

 $!"\#\$\%\&\%"()\#^*)+, -). '/+, 012\&+)3+42(+\%))))). \ \ \emph{Y0}. \ \ 631. \ \ 0. \ \ 5())-. \ \ 5(. \ \ \text{F0}. \ \ 5@))-0' \ \ 5())\$0. \ \ 631. \ \ \$0.$

4?\$*\$/6'!&\%-\#\$!@*)-\$A!36-)\&*,!\&*!B.\$6*,!6*A! -\#\$!C6(!\&\%-\#\$!>\$6D!=1/,16*-!-\&!?\\$*\\$/6'!7,,\\$: O'2!/\\$,\&'1-)\&*!EEFGHI!\&\%JK!L\\$.\\$: O\\$/!GKGGD! 6,!/\\$M1\\$,-\\$A!)GKG

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/$,=&*,)0'$!0&A)$,!()-#)*!35789P!"#$!: &,-!/$.$*-!A&.1: $*-!),!06,$A!&*!-#$!@3?7!
/$,&'1-)&*!6A&=-$A!)*!-#$!=/$$)&1,!2$6/!;-#$!GKGG!@3!/$,&'1-)&*!)*!-#),!.6,$\P!!
35789!-6R$,!,$/)&1,'2!)-,!/&'$!)*!,1==&/-)*+!@3!'$6/*)*+!6*A!/$$)$(!=/&.$,,$,!/$'6-$A!-&!
+'&06'!\(\dagge(), #\$/)\$, P!!35789!=6/-).)=6-\$A!()-#!=/\$,\$*-6-\\&*,!6*A!.\&*-/)01-\$A!A&.1:\$*-,!-&!-#$!
GKGG!0*\%/: 6'!9\&*, 1'-6-)\&*, !&\%>-6-$!U6/-)$, !-&!@38>7!&*!-#$!$.&, 2, -$: !6==/&6. #!-&!
%,#$/)$,!: 6*6+$: $*-P!!0-!6',&!(6,!6*!6.-)$$!=6/-).)=6*-!6*A!=/$,$*-$/!-&!-#$!GKGG!@3!
[ &/R, #\&=!\&^*!): ='\$: \$^*-6-)\&^*!\&\%-\#\$!@3?7!/\$, \&'1-)\&^*, !\&^*!): =6.-, !\&\%0\&--\&: !\%, #)^*+!\&^*!
$1'*$/60'$!: 6/)*$!$.&,2,-$: ,!6*A!-#$!'&*+4-$/: !,1,-6)*60)')-2!&%A$$=4,$6!%,#!,-&.R,P!!
"'/6*,#)=: $*-Z!35789!#6,!0$$*!/$S)$()*+!)-,!/$+1'6-)&*!&%-/6*,#)=: $*-,!,)*.$!GKGKP!!"#$!
GKGG!7**16!N$$-)*+!6A\&=-$A!6!0)*A)*+!/$.\&:: $*A6-)&*!&*!.&*-/&',!6==').60'$!-&!
-/6*, #)=: $*-,!6-!, $6!-8!): =/8S$!: 8*)-8/)*+!6*A!. 8*-/8'!8\%-#$, $!8=$/6-)8*, P!!''#), !6: $*A, !
-#$!35789!>. #$: $!-&!. &*-/&'!-/6*, #)=: $*-!6-!, $6!)*S&'S)*+!/$+1'6-$A!/$, &1/. $,!. 61+#-!)*!
-#$!T$+1'6-&/2!7/$6D! (#$-#$/!&/!*&-!-#$!-/6*,#)=: $*-!&..1//$A!&1-,)A$!-#$!T$+1'6-&/2!&/!
9&*S$*-)&*!7/$6P!B*$!U6/-2!),!*&-!0&1*A!02!-#$,$!*$(!/$+1'6-)&*,P!
L), .6/A, Z!35789!#6,!#6A!6!A), .6/A!06*!)*!='6.$!,)*.$!GKOKD!#&($$$!!-#),!(6,!&%'): )-$A!
,.&=$!)*!-$/: ,!&%-#$!35789!,-&.R,!)-!.&$$/$A!6*A!6',&!(6,!*&-!0)*A)*+!&*!&*$!&%-#$!
9&*-/6.-)*+!U6/-)$,!A1$!-&!6*!&OX$.-)&*P!!!35789!,-6/-$A!6!=/&.$,,!)*!GKGK!-&!/$S)$(!)-,!
/$+1'6-)&*,!)*!-$/:,!-#$!'$$$'!&%6: 0)-)&*!6*A!,.&=$P!!!7-!-#$!,6: $!-): $!095>!(6,!/$M1$,-$A!
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35789!/\$: 6)*,!\$*+6+\$A!()-#!-#\$!@3!8&&A!6*A!7+/).1'-1/\$!B/+6*)`6-)&*D!O\$)*+!6!=6/-*\$/!)*!-#\$!L\$\$=4>\$6!

