- G5 Z.O!M,\*\*!2%%!(![6(J!"!6,T,+(\*!>88%22\!84(\$T%!.'!J.O\$!+O,+,.'!('H!Q%%!I,\*\*!Q.\$:!!CDDEFG! HI16)&1!%->JE!
- E5 Z.O!4(/%!+4%!.K+,.'!+.!.K+!.O+!IJ!O2,'T!(!\*,'-!,'!(!\$%&,'H%\$!%&(,\*!J.O!M,\*\*!\$%8%,/%! M,+4!+4%!20I`%8+![6(J!"!6,T,+(\*!>88%22\5!K)'!0'\$%!);%!)'%!<u>#)!,-%1&!%L-#</u>!M-#'-&?! N0'''3!.+4%\$M,2%!J.O!M,\*\*!I%!84(\$T%H!Q.\$!+4%!+%R+I..-5!

P\$.0I\*%24..+, 'T!20KK.\$+!,2!(/(,\*(I\*%!GabW!+4\$.0T4!c,+(\*7.0\$8%5!

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=.\$!G9GG3!BUP!M,\*\*!8.'+,'O%!+.!8./%\$!+4%!8.2+!.0!&.I,\*%!,A\*,8-%\$25!>!K..\*!.0!K4J2,8(\*!8\*,8-%\$2!,2

+%(&&(+%2!24.0\*H!(KK%(\$!.'!+4%!20I&,22,.'5!=\$%%!\$,H,'T!24.0\*H!'.+!4(KK%'5!!)\*%(2%!8.'+(8+!&%!)>7>)!,0!('J!,220%2!(\$,2%!M,+4,'!J.0\$!+%(&5!!))

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> +!+4%!%'H! . 0!+4%!2%&%2+%3!J . 0\$!8 . '+\$, IO+, . '!+ .!+4%!+%(&M .\$-!M, \*\*!I%!20I`%8+!+ .!8 . '0,H%'+, (\*!K%%\$! %/(\*O(+, .'5!!Z . 0\$!4 . &%M .\$-!28 . \$%!M, \*\*!I%!M%, T4%H!IJ!J . 0\$!+%(&&(+%2j!%/(\*O(+, .'25!)))) = 0.5%!M

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#### 8#29)69+L-;%1&!<&-(%/(1!<&)I,10\$\*!

 $\begin{array}{l} \texttt{U!M, **!K. 2+!('2M\% \$2!+.!+4\%!.HH0'O\&I\%!\%'H0.Q084(K+\% \$!K\$.I*\% \&2!, '!+4\%!+\% R+I..-5!!Z.O!(\%)! \\ \texttt{WRK\% 8+\% H!+.!M.\$-!+4\$.OT4!+4\% 2\%!K\$.I*\% \&2!+.!\%'2O\$\%!\&(2+\%\$J!.Q!+4\%!\&(+\%\$,(*5!!P\$J!+.!H.!+4\%!K\$.I*\% \&2!M, +4.O+!*..-, 'T!(+!+4\%!('2M\% \$2!\$, T4+!(M(J5!!<u>U!M, **!'.+!8.**\% 8+</u>!J.O\$!M.\$-!.'!+4\% 2\%!K\$.I*\% \&25!!P4\% 2\%!(\$\%!T..H!K\$(8+,8\%!K\$.I*\% &2!Q.\$!+4\%!\% R(&2!2.!J.O!(\$\%!(H/,2\% H!+.!M.\$-!.'!+4.2\%!K\$.I*\% &25!!P4\% 2\%!(\$\%!T..H!K\$(8+,8\%!K\$.I*\% &2!Q.\$!+4\%!\% R(&2!2.!J.O!(\$\%!(H/,2\% H!+.!M.\$-!.'!+4.2\%!K\$.I*\% &25!!P4\% &25!!$ 

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#### **B**<sup>\\\\</sup>1#2-#(1!-#2!/#9(,-\$\$!;-&<sup>\\</sup>/(/;-<sup>\\</sup>/)#\*!

$$\label{eq:constraint} \begin{split} & Z . 0!(\$\%!(**.M\%H!+.!\&,22!\underline{+M}.!8*(22\%2!0.\$!M4(\underline{+\%/\%}!\$\%(2.'2!k\%R802\%H!('H!O'\%R802\%H!5!!@(84!(HH,\underline{+},.'(*!(12\%'8\%!M,\underline{**!}\%HO8\%!J.0\$!(\underline{+},\%'H('8\%!('H!K(\$+,8,K(\underline{+},.'!28.\$\%5!!0!J.0!\&,22!\&.\$\%!\underline{+}('!G9i!.0!\&(22\%2!kD!8*(22\%21!J.0!M,\underline{**!}\%8\%,/\%!(\underline{+},\%'H('8\%!('H!K(\$+,8,K(\underline{+},.'!28.\$\%!.0!m\%\$.!0.\$!\underline{+}4,2!8.0\$2\%5!!P4\%2\%!(12\%'8\%2!,'8*OH\%!I.\underline{+}4!/(*,H!k2,8-'\%223!M\%(\underline{+}4\%3!\%\&\%\%T\%'8,\%21!('H!,'/(*,H!\%(2.'2!)))) \end{split}$$

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Z.0\$!K(\$+,8,K(+,.'!,'!8\*(22!H,28022,.'2!,2!%22%'+,(\*!0.\$!%'4('8,'T!J.0\$!('H!J.0\$!8\*(22&(+%2j! \*\*%(\$','T!%RK%\$,%'8%!,'!+4,2!8\*(225!!Z.0\$!K(\$+,8,K(+,.'!,2!(!84('8%!0.\$!J.0!+.!+4,'-!8\$,+,8(\*\*J3!(KK\*J! \*\*%(\$'%H!8.'8%K+2!('H!02%!+4%!\*%(\$'%H!+%\$&,'.\*.TJ5!!;(-,'T!&,2+(-%2!,2!K(\$+!.0!\*%(\$','T5!!7.3! H.'j+!I%!24J3!K(\$+,8,K(+%!,'!8\*(22!H,28022,.'2!('H!T%+!&.\$%!.0+!.0!+4,2!8\*(22e!!!

>\*2.3!, 0! J . 0! 4 (/%! (!S0%2+, . ' !H0\$, ' T!\*%8+0%3!0%\*!0%%!+.!, '+%\$OK+! &%5! P4(+!M. ' j+!I . +4%\$! &%5!! !!

## +)00'#/(-%/)#\*!

 $\begin{array}{l} \texttt{U}!(\&!(/(,*(I^{*}\%!+.!('2M\%!SO\%2+,.'2!\%*(+\%H!+.!+4\%!8.0\$2\%!\&(+\%\$,(*!('H!+4\%!4.\&\%M.\$-5!!P4\%!I\%2+!)M(J!+.!8.'+(\$+!\&\%!,2!+.!2\%\%!\&\%!,'!.QQ,8\%!4.0\$25!!Z.0!8('!(*2.!\%\&(,*!\&\%!M,+4!24.\$+!SO\%2+,.'25!!U!M,**!+\$J!+.!\%2K.'H!+.!J.0\$!\%\&(,*2!K\$.\&K+*J!H0\$,'T!IO2,'\%22!4.0\$25!!)*\%(2\%!,'8*OH\%!@ABC!aX''X!,'!+4\%!2OI`\state{1} + 1.5\%2K.'K5!!! \\ \end{array}$ 

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## .1#%-%/S1!+)'&\$1!5'%,/#1!!

- "5 P4%!7,&K\*%!V%T\$%22,.'!; .H%\*!kA4(K+%\$!G1!
- G5 ;  $0^{+}, K^{*}, V^{T}$ ,  $1 > '(*J2, 2!) @2^{+}, (+, .'!kA4(K+)!E1!)$
- E5 ; O\*+,K\*%!V%T\$%22,.'!>'(\*J2,2:!U'Q%\$%'8%!kA4(K+%\$!al!
- F5 ; O\*+,K\*%!V%T\$%22,.'!>'(\*J2,2:!=O\$+4%\$!U22O%2!kA4(K+%\$!d1!
- d5 ;  $O^{+}, K^{*} ! V^{T} 2^{2}, . ' ! > ' (*J2, 2!M, +4! n O(*, +(+, / %!U'Q. \&(+, . ':!^, '(J!c((, I*)2! KA4(K+))!W))))$

D5 >HH,+,. ' (\*! ; O\*+,K\*%!V%T\$%22,. '!> ' (\*J2,2!U22O%25!

# T#/S1&\$/%?!<),/(/1\$!

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

## . \*/0-%\* ' \*12\$(3&%( ! 4 56789:(

 $> 2!(!&(++\%!.0!KOI*,8!4\%(*+4!('H!2(0\%+J3!(**!&\%&I\%!2!.0!+4\%!A]!^{.0\%H\%!8..}&&O',+J!('H!(**!KOI*,8!)), 2.5,1,2.5,$ 

 $\begin{array}{l} A ] !^{0} . 0^{H} \$ ! 80 \$ \$ ' +^{3} J ! \$ SO, \$ 2! \& (2 - 2!, '! 8^{2} (22 . . \& 2! ( 'H!^{4} ( I . \$(+ . \$, \% 2! \$ \% T (\$H^{*} \% 22! . 0! / (88, '(+, . '! 2+(+025! P4, 2! \$ SO, \$ \& \% '+!, 2! (!K \$ \$ (0+, . '!+. !20 KK \ast \& \% '+! A ] !^{0} . 0^{8} H \$ 5 J ! A B c U 6 0'' D! / (88, ' \%! \\ \$ SO, \$ \& \% '+5! @ R \% \& K+, . '2!, '8 * 0 H \%!, 'H, /, H0 (*2! M 4 . !8 ( ' . +! & M + 8 (**J!+. * \$ (+\%! (!0 (8\% ! 8 . / \% $, 'T3! (2! M) * 10 (2! M 4 . !! (1 . * + 1 . * 1 .$ 

## ; <<& ' ' &=#2-&1(3&%(7-\$#>-"-2-\*\$(

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UQ!J.O!SO(\*,QJ!Q.\$!(88.&&.H(+,.'2!I%8(02%!.Q!(!H,2(I,\*,+J3!K\*%(2%!20I&,+!J.O\$!(88.&&.H(+,.'! \*%++%\$!Q\$.&!6,2(I,\*,+J!7%\$/,8%2!+.!J.O\$!Q(80\*+J!&%&I%\$!,'!(!+,&%\*J!&(''%\$!2.!+4(+!J.O\$!'%%H2!8('! I%!(HH\$%22%H5!!6,2(I,\*,+J!7%\$/,8%2!H%+%\$&,'%2!(88.&&.H(+,.'2!I(2%H!.'!H.80&%'+%H!H,2(I,\*,+,%2! ,'!+4%!(8(H%&,8!%'/,\$.'&%'+5!!U'Q.\$&(+,.'!.'!\$%S0%2+,'T!(88.&&.H(+,.'2!,2!\*.8(+%H!.'! +4%!<u>6,2(I,\*,+J!7%\$/,8%2!M%I2,+%</u>5!A.'+(8+!6,2(I,\*,+J!7%\$/,8%2!(+!E9E0aDG0XdW''! .\$!<u>H2,'Q.N8.\*.\$(H.5%H0</u>!Q.\$!Q0\$+4%\$!(22,2+('8%5!!UQ!J.0!4(/%!(!+%&K.\$(\$J!&%H,8(\*!8.'H,+,.'3! 2%%!<u>P%&K.\$(\$J!;%H,8(\*!A.'H,+,.'2</u>!.'!+4%!6,2(I,\*,+J!7%\$/,8%2!M%I2,+%5!

#### ?%\*3\*%%\*=(@20=\*12(A# ' \*\$(#1=(?%&1&01\$(

A]!^.O\*H%\$!\$%8.T',m%2!+4(+!2+OH%'+2f!\*%T(\*!,'Q.\$&(+,.'!H.%2'f+!(\*M(J2!(\*,T'!M,+4!4.M!+4%J!,H%'+,QJ5!7+OH%'+2!&(J!OKH(+%!+4%,\$!K\$%Q%\$\$%H!'(&%2!('H!K\$.'.O'2!/,(!+4%!2+OH%'+!K.\$+(\*p!+4.2%!K\$%Q%\$\$%H!'(&%2!('H!K\$.'.O'2!(\$%!\*,2+%H!.'!,'2+\$O8+.\$2f!8\*(22!\$.2+%\$25!U'!+4%!(I2%'8%!.Q!2O84!OKH(+%23!+4%!'(&%5!

# **B&1&%(!&=\*(**

## @\*CO#"(D-\$<&1=0<2E(7-\$<%-'-1#2-&1E(B#%#\$\$'\*12(#1=F&%(.\*"#2\*=(.\*2#"-#2-&1(

A ] !^ .0\*H%\$!,2!8.&&,++%H!+.!Q.2+%\$, 'T!('!,'8\*O2,/%!('H!M%\*8.&,'T!\*%(\$','T3!M.\$-,'T3!('H!\*,/,'T! %'/,\$.'&%'+5!P4%!O',/%\$2,+J!M,\*\*!'.+!+.\*%\$(+%!(8+2!.Q!2%RO(\*!&,28.'HO8+!k4(\$(22&%'+3! %RK\*.,+(+,.'3!('H!(22(O\*+13!,'+,&(+%!K(\$+'%\$!/,.\*%'8%!kH(+,'T!.\$!H.&%2+,8!/,.\*%'8%13!2+(\*-,'T3!.\$! K\$.+%8+%H08\*(22!H,28\$,&,'(+,.'!.\$!4(\$(22&%'+!IJ!.\$!(T(,'2+!&%&I%\$2!.Q!.O\$!8.&&O',+J5! U'H,/,HO(\*2!M4.!I%\*,%/%!+4%J!4(/%!I%%'!20I`%8+!+.!&,28.'HO8+!.\$!\$%+(\*,(+.\$J!(8+,.'2!Q.\$!\$%K.\$+,'T! (!8.'8%\$'!24.O\*H!8.'+(8+!+4%!BQQ,8%!.Q!U'2+,+O+,.'(\*!@SO,+J!('H!A.&K\*,('8%!kBU@A1!(+!E9E0aDG0 G''GW!.\$!%&(,\*!80\$%K.\$+N 8.\*.\$(H.5%HO5!U'Q.\$&(+,.'!(I.O+!O',/%\$2,+J!K.\*,8,%23!\$%K.\$+,'T!.K+,.'2 7%%!+4%!<u>8(&KO2!K.\*,8J!\$%T(\$H,'T!\$%\*,T,.O2!.I2%\$/('8%2</u>!Q.\$!QO\*\*!H%+(,\*25! !