!; .%!-'08/)6!58(4\$6!H\$(\$!!+!2\$+\$('/!!+!-'4,(!,-!)#\$!+\$H!&(,0\$55!! MR h !,-!)#\$!..!-'08/)6!'2(\$\$:!,(!5)(,+2/6!'2(\$\$:!H1)#!)#\$!&(,&,5\$:!)\$'0#1+2!\$4'/8')1,+!&(,0\$55!! H#1/\$!Jg h !:15'2(\$\$:!,(!5)(,+2/6!:15'2(\$\$:I!Kg h !H\$(\$!+\$8)('/!,(!:1:!+,)!B+, H!\$+,82#!),!&(,41:\$! '!(\$5&,+5\$<!!9'08/)6!0, **\$+)5!!+0/8:\$:!EG*40"-%#.>*\$#"((*0D\$0*0D(*(,\$./\$04-%4>40(6*D\$4*0-* <D\$%#(F1!EG*)-*%-0*?(.&(,(*0D\$0*40/)(%04*\$%)*&%)/40">*=\$"0%("4*<\$%*3\$&".>*(,\$./\$0(*0D(*3\$</.0>* =("3-"6\$%<(*H&0D-/0*?(&%#*\$33(<0()*?*&\$0(&"*?&\$4(4 I F9!'+:!_%(&0D("*40/)(%049%-"*&%)/40">* /%)("40\$%)*H(..*0D(*(J=(<0\$0&-%4*3"-6*3\$</.0>I FK!!N)!15!+,)\$H,()#6!)#')!)#15!; .%!&(,2('*!)#\$6! H,8/:!/1B\$!),!/\$'(+!*,(\$!'>,8)<!!"#\$!),0:')\$!'01141)1\$5!'+:!,4\$('//!-'08/)6!(\$5&,+5\$5!,+!)#\$!+\$H!)\$'0#1+2!\$4'/8')1,+!&(,0\$55!'&&\$'(!\$+0,8('21+2L!>8)!1)!15!'/5,!0/\$'(!)#')!'::101,+'/!\$--,()!15! +\$\$:\$:!),1>\$))\$(!1+-,(*!'+:!\$+2'2\$!)#\$!-'08/)6!,+!)#\$!5&\$01-105!,-!)#\$!&(,0\$55!'+:!1)5!,4\$('//! 1+)\$+)!),!'5515!-'08/)6!1+11:\$+)1-61+2!'(\$'5!H#\$(\$!)#\$6!0'+!1*&(,4\$!)#\$1(!)\$'0#1+2!\$--\$0)14\$+\$55<!!

!! "#15!'0)141)6!-,085\$5!,+!1+4\$5)12')1+2!)#\$!1*&'0)!,-!'0)1,+@5)')\$!

 $(1\$+)'1, +!, +!5)8:\$+)!5)8:6!\#'>1)5!'+:!\&\$(-,(*'+0\$!'+:!H1//!'/5,!!+4\$5)12')\$!H\#\$)\#\$(!5)8:\$+)5! \\ 0'+!>\$0, *\$!*,(\$!'0)1, +\emptyset,(1\$+)\$:!)\#(,82\#!!+)\$(4\$+)1, +5!'+:!281:'+0\$!-(,*!-'08/)6':\$\&'()*\$+)<!! \\ F0)1, +05)')\$!,(1\$+)'1, +!15!'!\&\$(5, +'/1)6!')(1>8)\$!)\#')!(\$-/\$0)5!\#,H!H\$//!\&\$,\&\%/\$!0'+!:\$4\$/,\&! \\ \$--\$0)14\$!5)(')\$21\$5!),!'0\#184\$!)\#\$1(!2, '/5<'łKZ!!G$0, *1+2!*,(\$!'0)1, +0,(1\$+)$:!15!&'()!,-!)\#\$! \\ "'B1+2!; \$5\&, +51>1/1)6!), !3+:\$(5)'+:!+21+\$$(1+2!C"; 3. E!0, +0$\&)!)#')!'1*5!')!1*\&(,41+2!)\#\$! \\ 5)8:\$+)5X!\$+2'2\$*\$+)!H1)#!)#\$1(!'0':\$*10!\&(,2('*<!!\%8(1+2!)\#\$!D!"!6\$'(!,-!; ...)!!$<0...%L!$<0...%L!$<0...%L!$</br>

5)8:$+)5X!$+2'2$*$+)!H1)#!)#$1(!'0':$*10!&(,2('*<!!\%8(1+2!)#$!D!"!6$'(!,-!; ...)!$<0...%L!$<0...%L!$<0...%L!$</td>

6)91,+0')1,+158(4$65!H$($!0, *&/$)$:!1+!4'(1,85!8+14$(51)6!0,8(5$5!L!+0/8:1+2!...1!$+21+$$(1+2!!'+:! + ...)*(1+2!+$$(1+2!*'=,(5!)]

7)8RR!&560#,/,26!*'=,(5!'+2!!P4$(!JWRR!5)8:$+)5!H$($!58(4$6$:1!H1)#!jDKRR!$+21+$$(1+2!*'=,(5!)]

7)8RR!&560#,/,26!*'=,(5!'+2!!jJWR!$/$0)(10'/!$+21+$$(1+2!*'=,(5!0, *&)]+2!)#$!4,/8+)'(6!

7)8(4$65<!!!"#$!1+1)1'/!($58/)5!:1:!5#,H1!'!/1+B!>$)H$$+!'0)1,+0'5'')$!,(1$+)'1,+!'+2!5)8:6!>$#'41,(51!

7)91,+0,(1$+)$:!5)8:$+)5!$??#1>1)$:!1*&(,4$:!50.2($)0TJETQ$ **8**71-974'(+:!!jJWR!\$7.24000.241%)0!; ..+2!)0.2(1)0

A; P9.77NPOFk!9P;] F"NPO!P9!.O1NO..; 7!QP3; 7.!7.; N.7!

M - / ''4(*N(4 < ''b = 0b - % * %) * O

. *>\$::\$:!H1)#1+!)#\$!A9.!5\$(1\$5!'(\$!)H,!'::1)1,+'/!0, *&,+\$+)5!,-!)#\$!; .%!&(,2('*V!CDE!"; 3.! k\$0)8(\$!5\$(1\$5!C" k7EL!'+:!CJE!A\$(5,+'/lU\$:!m8'/l-10')1,+!A/'+5!CmAE<!

"#\$!"; 3. !/\$0)8(\$!5\$(1\$5!H'5!/'8+0#\$:!1+!6\$'(!J!,-!)#\$!; .%!&(,2('*<!!"#\$!2,'/!,-!"k7!15!),! 0(\$')\$!'!:1(\$0)!/1+B!>\$)H\$\$+!5)8:\$+)5!'+:!&('0)101+2!\$+21+\$\$(5!1+!'+!1+)\$('0)14\$!5\$))1+2!:8(1+2!)#\$! *1::/\$!6\$'(5!,-!)#\$1(!'0':\$*10!&(,2('*!),!>\$))\$(!1+-,(*!)#\$*!,+!)#\$!1*&,()'+0\$!,-!08((108/'(!0,+))*)+)!+:!\$?)('08((108/'(!0)14))\$5!,+!)#\$1(!-8)8(\$!0'(\$(5!H1)#1+!)#\$!..!:1501&/1+\$<!

"#\$!m8'/1-10')1, +!A/'+5!H\$(\$!1+)(,:80\$:!51+0\$!)#\$!1+1)1'/!1*&/\$*\$+)'1, +!, -!)#\$!A9.!5\$(1\$5!YWZ<!! "#\$!mA5!'(\$!1+)\$+:\$:!), !1+5)1//!5\$/- θ \$'(+1+2!'+:!0,+)1+8,85!\$:80')1,+!'*,+2!...15)8:\$+)51!'+:! '(\$!&'()!,-!)#\$!"; 3.!0,+0\$&)1!H1)#!5)8:\$+)5!'B1+2!(\$5&,+51>1/1)6!), !&8(58\$!5\$/- θ \$'(+1+2!>\$6,+:!)#\$1(!(\$28/'(6!50#\$:8/\$:0,8(5\$H,(B<!!A9.!5)8:\$+)5!:\$4\$/,&\$:!)#\$1(!,H+!mA!),!'::(\$55!0\$()'1+! 5B1//5!'+:!0,*&\$)\$+01\$5!)#\$6!1:\$+)1-6!'5!0(1)10'/!), !)#\$1(!-8)8(\$!0'(\$\$(5L!'+:!1+!H#10#!)#\$6!5\$\$!)#\$! +\$\$:!-,(!5\$/- θ *&(,4\$*\$+)<!!N+1)1'/(6!)#\$!mAX5!H\$(\$!5\$/- θ :\$-1+\$:!'+:!5\$/- θ *,+1),(\$:!C>6!)#\$! 5)8:\$+)5E<!!7)8:\$+)5!&(,41:\$:!&(,2(\$55!(\$&,()5!,+!)#\$!h!0,*&/\$)1,+!,-!)#\$!4'(1,85! 5)8:\$+)5E<!!7)8:\$+)5!&(,41:\$:!&(,2(\$55!(\$&,()5!,+!)#\$!h!0,*&/\$)1,+!,-!)#\$!4'(1,85! 5)8',5'0,*&\$)\$+01\$5!)#\$6!1+0/8:\$:!1+!)#\$1(!mA!&/'+1!1)!H'5!+,)!(\$S81(\$:!)#')!'/!5B1//5!'+:! '0)141)1\$5!'(\$!DRR h!0,*&/\$)\$:<!!"#\$!2,'/!8+:\$(!;.%!15!),!&(,41:\$!'::1)1,+'/!5)(80)8(\$!-,(! 1*&(,4\$:!*,+1),(1+2!,-!5)8:\$+)!&(,2(\$55!'+:!(\$0,2+1)1,+<!!%8(1+2!)#\$!-1(5)!6\$'(!,-!;.%!!'! *,:8/\$!#'5!>\$\$+!0(\$')\$:!H1)#1+!QFO[F7!)#')!H1//!\$+'>/\$!-'08/6!),!*,+1),(!mA!'0)141)1\$5!'+:! '5512+!2(':\$5!'5!)#\$5\$!'(\$!0,*&/\$)\$:<!!O\$?)!5)&\$5!!+0/8:\$!)#\$!:\$4\$/,&*\$+)!,-!'+! 'H'(:`(\$0,2+1)1,+!&(,0\$55!)#')!H1//!(\$0,2+10\$!5)8:\$+)5!H#,!#'4\$!:\$4\$/,&\$:!\$?0\$&)1,+'/!mA5!'+:! '0#1\$4\$:!#12#!/\$4\$/!,-!0,*&/\$)1,+<!

 $- '08/)6! * \$)1+25!!'+:!-'08/)6!C+,)! * \$ *> \$(5!, -!) \# \$!08((108/8 * !0, * * 1)) \$E!H\$(\$!!+41)\$:!), ! \\ \&'()101\&')\$!!+!; . \%!(\$/')\$:!'0141)1\$5!C-, (!\$?' * \&/\$!'5! * \$ > \$(5!, -!) \# \$!+\$H!-'08/)6!\$4'/8')1, +!, -! \\)\$'0\#1+2!0, * * 1))\$E\!\!\times!!O\$4\$()\#\$/\$55!!) \# \$!(\$58/)5!, -!) \# \$!6\$'(\$+:!58(4\$6!\&, 1+)!), !) \# \$!+\$\$:!-, (! \\ 1 * \&(, 4\$:!0, * *8+10')1, +!'+:!\$+2'2\$ * \$+)!!'5!0' \&)8(\$:!>6!'!; . \%!)\$' * !*\$ *>\$(!0, * *+)!_S \% > *$

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 $\begin{array}{l}9128(\$!J<!!78(4\$6!(\$58/)5!!+!A9.!D!,+!)\#\$!S8\$5)1,+!^{**}+\$0(*>-/''*\$?\&\&0>*\&\%*(\$<D^*-3*0D(*3-..-H\&\%\#*<<-/''4(*-?T(<0\&,(*=''\&-''*0-*40\$''0\&\%\#*257*8*\$\%))*\$0*0D(*(\%)*-3*0D(*<-/''4(K*)!)))\\ \end{array}$

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 $\begin{array}{l}9128(\$!K<!!78(4\$6!(\$58/)5!!+!A9.!D!C),\&E!'+:!A9.!K!C>,)), *E!,+!)\#\$!S8\$5)1,+!!V(.(<0*0D(*3-/''*4A\&..4*>-/*\$''(*<\!D--4\&\%\#*0-*3-</4*-\%*3-''*=''-3(44\&-\%\$.*W/\$.\&3\&<\$0\&-\%*2.\$\%\&!!!!!!!\\\end{array}$

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;.9.;.OQ.7!

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 $\begin{array}{l} \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!!Q4!9('8\$+\#\$1*\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!!Q4!9('8\$+\#\$1*\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!!Q4!9('8\$+\#\$1*\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!!Q4!9('8\$+\#\$1*\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!Q8(('/\label{eq:1}) & \text{YDZ}!Q8(('/\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!!Q8(('/\label{eq:1}) & \text{YDZ}!Q8(('/\label{eq:1}) & \text{YDZ}!Q8(('/\$

YJZ!7&,,(\$+L!Ad!G(,0B?L!Gd! i !],()\$/* '+5L!%<!CJRDKE<!P+!)#\$!4'/1:1)6!,-!5)8:\$+)!\$4'/8')1,+!,-!)\$'0#1+2V!''#\$!5)')\$!,-!)#\$!'()<!+(,&(H*-3*7)/<\$0&-%\$.*+(4(\$''<DL!Z;CMEL!gbf@WMJ<!

 $\begin{aligned} & \mathsf{YKZ!} \wedge \mathsf{S\#/L!o<!CDbbJE<!F!)\#\$, (6!, -!5\$/-@(\$28/')1, +\forall!F0)1, +!4\$(585!5)')\$!, (1\$+)')1, +\texttt{L!}5\$/-@ \\ & :150(1*1+')1, +\texttt{L!}'+:!5, *\$!'\&\&/10')1, +5<!X==.\&()*24><D-.-\#>1*X\%*6\%0(''\%\$0\&-\%\$.*+(,\&(H\texttt{L}*f\&\texttt{CJEL!bT}@DJb<!)))) \\ & \mathsf{DJb<!} \end{aligned}$

 $\begin{array}{l} \mathsf{YMZ!7\&\$0}, (\mathsf{L!Ad!9\$(\$B1:\$5\mathsf{L!Q<!7d!}] & \$0\mathsf{8L!1d!365'/L!Nd!i!0\$, +2\mathsf{L!Q<!7d!}X<0\mathit{d}-\%\mathsf{LV0\$0(*!''\mathit{d}(\%0\$0-\%*\%\ast\%))} \\ & \$4\ast X\%^{\ast}\mathsf{G}\,\mathsf{G}=()\,\&\,\mathsf{G}\,(\%0\ast0-\ast7\%\%\%\%)\,(\%0\ast V/<<(449!5\mathsf{8>}\ast1))\$:!)\,,!)\#\$!5'*\$!0\,,+-\$(\$+0\$!\mathsf{CF7..!} \\ & \mathsf{JRJJE!} \end{aligned}$

YgZ!#))&5V``HHH<+'0\$H\$><,(2`8&/,':\$:-1/\$5`JRJD`(\$5,8(0\$5`+'0\$@0'(\$\$(@(\$':1+\$55@ 0,*&\$)\$+01\$5@(\$415\$:@'&(@JRJD<&:-!

 $\begin{aligned} & \mathsf{YWZ! a, H}/(L!od!9\$(\$B1:\$5L!Q<!7d!], (\$+, L! \setminus <!Fd! \setminus \$//\$(L!"d!i!"'B5\#1L!F<!CJRDbL!o8+\$E<! \\ & 2''(=\$''\&\%\#*7\%\#\&\%((''\&\%\#*V0/)(\%04*3-''*@D(\&''2''-3(44\&-\%LX*\setminus -, (.*M/''''\&</.\$''*X==''-\$<D<!N+!JRDb! \\ & F7...!F++8'/!Q, +-\$(\$+0\$!i!..?\&, 51)1, +<! \end{aligned}$

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