-/6*, '6-\$A!)*-&!=/6.-).6'!: \$6,1/\$,!-&!): =/&S\$!-#\$!,-6-1,!&%,1.#!,#6/R,D!/62,!6*A!.#): 6\$/6,D! O1-!-#\$!*\$\-!: \$\$-)*+!&%35789!6*A!B>U7T!1*A\$/!-#\$!.&''\$.-)S\$!6//6*+\$: \$*-!()''!A),.1,,!-#),! 6'&*+,)A\$!*\$(!(&/R!O2!095>P!!

 $35789! \cdot \&^*-)^*1\$, ! *\$S\$/-\#\$'\$, , ! -\&! 6 == '2!) - , ! \$ \setminus), -)^*+! = /\& -\$ - . -) \&^*, P! ! 7 , ! = /\$S) \& 1 , '2! /\$ = \&/-\$AD! \%, \#)^*+!06^*, !1^*A\$/!0)^*A)^*+!T\$. \& : : $^*A6-)&^*, !\%\/!. &^*, $/S6-)&^*!6^*A! : 6^*6+$: $^*-!: $6, 1/\$, !\%\/!= &/O$6+'$D!O6, R)^*+!, \#6/RD!A$$=!, $6!, \#6/R, D!/62, !6^*A!. \#): 6$/6, D!/$: 6)^*!)^*!='6.$!1^*-)'!-\#$! $^*A! & GKGJP!Q^*!GKGJ! 35789! 6AA$A!, \\!, =\$.)$, !& \\#. \\#.): 6$/6!-&!-\#$!>.\#$: $!& \\#.9 &^*-/&'!6^*A! \
5^*\\\%\/.$: $^*-P!''\#), !()''!$^*60'$!/$=&/-)^*+!& \\#.-\#$!, =\$.)$, !6, !02.6-.\#D!6^*A!.&1'A!&=$^*!6!=6-\#!-&!-\#$: !0$)^*+!6AA$A!-&!-\#$!$\\), -)^*+!06^*!&^*!-6/+$-$A!\\%, \\#)^*+!& \\#.-\#/$$!.\#): 6$/6!, =\$.)$, P!!!$

Q*! GKGG! Q95>! 6AS), \$A! 6! *&*4`\$/&! .6-.#! 6AS). \$! %/! GKGJ4GKGH!;6/&1*A! GGK! -&**\$,<! %&/! =&/O\$6+'\$D!/\$%'\$.-)*+!6!,')+#-!)*./\$6,\$!)*!-#\$!,-&.R!O)&: 6,,P!!3\$S\$/-#\$'\$,,D!*&!=/&=&,6'!(6,!:6A\$!02!35789!-&!/\$,-6/-!-#\$!%,#\$/2P!!!!Q*!-#\$!.6,\$!&%,=1/A&+D!%&/!(#).#!6!%,#\$/2!.'&,1/\$!#6A!O\$\$*!)*!='6.\$!%&/!,)*.\$!GKK]D!Q95>!6AS),\$A!)*!GKGG!-#6-!-#\$!,-&.R!(6,!/\$.&S\$/)*+!%&:!6!'&(!O)&:6,,!)*!-#\$!:)A4GKKK,P!''#\$!.6-.#!6AS),\$A!%&/!-#\$!,-&.R!(6,!-#\$/\$%&/\$!)*./\$6,\$A!%&:!`\$/&!.6-.#!-&!.6-.#\$,!&%**\$,!0E!1dd!-&**\$,!)*!GKGJ!6*A!GKGH!/\$,=\$.-)\$\$'2P!!!35789!6+/\$\$A!6!/\$.&::\$*A6-)&*!-&!6''&(!6!%,#\$/2!-&!/\$,-6/-D!()-#!6!.6-.#!:6-.#\$A!-&!-#\$!095>!6AS).\$P!!Q*!A&)*+!-#),D!-#\$!35789!9&*-/6.-)*+!U6/-)\$,!*&-\$A!-#6-!&*'2!6!+/6A16'!\$\=6*,)&*!&%!-#\$!%,#\$/2!,#&1'A!O\$!6''&(\$AD!6*A!-#6-!\$\-/\$:\$!.61-)&*!(&1'A!O\$!*\$\$A\$A!-&!6\$&)A!6!/\$-1/*!-&!=&&/!,-6-1,!)*!6!%\$(!2\$6/,P!!

5. &, 2, -\$: !Y6, \$A!N6*6+\$: \$*-!&\(\mathbb{8}\), #\$/)\$,!;5Y8N<!

7,!/\$=&/-\$A!60&\$\$D!35789!. &*-/)01-\$A!-&!-#\$!0*%&/: 6'!9&*,1'-6-)&*,!&%>-6-\$!U6/-)\$,!;09>U<!
-&!@38>7!#\$'A!)*!GKGG!&*!-#\$!\$. &,2,-\$: !6==/&6.#!-&!%,#\$/)\$,!: 6*6+\$: \$*-P!!!"#\$!35789!
U\$/: 6*\$*-!9&: :)--\$\$!&*!N6*6+\$: \$*-!6*A!>.)\$*.\$!#6,!. &*-)*1\$A!6!A),. 1,,)&*!&*!5Y8N!
-#6-!#6A!0\$\$*!,-6/-\$A!02!35789!)*!GKGK!01-!#6A!0\$\$*!=&,-=&*\$A!A1\$!-&!R\$2!)*=1-,!0\$)*+!
A\$'62\$A!02!-#\$!=6*A\$:).P!!"#),!)*.'1A\$A!-#\$!09>U!6*A!(&/R!1*A\$/!-#\$!3&/-#(\$,-!7-'6*-).!

)*,1%).)\$*-!A6-6D!()-#!)*6A\$M16-\$!/\$,&'1-)&*!-&!6*,(\$/!-#\$!M1\$,-)&*,!6/),)*+P!!!3\$(!A6-6!.6'',!6*A!(&/R,#&=,!02!095>!6/\$!='6**\$A!\&/!GKGJ!

6*A! ?89N!)*)-)6-\$A! 6! =)'&-! =/&X\$. -! &*! b\$, , \$'! N&*)-&/)*+! >2, -\$: , !; bN><!! "#\$! "\$/: , !&% T\$%\$/\$*. \$!%/!-#), !&*+&)*+! =/&X\$. -!)*. '1A\$! 35789!, #<math>6/)*+!)*\%/: 6-0, *!6*A!\$\=\$/)\$*. \$! ()-#! ?89N! &*!'\$+6'!6*A!-\$. #*). 6'!/\$M1)/\$: \$*-,!/\$'6-\$A!-&!6!. \$*-/6'0, \$AF/\$+)&*6'!bN>0!/&'\$,!&% =6/-)\$, !6*A!-#\$!>\$. /\$-6/)6-0!. &: 1*). 6-0&*!\%/: 6-, 0!A6-6!: 6*6+\$: \$*-!6*A!+&S\$/*6*. \$P!!!

35789!),!6',&!.&&=\$/6-)*+!()-#!-#\$!@3!87B!6,!)-!.&*-)*1\$,!-&!A\$\$\$'&=!)-,!?'&06'!0*\%/: 6-)&*! 5\.#6*+\$!>2,-\$: !;?05><!\%/!-#\$!U\&/-!>-6-\$!N\\$6,1/\\$,!7+/\\$\: \\$*-!;\U>N7\\!''#\\$!U>N7\\\.; ,!6! :)*): 1: !,-6*A6/A!\%/!35789\!*\&-)*+!-#\\$!\\$'\\$.-/\&*).!U\&/-!>-6-\\$!9\&*-/\&'!,2,-\\$: