! ! ! ! ! ! **!** "#\$%&%" ' ("\$) #*%" + #* , # (-.) %% % # / + #) 0 " # / # 1 (# (-.) 2 * " + " * -) 3 (4 " * 1 * # ! -) 3 5 - " * / 67 (\$ # ("3-0%" 8 , - (!%-) - (- # (-+ "7%# (% 9 , \$ \$ # !%7 (# ("% ,)-+"\$7-(!% ! !) 75%3:;<=%)>?%&@AB@A@% % 7CD=CEFC: \&A6\GHGH\ ! ! ! !

(#L*"%.5%0.)(")(7%

 $\begin{aligned} & \text{``NCOI=JPC$``7IEE;:} M \text{``} \text{``NCOI=JPC$``7IEE;:} M \text{``} \text{``$

G? (\$. / , 0 (-.) %

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G?&%% .: U;<JY;=J><%>V%=SC%\$CD>:=%

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P)%,!\$8; '\$/!%,!7%9%787!%*/'!,898\$#.!&8:!,82/%'*,3!682/%'*!?3?!;\$'9%78,!#!J\$%8C!'98\$9%8<!'C!/)8! "-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!+\$#*/0!C'..'<87!J:!#!78,2\$%;/%'*!'C!/)8!89#.-#/%'*!#2/%9%/%8,! #*7!=8/)'7,!%*!682/%'*!E3!682/%'*!L!2'98\$,!/)8!C%*7%*+,!C\$'=!/)8!8b/8\$*#.!89#.-#/%'*3!P)8!\$8; '\$/! 8*7,!<%/)!#!2'*2.-,%'*!#*7!\$82'==8*7#/%'*,!%*!682/%'*!O3!

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G?G%% 9 I::;M%7=;=C%# / + #) 0 ''%#K;D=;=J><% . PC:PJCZ%

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 $"-\$\$! : !6/\#/8!M *\$98\$, \$/: !] " 6M^!\$, !2' = ; .8/\$ + !/) 8!C\$\$, /!: 8\#\$! 'C!\#!E>: 8\#\$!H6U!F5GFH(I!F7#;/#/\% '*!+\$#*/[!N898.\%+!/) 8!4.#: \% +!U\&.70!6/\$#/8+\%2!I_-\%/: !1*\%\%#/\%98, !#/! "-\$\$#: !6/#/8! M*\$98\$, \%/3!P) 8!; $'\$2/!#\\ =, !/'!J-\%.7!'*!, -228, ,C-.! " 6M!F5GFH(I!(#/#.:, /!#2/\\9\\%8, !#*7! #7#;/!; $'+$#=, !C$'=!'/) 8$!-*\$98\$, \%/\&8, !/'!\\ =; $'98!8_-\%/: !C'\$!C#2-./: !#/! " 6M!-, \% +!#*! \%*/8\$, 82/\% '*#.!C\$#=8<'\$&3!!$

 $\label{eq:solution} \begin{array}{l} & 6M!F5GFH(I!\!\#2/\!\!\$9\!\!\%/\!\!\$8,!\!\#\!\!\$8!\!\!\%'/\!\!\$^*787!/\!\!!\!\%=;\!\!\$'98!\!;\!\!\$\!\!\#2/\!\!\$28,!\!\#\!*7!\!'-\!/2\!'=\!8,!\!\!\$8.\!\#/\!87!/\!\!!!\!(\!\#\!2-./\!:\!!\!$

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- •! 1*>)'-,8!%*/8\$#2/%98!/)8#/\$8!+\$'-;!
- •! 68#\$2)!2' = = %//88!/\$#%*%*+!
- •! P8*-\$8!#*7!; ' = '/% ' *!2 ' = = %//88!/\$#%*%*+!

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3>;(\\G?\\''<S;<0C\\:C=C<=J><\;<K\\E>PCEC<=\\=S:>IUS\\:;<]R\[97,\3:>Z\\

- •! T \$%/%*+!D8/\$8#/,!
- •! I#\$.:!2#\$88\$!C#2-./:!<'\$&,)';,!
- •! "%7>2#\$88\$!C#2-./:!<'\$&,)';,

T^{5} , (-+-(-''7)

 $\label{eq:structure} $$ - $$ #: !6/#/8!F 5 GFH(I!#2/\\9\\\\8, !*!\\8#\$!@!C'2-, 87!'*!8b; #*7*+!=8*/'$*+!2\\$2.8, 0!.#-*2)*+! /) 8! < $\\\\\\8\\\8\\\8\\\8\\\8\\\8\\\8\\8\\\8$

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T?&% 97, %*C;:<%

 $P)8!'J\&82/\$98!'C! " 6M!N8\#\$*!\$, !/'!782\$8\#, 8!\% = ; .\$2\%/!J\%\#, !\%*!, 8\#\$2)0!/8*-\$80!\#*7!; \$' = '/\$'*!/)\$'-+)! /)8!7898.'; = 8*/!'C!#*!\%*/8\$#2/\$98!/)8#/\$8!; $'+$#=!#*7!/$#\%**+!9\%78', 3!$

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$T^{*}_{0} = C^{*}_{0} = JPC^{*}_{0} (SC^{*}_{0} = C^{*}_{0})$

 $P)8! " -\$\$#: !6/#/8!F5GFH(I!F7#; /#/\s' *! + $#*/!#\strute = ,!/'!#7#; /!/)8!M*\strute 98\$, \strute 1'C!H8 <!$

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!!O

5JUI:C\\&?\\

 $[&]quot;-\$\$\#:!6/\#/8!F5GFH(I!F7\#;/\#/\$'*! \ 8\#\$!@!I9\#.-\#/\$'*0!;\$8;\#\$87!J:!"\#\$\%\&'!()\#*+!('*,-./\%*+0!1*23!!!!X)$

P)8!4'<8\$4.#:!898*/,!<8\$8!#!,%+*%C%2#*/!,/8;!/'<#\$7!"-\$\$#:!6/#/8!F5GFH(I!7898.';%*+!/)8%\$! '<*!%*/8\$#2/%98!/\$#%*%+,0!#,!*'/87!J:!/)%,!%*/8\$9%8<88[!

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[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!!Q

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T?G% 97, %3:>Z%

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"6M!R\$'<!#%=,!/'!8*)#*28!/)8!\$8/8*/%'*!#*7!#79#*28=8*/!'C!<'=8*!6PI "!C#2-./:!/)\$'-+)!/)8! 8b;#*,%'*!'C!=8*/'\$%*+!';;'\$/-*%/%8,!#*7!.8#78\$,)%;!7898.';=8*/3!

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T?G?&% 9 C<=>:J<U%0J:00CR%

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P)8!+'#.!'C!/)8! "8*/'\$%*+!(%2.8,!;\$'+\$#=0!8,/#J.%,)87!#,!;#\$/!'C!/)8!;\$89%'-,!(#/#.:,/!+\$#*/0!%,! /'!C',/8\$!2'==-*%/:!#*7!,-;;'\$/!#='*+!<'=8*!C#2-./:!#/! "-\$\$#:!6/#/8!M*%98\$,%/:3!1*!\8#\$!@!'C! /)8!F7#;/#/%'*!+\$#*/0!<%/)!,-;;'\$/!C\$'=!/)8!4\$'9',/V,!ACC%280!/)8!;\$'+\$#=!<#,!8b;#*787!/'!#..'<! ;#\$/%2%;#*/,!C\$'=!#..!C%8.7,!\$#/)8\$!/)#*!K-,/!6PI "!'\$!6W6!C%8.7,!#,!%*!;\$89%'-,!:8#\$,3!

U#2-./:!<)'!2)'',8!/'!;#\$/%2%;#/8!%*!/)8!;\$'+\$#=!#\$8!#,,%+*87!/'!+\$'-;,!'C!X>S!<'=8*!C\$'=!#! 9#\$%8/:!'C!C%8.7,!<%/)!'*8!;88\$!C#2%.%/#/'\$3!R\$'-;!=8=J8\$,!8*+#+8!%*!\$8+-.#\$!=88/%*+,!/'!7%,2-,,! %,,-8,!\$8.89#*/!/'!<'=8*!%*!#2#78=%#0!2)',8*!J:!/)8!'' 6M!F5GFH(I!/8#=0!+\$'-;!;#\$/%2%;#*/,0! '\$!/)8!C#2%.%/#/'\$3!!

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P)8! "-\$\$#:!6/#/8!F5GFH(I!/8#=!2'*7-2/87!#!,-\$98:!'C! "8*/'\$%*+!(%\$2.8!;#\$/%2%;#*/,!%*!,;\$%*+!?Z?Z3!P<8*/:>

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!!S

"-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!!Y

5*GHI*#

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1*!J'/)!,-\$98:,!#*7!*/8\$9\8<,!<\/)!/)8!8b/8\$*#.!89#.-#/'\$0!2\\$2.8!;#\$/\2\;#*/\!*7\2#/87!/)#/! *8/<'\$&*+!#*7!2'**82/*+!<\/)!'/)8\$!<'=8*!C#2-./:!<#,!'*8!'C!/)8!=',/!-,8C-.!#,;82/,!'C!/)8! ; '+\$#=3!P)8,8!2 '**82/% '*,!)8.;87!C#2-./:!/ '!J-%.7!#!2 '= = -*%/:!'C!,-;; '\$/!#= '*+!/)8%\$! 2'..8#+-8,0!%*2.-7%*+!/)',8!#/!/)8!,#=8!.898.!#*7!='\$8!,8*%'\$!'\$!K-*%'\$!C#2-./:0!#*7!#2\$',.! 7%,2%;.%*8,!#*7!C%8.7,3!1*!%*/8\$9%8<,0!2%\$2.8!;#\$/%2%;#*/,!78,2\$%J87!/)8!J8*8C%/,[!

hP) 8 8! < #, !#1; '%*/!%*! '*8!'C!' - \$!2%2.8! = 88/%*+, !<) 8 \$8!1!2' = = 8*/87!/) #/!#1; #5/%2-.#\$!

=8=J8\$!'C!'-\$!2\\$2.8!<#,!/)8!*,;\\$#/\`*!/)#/!1!7\$#<!'*!*!28\$/#*!,\/-#/\`*,0!#*7!#*'/)8\$! =8=J8; (1/)8!2; 2.8!, #70!0A; (-188!/)8!; 8!1!7; (-188!/)8!; 8!1!7; (-188!/18); (-,\\/-\#/\\'*,3\!F*7!/)8*!/)8!'*8!/)#/!!!)#7!; '*/87!/'0!; '*/87!/'!#*'/)8\$!=8=J8\$!'C!/)8!

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 $\frac{h1}{n}, \frac{\#1}{4} = \frac{1}{10}, \frac{1}{4}, \frac{1}{10}, \frac{1$

h1n = !% * !k#!78; #\$/=8*/1m! * !/)8!87 + 8! C!2#=; -, 3!F*7!, 0!%/!K-, !!+#98!=8!#!\$8#.!+ ''7!

 $[&]quot;-\$\$#:!6/\#/8!F5GFH(I!F7\#;/\#/\$'*! \ 8\#\$!@!I9\#.-\#/\$'*0!;\$8;\#\$87!J:!"\#\$\%\&'!()\#*+!('*,-./\%*+0!1*23!!!0Z)$

T?G?G\\# / + #) 0 ''\ b :J=J<U\\\$C=:C;=\

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 $\begin{array}{l} P)8!F5GFH(I!T$\%/\%*+!D8/$8#/!<\#,!)8.7!\%*!,;\%*+!?Z?Z!#*7!\%^2.-787!8.898*!;#$/\%2\%;#*/,!\%*!#!\\ 9\#\%8/:!'C!C\&8.7,3!P)8!'J&82/\&98!'C!/)8!898*/!<\#,!/'!)8.;!<'=8*!C#2-./:!\%2\&#,8!/)8\&!<\%/\\%*+!:$ $;\'7-2/\&9\/:!#*7!/'!2'**82/!<\%/)!/)8\\&!2'..8#+-8,3!4#$/\\2\\;#*/,!<8\&8!#,&87!/'!#;;.:!/'!/)8!$ $;\'+$#=!#*7!78,2$\\J8!,;82\\C\2!\&8,8#\$2)!+'#.,!/)#/!/)8:!)';87!/'!#22'=;.\\,)!7-$*+!/)8!\&8\\&8#/3!$ $5-8!/'!/)8!-*\\98\$,\\':12.',-$8!\&8,-./*+!C\$'=!/)8!(AG15>@Y!;#*78=\\20!/)8!?Z?Z!\&8\\&#/!<#,!)8.7!$ $9\\$/-#..:3!1*!#77\\\\'*!/'!)#9*+!787\\2#\87!<\\\%*+!/\\=80!;#\$/\\2\\;#*/,!8*+#+87!*!9\\78'!$ $2'*98\$,#/\\'*,!#,!#!+$'-;3!$

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 $\begin{array}{l} \mathbf{P}'!=8\#, -\$8!/) \$!\$ = ; \#2/, !' C!/) \$!\$\$/\$\$ \#7! \#7!/'! \#7!/ \$! (2887 J \#2\&!'*!) '<!/3898*/!2 '-.7! J \$! \\ \$=;\$'9870!/) \$88!'*. \$*8!, -\$98:, !<8\$8! \#7= \$*\%, /8\$87!/'!; \#5/\%2\stars, [!#!; $8>, -\$98:!2'*7-2/87!; $\stars, [!#!; $8>, -\$98:!2'*7-2/87!; $\stars, [!#!; $8>, -$98:!2'*7-2/87!; $\stars, [!#!/) \$! 888*/!] h; $\stars, [!, -$98:!] = 87\stars, [!#!/) \$! 2'*2. -, $\stars, [!#!: (2!) 81898*/!] h; ', i^0! \#7! \\ \#'/) \$! $\stars, [!, -$98:!] $\stars, [!= 87\stars, [!#!/) 8! 2'*2. -, $\stars, [!#!; $8>, -$98:!2'*7-2/87!; $\stars, [!] \\ \#'/) \$! $\stars, [!, -$98:!] \\ \$! $\stars, [!= 87\stars, [!#!/) 8! 2'*2. -, $\stars, [!#!; (!], -$1000 \\ \$! \stars, [!] \\ \$! $\stars, [!] \\ \$! $\stars, [!] \\ \$! \stars, [!] \\ times, [!] \\$

7 I : PCM% \$ CR I ()=R%

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 $4\$\%'\$!/'!/)\$! <\$\%\%\% + !!\$\%\%\% \\ $1/10\% \\$

9%&;;()8(3#.%&.#P00(:.#P:%*('*)8#07*.*)8#R''&;3#

W8C'\$8!/)8!\$8/\$8#/0!;#\$/%2%;#*/,!\$8; '\$/87!/)#/!/)8!2)#..8*+8,!/)#/!= ',/!%=;#2/87!/)8%\$!#J%.%/:!/'! #22'=;.%,)!/)8%\$!<\$%/%*+!+'#.,!<8\$8!#//8*7%*+!/'!'/)8\$!;\$'C8,,%'*#.!\$8,; '*,%J%.%/%8,0!*'/!=#&%*+! <\$%/%*+!#!;\$%'\$%/:0!%*/8\$\$-;/%'*,0!#*7!;8\$C82/%'*%,=!]U%+-\$8!L^3!A/)8\$!2)#..8*+8,!%78*/%C%87!%*!';8*! \$8,; '*,8,!%*2.-787!2)%.72#\$80!.#2&!'C!,; '*/#*8%/:!%*!/)8!<\$%/%*+!;\$'28,,0!#*7!-*28\$/#%*/:!#J'-/! -*78\$/#&%*+!#!<\$%/%*+!;\$'K82/!<%/)'-/!C887J#2&!C\$'=!/)8!2'>#-/)'\$3!!!!

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/\`*!\8#\$!@!I9#.-#/\`*0!;\$8;#\$87!J:!"#\$\&'!()#*+!('*,-./*+0!1*23!!!@@

5JUI:C%T?%OS;QQC<UCR%=S;=%-ED;O=%#==C<KCCRd%#FJQJ=M%=>%#00>EDQJRS%b:J=J<U%3>;QR%[1:C6%1>R=6%;<K%Ae9><=S%1>R=%\$C=:C;=%9C;<R\!



5GKKJ#!:&;(E#KG5('(7#HGS::&3*")&;;1#MG!"D(.*D(3#NGSQ.()#TGP;;#.%(#.*D()

"-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**@**?

,-++8,/%*+!/)#/!/)8\$8!<#,!#!.'*+8\$>/8\$=!\$87-2/%'*!%*!/)8!8b;8\$%8*28!'C!/)8,8!2)#..8*+8,!#*7c'\$!#*! %*2\$8#,87!#J%.%/:!/'!8CC82/%98.:!=%/%+#/8!/)8=3!

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0 7*.*)8#4 &B*.3#

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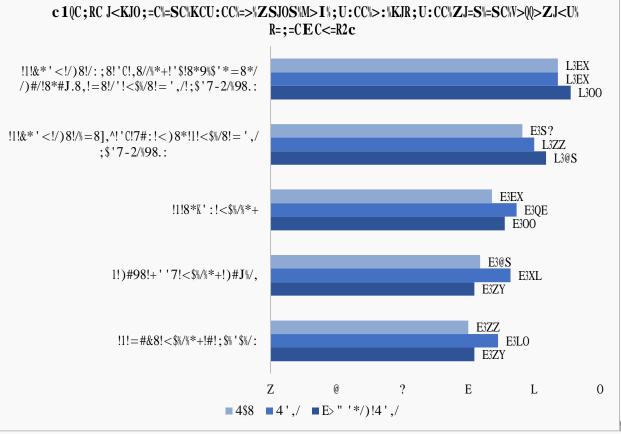
$$\begin{split} &4\$8>; \ ', !!!, \$8, ... = 8*/! \ 'C!!!!/8*788, \forall!\&* '<.87+8!!*7! <\$\%/\%*+!) \#J\%/, !C'-*7!/) \#/! <) \%.8! \#//8*788, !\\ &+8*8\$#... !<8\$8! = '\$8!. \%&8..!/ '!#+$88! \#C/8$!/) \$!\$8/$8#/!/) \#/!/) \$: !8*K': !<\$\%/\%*+0!) \#98!+ ''7! <\$\%/\%*+!\\ &) \#J\%/, 0! = #\&8! <\$\%/\%*+! !!; \$\% '$\%/: 0! #*7! &* '<!/) \$!\% = 8! 'C!7 #: !/) 8: !!<\$\%/8! = ', !; $'7-2/\$98.. 0!/) 8!\\ &\%2$8#, 8, !<8\$8!*'/!, #/\%, /\$2#..: !, \$+*\C\$2#*/3!] 688! U\$+-$8!0! #*7! P#J.8!?3^!!P) 8$8! <#, !!!, /#/\$, /\$2#..: !\\ &\%2$8#, 8, !<8\$8!*'/!, #/\%, /\$2#..: !, \$+*\C\$2#*/3!] 688! U\$+-$8!0! #*7! P#J.8!?3^!!P) 8$8! <#, !!!, /#/\$, /\$2#..: !\\ &\%7! #*8C\$2#*/!782$8#, 8!; ', !/'!E> = '*/), !; ', !!$8/$8#/!\$*788, \$2CC'$/, !/'! = #&8! <$\%/\$*+!#!; $\$'$\%/: !\\ &#*7! #+$88 = 8*/!/) #/!/) 8: !) #98!+ ''7! <$\%/\$*+!) #J\%/, 3!! \end{split}$$

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 $T) 8^{!!} ' = ; \#\$\%^{+!} / (8^{788}, \forall!E) = ' * /) !; ' , /! \$8 / \$# / !\$^{+}, !<\% / !) 8^{!} ; \$8! \$8 / \$# / !\$^{+}, 0! /) 8^{!} != ' * /) !; ' , /! \$8 / \$8 / !\$ / \$8 + .! < \% / \$8 + .! < \% / \$8! ; \$8! \$8 / \$8 / !\$^{+}, 0! /) 8^{!} != * & 8 / !' * ! = # & 8 + !! < \% / \% + .! !! ; \$\% ' $\% /: 0!8 * K' : \% + .! < \% / \% * + 0! /) 8^{!} != * (1 - 1) 8^{$

5JUI:C\\B?\\\$C=:C;=\\#==C<KCCRd\\W<>Z(CKUC\\;<K\\b:J=J<U\\4;FJ=R\\[1:C6\\1>R=6\\;<K\\Ae9><=S\\1>R=\\ \$C=:C;=\\9C;<R\



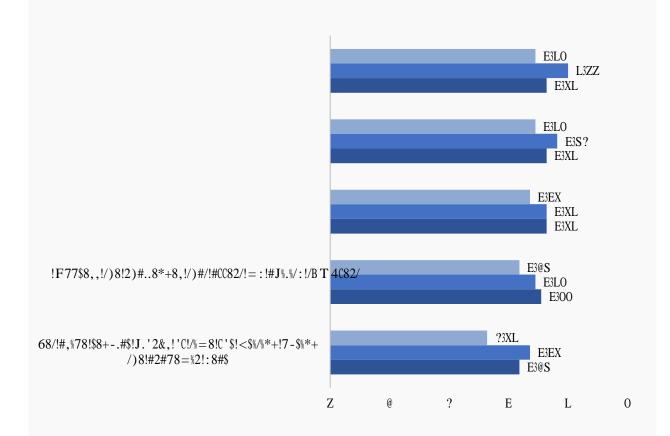
⁵*GKKJ*#!:&;(E#KY!.7")8;1#+*3&87((#HG#C*3&87((#MG5(=.7&;#NGP87((#TG!.7")8;1#P87((#

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%`*!\8#\$!@!I9#.-#/%`*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**@**L

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 $[&]quot;-\$\$#:!6/\#/8!F5GFH(I!F7\#;/\#/\$'*! \ 8\#\$!@!I9\#.-\#/\$'*0!;\$8;\#\$87!J:!"\#\$\%\&'!()\#*+!('*,-./\%*+0!1*23!!!@O$

5JUI:C%i?%\$C=:C;=%#==C<KCCRd%b:J=J<Ue\$CQ;=CK%0><VJKC<OC%[1:C6%1>R=6%;<K%Ae9><=SR%1>R=% \$C=:C;=%9C;<R\



 $5\,GKKJ\#!:\&;(E\#KG5".\#\&.\#\&;;\#HG5".\#D=:\%\#MG!"D(-\%\&.\#NGA"\#\&\#8""+\#(Z.().\#TGA"\#\&\#87(\&.\#(Z.().\%))))))$

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(;FQC%A?%OS;<UC%J<%#==C<KCCRd%O><VJKC<OC%[1:C%=>%1>R=6%1>R=6%1>R=6%;<K%1:C%=>%Ae 9><=S%1>R=6%;<K%1:C%=>%Ae

-=CE%	1:C%PR%1>R=% 0S; <uc% [)g&&\%</uc% 	1>R=\\PR\\ AeE><=S\\ 1>R=\\ 0S; <uc\\ [)g&&\\</uc\\ 	1:C%PR% AeE><=S% 1>R=% 0S; <uc% [)g&&\%</uc%
F22' = ;.%,)! = :! < %/% * +! + '#.,!	!!	!	!
"#%*/#%*!;',%/%9%/:!%*!/)8!8b;8\$%8*28!'C!<\$%/%*+!	% h %	!	!
I,/#J.%,)!<\$%/%*+!+'#.,!<%/)!\$8#.%,/%2!#*7!=8#,-\$#J.8! '-/2'=8,!	!!	»»!	!
F77\$8,,!/)8!2)#8*+8,!/)#/!#CC82/!=:!#J%.%/:!/'!<\$%/8! ;\$'7-2/%98.:!	!	!	!
68/!#,%78!\$8+#\$!J.'2&,!'C!/%=8!C'\$!<\$%/%*+!7-\$%*+!/)8! #2#78=%2!:8#\$!	% h %	!	!

 $U @ \#V \| XTJ \# \#): 7(\&3(\# \#C(:7(\&3(\#YY\#)"\#:\%\&)8(\#$

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**\X**

 $FC/8\$!/) \$!\$8/\$8\#/0!\#//\$*788,!\$78*/\$C\$87!, \$98\$#.!+\#\%*, !\$8, -./\%*+!C\$' = !/) \$\%! ; \#\%/\$2\% ; \#/\%'*!/\$*!/) \$! \\ \$8/\$8\#/3!P) \$, \$!\%*2. - 787!#*!#<\#\$8*8, .!'C!/) \$!*887!/'!7898.' ; !#!; $'28, .!C'\$!=#*#+\%+!/\%= \$!#*7! \\ <'$\&.'#73!4\#\%/\%2\% ; #*/,!#., '!.8\#\$*87!/) \$!\% = ; '$/#*28!'C!\$8C.82/\%+!'*!#22' = ; .\%,) = 8*/,!#*7!, 8//\%+! \\ #,\$78!*8+#/\$98!8='/\%'*, !/) #/!\$ = ; 878!/) \$! < $\%/\$*+!; $'28, .3!P) 8$8! < 8$8!#., '!\$*2$8#, 8, !\$*!8*/) - ,\$#, =! \\ #J' - /! < $\%/\$*+0!#!, 8*, 8!'C!#22' = ; .\%,) = 8*/0!#*7!, 898$#.! = 8*/\$'*87!+#*\$*!8#.8$!2'*C\$78*28!\$! \\ < $\%/\$*+3!!A/) 8$!+#*, !\$*2. - 787!.8#$*\$*\$*+!/'!J8!J8//8$!'$+#*\$B87!#*7!C'2-, 870!J$8#&\$*+!/#, &, !\$*/'! \\ = #*#+8#J.8!, 82/\$'*, 0!#*7!, 8//\$*+!#*7!C'..' < *+!$8#.\$, /\2!7#\$.:! < $\%/\$*+!+'#.3!F, !#!$8, -./0!, 898$#.! \\ ; #$/\$2\$; #*/, !$8; '$/87!J8*+!#J.8!/'! = #&8!, *+\$C\2#*/! < \\/\$*+!$$' +$8, .3!!$

T)8*!#,&87!#J'-/!/)8%\$!<\$%/%*+!+'#.,!C'\$!/)8!,%b!='*/),!C'..'<%*+!/)8!\$8/\$8#/0!;#\$/%2%;#*/,! \$8; '\$/87!/)8:!%*/8*787!/'!787%2#/8!/%=8!/'!<\$%/%*+!7#%.:!#*7!.%,/87!#=J%/%'-,!+'#.,0!C'\$!8b#=;.8[!

 $h@3!P'!, -J = \frac{1}{2} + \frac{1}{2} +$

! $hP'!, -J = \frac{1}{2} \frac{1}{2} \frac{1}{3} \frac{1}{3}$

h1!#=!C'2-,%*+!;\$%=#\$%.:!'*!=:!='*'+\$#;)3!!!<'-.7!.%&8!/<'!'\$!/)\$88!2)#;/8\$,!<\$%//8*! #*7!/)8!J''&!'-/.%*873i!

P'! 8: !!/8 = !#22' = :.%, 9!/8, 8! + '#., 0! : #\$/%2%; #*/, != 8*/%'*87!/8:!<'-.7!2#\$\$:!C'\$<#\$7!<)#/! //8:!)#7!.8#\$*87!C\$' =!/8!\$8/\$8#/0!<%/!=',/!2' = 8*/%*+!'*!/8!% =: '\$/#*28!'C!J\$8#&%*+!/)*+,! 7'<*!%*/'!, =#..!/#, &, 3!!P<'!: #\$/%2%; #*/, !#., '!=8*/%*87!/)#/!/8!, '2%#.!%*/8\$#2/%'*!#*7!, '2%#.! :\$8,,-\$8!'C!J8%*+!)8.7!#22'-*/#J.8!C'\$!<\$%/%*+!<8\$8!%=; '\$/#*/!#*7!'*8!, %+*87!-; !C'\$!#!+\$'-;!/'! .8:: !&88:!/9 =: !\$/#*/!#*7!'*8!, %+*87!-; !C'\$!#!+\$'-;!/'! .8:: !&88:!/9 =: '\$/#*/!#*7!'*8!, %+*87!-; !C'\$!#!+\$'-;!/'!! .8:: !&88:!/9 =: '\$/#*/!#*7!'*8!, %+*87!-; !C'\$!#!+\$'-;!/'!! .8:: !&88:!/9 =: '\$/#*/!#*7!'*8!, %+*87!-; !C'\$!#!+\$'-;!/'!! .8:: !&88:!/9 =: !#22'-*/#J.83!

T)8*!#,&87!C'\$!,-++8,/%'*,!#,!/'!)'<!/)8!\$8/\$8#/!2#*!J8!%=;\$'9870!;#\$/%2%;#*/!2'==8*/,!C'2-,87!'*!;\$'9%7%*+!#77%/%'*#.!';;'\$/-*%/%8,!C'\$!9%\$/-#.!2'**82/%'*0!,-2)!#,[!

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 $\begin{array}{l} h1!\#; \\ \$82\%\#/87!/) \\ \$!(\#2!/) \\ \$!= '\$'\%* + !\#7! \\ \#'(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!(2) \\ \$!= \\ \$!$

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**0**S

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h1C!%/!*887,!/'!J8!9%\$/-#.!#+#%*0!1!/)%*&!/)#/!%/!2'-.7!J8!)8.;C-.!)#9%*+!#!r''=!=88/%*+! ';8*!#..!7#:3!!1!<'\$&!<8..!<)8*!1V=!)8.7!#22'-*/#J.83!T)8*!1!+8/!7%,/\$#2/870!%/!)8.;,!=8! /'!J8!#J.8!/'!.''&!-;!#*7!,88!'/)8\$!;8';.8!<'\$&%*+!)#\$73i!

hP) 8! ' + # * B8 , ! 8 # ... ! 7 % 7 ! # !;) 8 * ' = 8 * # .! K ' J ! % * !; .# * * % * +! /) 8! + ' ' 7 % 8! J # + , 0! r ' ' = ! $= 88 / \% * + , 0! # * 7!; ' , % / \% 98! = 8, , # + 8, ! /) $' - +) ' - /! /) 8! 7 # : 3!! 48 $) #; ,! , / # $ / \% * +! 8 # $. \ 88 ! \ * ! /) 8! 7 # : 0!$ $# $' - * 7! S! ' $! S[EZ! # 3 = 30! # * 7c ' $! \ * 2 ' $; ' $ # / \% * +! # ! EZ >= \ * - / 8!. - * 2) ! = 88 / \% * +! ' *! r ' ' = ! 2 ' - .7! J 8!$) 8. : C - .3i !

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F,!,)'<*!\%*!U\%+-\\$8!S0!#/!/)\\$88!='*/),!;',/!\\$8/\\$8#/0!/)8!=#K'\\$\/:!'C!#//8*788,!]S? a^!#+\\$87!/)#/! /)8!\\$8/\\$8#/!,-;;'\\$/87!/)8\\\$!;\C8,,\\'*#.!2#\\$88\!7898.';=8*/3!U8<8\!#//8*788,!#+\\$870!)'<898\\0! /)#/!/)8:!#22'=;.\,)87!/)8!+'#.,!,8/!C'\\$!/)8!='*/),!,*28!/)8!\\$8/\\$8#/!]XL a^3!!

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!@Y

 $\begin{array}{l} 1^{*!} & |8!E\rangle = \frac{1}{1}, \frac{1}{894}, -\frac{1}{1}, \frac{1}{898}, \frac{1}{1}, \frac{1}{898}, \frac{1}{1}, \frac{1}{8788}, \frac{1}{871}, \frac{1}{871}, \frac{1}{1}, \frac{1}{1894}, \frac{1}{1}, \frac{1}{1898}, \frac{1}{1}, \frac{1}{1898}, \frac{1}{1881}, \frac{1}{1898}, \frac{1}{1881}, \frac{1}{1$

 $T) 8^{!\#}, & 87!/'!, -++8, /!\#77\%\%'*\#.!$8, '-$28, !'$!, -; ; '$/!/) \#/!/) 8:!<'-.7!) \#98!.\%&87!/'!) \#98!) \#7!\%*! /) 8!; \#, /! = '*/), !, \%^28!/) 8!$8/$8 \#/0! \#//8 * 788, != \#78!, 898 \%.!$82' = = 8 * 7 \#/\%'*, 3!P < '!'C!/) 8! \#/8 * 788, != 'M9#/87!#, !<8..!#, !, =#..!+$'-; !/#, &, !'$!7\%, 2-, , \%'*, 3!! A*8! #//8 * 788!, -++8, /87!/) #/!h) #9\%*+!, =#..!+$'-; ,!<) '!#$8!<'$ & \%*+! \%*!, \%=\%. \#$!C%8.7, c/:; 8, !'C! ; `K82/, c.898., !*!2 # 88!/) #/!2'-.7! #. & 1/3 * 1$

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!?Z

U#2-./:!(#-2-,0!#='*+!'/)8\$,3!P)8!+\$'-;,!#%=!/'!7%,8=%*#/8!%*C'\$=#/%'*!#J'-/!8b%,/%*+!;'.%2%8,!#*7!;\$';',8!2)#*+8,!/'!%=;\$'98!C#2-./:!,#/%,C#2/%'*!#*7!<'\$&>.%C8!J#.#*283!! !

 $[&]quot;-\$\$#:!6/\#/8!F5GFH(I!F7\#;/\#/\$'*! \ 8\#\$!@!I9\#.-\#/\$'*0!;\$8;\#\$87!J:!"\#\$\%\&'!()\#*+!('*,-./\$*+0!1*23!!!!)L$

 $2' = \frac{1}{88!} = 3 = J8 \le 1 = \frac{1}{100} = \frac{1}{100}$

 $\begin{array}{l} h1!/) \$ & \$! J 82\# - , \$!/) \$! 2' = = \$//88! . \$ #78\$, !7'!, -2) ! \#! + '7! \verb!\! J!' \verb!\!,) \$! 7 \# \$ * !/) \$!7 \# \#!/) \#!/ * \$! \\ 2' ..82/! \verb!\! S2! = !2\# = ; -, 0! \verb!\! S' = !, -\$98 : , ! '\$! \verb!\! S' = ! \verb!\! -, /!78 = '+\$ \#;) \$ 2!7 \# \# 3! \verb!\! P) \$!) \$ +) \$ \$! \\ \#7 = \$ \ast \$, /\$ \# \% * !J 8\$ \ast + !/) \$ \$ 8! \# 7! . \$, /8 \ast \$ * +!/ '!/) \$!7 \# / \#! = \# \& 8! \% / !! = -2)! = '\$ 8! \$ = ; \#2/C - .! \\ J 82 \# - , \$!/) 8: !, 88!/) 8! \ast 8870! \ast *, /8 \# 7! . !/) 8 = ! \verb!\! - , /! + 8 / \% * +! \#! 7' 2 - 8 \ast !/ < \$! = ; \#2/C - .! \\ J 82 \# - , 8!/) 8: !, 88!/) 8! \ast 8870! \ast *, /8 \# 7! . !/) 8 \$! J 8 \$ * +!/) 8 \$!/) \$ * +!/) 8 \$ 870! \# 7! . '!/) 8 \$! J 8 \$ * +!/) 8 \$!/) \$ * +!/) 8 \ast !/) 8 \ast !/) 8 \ast !/) 8 \ast !/) 8 \ast ?0! \# 7! . '!/) 8 \ast !J 8 \$ * +!/) 8 \$!/) \$ * +!/) 8 \ast !/) 8 \ast ?0! \# 7! . '!/) 8 \ast !J 8 \$ * +!/) 8 \$!/) 8 \ast !/)$

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 $P)8!Ib/8^{*\#.!6}/88^{*+!}('= = \frac{1}{88!} + 2.-78, \frac{1}{898}!C^{\#}2_{-1}/: \frac{1}{88!} + \frac{1}{898}, \frac{1}{88!} + \frac{1}{812}) + \frac{1}{812} + \frac{$

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**!**O

<'\$&!<%/)!/)8!15 IF!'CC%28!/'!2'=J%*8!/)8!8b%,/%*+!15 IF!/\$#%*%*+!<%/)!/)8!F5GFH(I!%=;.%2%/! J%#,!%*/8\$#2/%98!/)8#/\$8!/\$#%*%*+0!,%*28!J'/)!#%=!/'!%=;\$'98!/)8!C#2-./:!)%\$%*+!;\$'28,,3!

P)8,8!8b%,/%*+!8cC'\$/,!;\$'9%78!';;'\$/-*%/%8,!C'\$!2'..#J'\$#/%'*0!<)%2)!2#*!.8#7!/'!8*)#*287! '-/2'=8,!C'\$!#..!+\$'-;,!%*9'.9870!#,!,-==#\$%B87!J:!/)%,!%*/8\$9%8<88[!

 $\begin{array}{l} h1*2.-, \$'*!\#*7!7\$98\$, \$/:!) \#98!J88*!+'\$*+!'*!'*!2\#=; -, !C`\$!:8\#\$, 3!P)8!\#2/\$'*!C\$'=!/)8!\\ 7\$CC8\$8*/!+\$'-;, !=\$+)/!J8!J8//8\$!\$C!/)8:!2'\$*2\$787!<\$/2.5\%CC8\$8*/!+\$'-;, !\#\$8!\\ 7'\$*+!7\%CC8\$8*/!/)\$*+, !\#*7!\$C!/)8:!J\#*787!/'+8/)8\$!\%/!=\$+)/!J8!='\$8!\$=; \#2/C-.3i! \end{array}$

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T?T?A%-<=C:RC0=J><;(J=M%;<K% \$CD:CRC<=;=J><%

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 $\begin{array}{l} F!, \#/87!C'2-, !'C!/)8! " -\$\#: !6/\#/8!F5GFH(I!+\$\#*/!\%, !/'!-, 8!\#*!\%*/8\$, 82/\%'*\#.!C\$\#=8<'\$\&!/'! \\ \%=;\$'98!\$82\$-\%/=8*/!\#*7!\$8/8*/\%'*!'C!C8=\#.8!C#2-./:!\#/!/)8!-*\%98\$, \%/:3!6;82\%C%2#..:0!/)8!+\$#*/! \\ ,88\&, !/'!-*78\$, /\#*7!/)8!\%*/8\$, 82/\%'*!'C!\$#*&!!#*7!+8*78\$!'*!C#2-./:!8b;8\%8*283!!P)\%, !#;;$'#2)! \\ ,)'-.7!\$8=\#\%*!\#!C'2-, !'C!/)8\%\$!<'$&3!!1*!\%*/8$9\%8<, !<\/)!/)8!8b/8$*#.!89#.-#/'$0!, '=8! \\ ,/#\&8)'.78\$, !=8*/\%'*87!/)8!\%=;'$/#*28!'C!2'*, \%78\%\%*+!)'<!/'`!\%*2`$;'$#/8!'/)8$!\%78*/\%/\%8, !, -2)!#,! \\ $\#283!!U'$!8b\#=;.80!'*8!\%*/8$9\%8<88!=8*/\%'*87!/)8!2-$$8*/!78='+$#;)\%2,!'C!/>8!-*\%98$, \%/:!#*7! \\ /)8!J$'#78$!2'==-*\%:!<)8$8!\%!\%, !.'2#/87!;$8,8*/!2)#..8*+8, !\%*!/8$=,!'C!8*, -$*+!/)#/!<'=8*!'C! \\ 2'.`$!#$8!\%*2.-787!\%*!/)8!+$#*/!<'$&[!$

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 $\begin{array}{l} hP) \$\$\$n, !*'/!#!.'/!'C!k<'=8*!'C!2'.'\$!!'*!2#=;-,3!F*7!, '!1!/) \$*\&!/) \$:!kF5GFH(I1! \$*2.-78!<'=8*!'C!2'.'\$!#, !=-2)!#, !/) \$:!2#*3! T \$n\$\$! *!#$\$#0!#!98$:!$-$#.!<) \$/8!#$\$#!#*7! , '!, '=8!'C!/) #/!\,12) #..8*+\$*+0!J-/!<) #/!\,17\,2-,,87!#*7!/) \$!7##!/) #/!\,1,) #$\$70!) '<!<8! <'-.7!.\$&8!/'!='98!C'$<#$7!<\)!='$8!\$*2.-,\$98!8*9\$'*=8*/q/) 8!7\,2-,,\'*,!#$\$!/) 8\$80! J-/!#,!C#$!#,!$\$; $8,8*/#/\'*0!1!=8#*0!/) #/n,!2) #..8*+*+3i! \end{array}$

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 $\begin{array}{l} F^* '/ 8^{1} & F^{2} & F^{2} \\ J^{7} & F^{2} & F^{7} \\ J^{7} & F^{2} \\ F^{7} & F^{7} \\ F^{7} \\ F^{7} & F^{7} \\ F^{7} \\$

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 $\begin{array}{l} hP) \$\$1\%, 1\%1\% \$?\%\% $`1\%' 1\%2.-78! <'= 8*! 'C!2'. '\$1\%1/) \$!+\$\%\% $`1/3$!-\$1\% $`1/3$! $`1/3$! $$ 1\%2.-78! <'= 8*! 'C!2'. '\$1\%1/) \$! $$ 1\%2! $$$

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6'=8!\%*/8\$9\8<88,!#.,'!=8*/\%'*87!/)#/!\%/!<'-.7!J8!-,8C-.!/'!\%*2.-78!='\$8!=8*!\%*!/)8! "6M! F5GFH(I!<'\$&!#*7!#2/\%*+!#,!#79'2#/8,!#*7!#..\%,!/'!#79#*28!/)8!+'#.,3!!!!

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"-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!!?X

B?% O .) O * , 7- .) %#) / %W'' ! % \$ '' O . 9 9 '') / # (- .) 7%

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[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**!**?Q

- •! T '\$&!<%/)!\$8.89#*/!%*,/%/-/% '*#.!;#\$/*8\$,!/'!2'..82/!7#/#!'*!C#2-./:!78='+\$#;)%2,!#*7! %*C'\$=#/%'*!\$8.#/87!/'!,8#\$2)8,0!)%\$%*+0!/8*-\$80!#*7!;\$'='/%'*!%*!'\$78\$!/'!=8#,-\$8! ;\$'+\$#=!%=;#2/,!'98\$!/)8!2'-\$,8!'C!/)8!+\$#*/!
- •! ('*,\%78\$!8CC82/\%98!,/\$#/8+\%8,!C'\$!8*+#+\%*+!=8*!#,!#79'2#/8,!#*7!#..\%8,!\%*!/)8!<'\$&!'C!/)8! +\$#*/!
- •! I,/#J.%,)!7%\$82/!2'**82/%'*,!<%/)!/)8!4\$8,%78*/%#.!P#,&!U'\$28!'*!5%98\$,%/:!

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•! W8+%*!/'!8*+#+8!%*!2'*98\$,#/%'*,!C'2-,87!'*!)'<!/'!%*,/%/-/%'*#.%B8!&8:!;\$'+\$#=,!

 $\begin{array}{l} P'!2'*2.-780! "-\$\#:!6/\#/8!F5GFH(I!=\#78!\%=;\$8,,\$98!;\$'+\$8,,!\%*!/)\$!\%\%,!:8\#\$!'C!\%,!\\ F7\#;/\#/\%'*!+\$\#*/0!<\%/)!/)\$!.\#-*2)!\#*7!8b;\#*,\%'*!'C!,\%+*\#/-\$8!\%*\%/\%\#/\98,3!ICC'$/,!\%*!\8\#\$!?!,)'-.7!\\ C'2-,!'*!)'<!/'!C',/8\$!8*+\#+8=8*/!\%*!/)\$!\%*/8\$#2/\98!/)8\#/\$8!/\$\%\\\#\\98,3!ICC'$/,!\%*!\8#\\98,\98!/0!\#*7!\\ <'2*,.'':')'<!/*.''S',100'/38:!=-,/!J8!)8.7!9\\%/-#..:3!P)8!/8\#=!,)'-.7!#.,'!2'*/\%*-8!/'!2'...\#J'\$#/8!\#*7!,)#\$8!$ %*C'\$=#/%'*!<%)!2'=;.8=8*/\$:!%*,/%/-/%'*#.!8CC'\$/,!/'!%*2\$8#,8!J-:>%*!#*7!8*)#*28!/)8!%=;#2/,!'C!\$/,!<'\$&3!

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[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**!?S**

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**!**?Y

- S#! P*!; -34-!(&,!/1!4/%&8&(I(4-//%(!3(!</0)!6&2'), . &*,IO*3,!:(&&&4,!/*&=R! CHFA/COEHS/CSET/Ag c e COB/SNHP ! !
- T#! \$\&'(&!.')+!,-&!J0JJ\&!,-',!4/))&(2/*6(!,/!</0

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**E**Z

b :J=J<U% \$C=:C;=%GHGH% 1 :Ce7 I :PCM%

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- @3! d'<!7'8,!/)8!2'=;.8/%'*!'C!:'-\$!;.#**87!<\$%/%*+!;\$'K82/!C%/!%*!/'!:'-\$!.#\$+8\$!;\$'C8,,%'*#.! +'#.,!]%3830!;\$'='/%'*0!*8<!\$8,8#\$2)!7%\$82/%'*0!8*)#*2%*+!;\$'7-2/%9%/:0!8/23^p!!
- ?3! d'<!'C/8*!7'!: '-!8b;8\$\8*28!/)8!C'..'<*+!2)#..8*+8,!\=;#2/*+!: '-\$!#J\.\/:!/'!
 - #22'=;.%,)!:'-\$!<\$%/%*+!+'#.,p!]H898\$0!A22#,%'*#..:0!6'=8/%=8,0!AC/8*0!F..!/)8!P%=8^! #3! T \$%/8\$V,!J.'2&!
 - J3! 5 MCC 1/: !2' = * 2#/* + != : !*78#, !*! < */* + !
 - 23! R8//\%*+!8#,\%.:!7\%,/\$#2/87c.#2&!'C!C'2-,!
 - 73! 1*/8\$\$-;/%'*,!
 - 83! F//8*7%*+!/'!'/)8\$!;\$'C8,,%'*#.!\$8,;'*,%J%.%/%8,!]/8#2)%*+0!,8\$9%280!8/23^!
 - C3! F//8*7%*+!/'!;8\$, '*#.!#*7c'\$!C#=%.:!\$8, ; '*,%J%.%/%8,!
 - +3! 4'' = 8! = #*# + 8 = 8*/!
 -)3! N#2&!'C!+''7!<\$%/%*+!)#J%/,!
 - <code>\%3! H'/!,8//\%*+!'J\%2/\%98,!/'!)8.;!#2)\%898!J\$'#78\$!+'#.,!</code>
 - K3! H'/!=#&%*+!<\$%/%*+!#!;\$%'\$%/:!
 - &3! 4\$'2\$#,/%*#/%'*!
 - .3! 48\$C82/%'*%, =!
 - =3! U88.%*+!%, '.#/87!
 - *3! A/)8\$!uuuuuuuuuuuuuuu
- E3! T)#/!#77%/%'*#.!2)#..8*+8,0!%C!#*:0!7'!:'-!/)%*&!:'-!=#:!8b;8\$%8*28!+=7*)8#.%(#7(.7(&.! <)8*!/\$:%*+!/'!#22'=;.%,)!:'-\$!<\$%/%*+!+'#.,p!k4.8#,8!78,2\$%J81!
- L3! 4.8#,8!%*7%2#/8!/)8!8b/8*/!/'!<)%2)!: '-!#+\$88!'\$!7%,#+\$88!<%/)!/)8!C'..'<%*+!,/#/8=8*/,[!]6/\$'*+.:!F+\$880!F+\$880!H8-/\$#.0!5%,#+\$880!6/\$'*+.:!5%,#+\$88^!
 - #3! 1!=#&8!<\$%/%*+!#!;\$%'\$%/:3!
 - J3! 1!&* '<!/)8!/%=8,],^! 'C!7#:!<)8*!1!<\$%/8!= ',/!;\$ '7-2/%98.:3!
 - 23! 1!&* ' <!/)8!/:;8! 'C!,8//\%*+! '\$!8*9\\$ '*=8*/!/)#/!8*#J.8,!=8!/ '!<\$\/8!= ',/! ;\$ '7-2/\98.:3!
 - 73! 1!)#98!+''7!<\$%/%*+!)#J%/,3!
 - 83! 1!8*K':!<\$%/%*+3!

!

1

- 03! d'<!2'*C%78*/!#\$8!: '-!%*!: '-\$!#J%.%/:!/'mp!]P'!#!+\$8#/!8b/8*/0!P'!#!+''7!8b/8*/0! 6'=8<)#/0!H'/!=-2)0!H'/!#!.^!
 - #3! 68/!#, %78!\$8+-.#\$!J.'2&,!'C!/%=8!C'\$!<\$%/%*+!7-\$%*+!/)8!#2#78=%2!:8#\$3! J3!

Q3! T 8!<8.2' = 8!#*: !#77%/%'*#.!2' = = 8*/,[! S3! T)#/!%,!:'-\$!78;#\$/=8*/p! ! Y3! F/!/)8!,/#\$/!'C!C#..!,8=8,/8\$0!<)#/!%,!:'-\$!#*/%2%;#/87!\$#*&p!

!

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**E**?

b :J=J<U% \$ C=:C ;=%GHGH%1>R=e7 I :PCM%

\!&D(#Q''7#B''.%#@''3.#&)+#MYD'').%#@''3.]#

!

@3! 5-\$%*+!/)8!<\$%/%*+!\$8/\$8#/0!)'<!'C/8*!7%7!:'-!8b;8\$%8*28!/)8!C'..'<%*+!2)#..8*+8,! %=;#2/%*+!:'-\$!#J%.%/:!/'!#22'=;.%,)!:'-\$!<\$%/%*+!+'#.,p!]H898\$0!A22#,%'*#..:0!

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**E**E

- X3! 4.8#,8!%*7%2#/8!/)8!8b/8*/!/'!<)%2)!: '-!#+\$88!'\$!7%,#+\$88!<%/)!/)8!C'...'<%*+!,/#/8=8*/,! #J'-/!/)8!<\$%/%*+!\$8/\$8#/!]6/\$'*+.:!F+\$880!F+\$880!H8-/\$#.0!5%,#+\$880!6/\$'*+.:!5%,#+\$88! #*7!#!HcF!';/%'*!C'\$!/)8!%8=!#J'-/!/)8!(#*9#,!=#/8%#.,^[!
 - #3! P)8!\$8/\$8#/!)8.;87!8b;#*7!=:!;\$'C8,,\\'*#.!*8/<'\$&3!
 - J3! 5 \$*+!/)8!\$8/\$8#/0!1!J8*8C\//87!C\$' = !#!,8*,8!'C!2' = = -*\/:!/'!,-;;'\$/!=:!<\$\/*+! +'#.,3!
 - 23! 1!.8#\$*87!*8<!,/\$#/8+\%8,!C'\$!<\$\/*+!='\$8!;\$'7-2/\98.:3!
 - 73! P)8!\$8/\$8#/!)#,!,-;;'\$/87!=:!;\$'C8,,\'*#.!2#\$88\$!7898.';=8*/3!
 - 83! 1!#22' = ; .%,)87!/)8!+'#.,!1!)#7!,8/!C'\$!/)8!\$8/\$8#/3!
 - C3! 1!C'-*7!/)8!=#/8\$\$#.,!'*!(#*9#,!-,8C-.3!
 - +3!

[&]quot;-\$\$#:!6/#/8!F5GFH(I!F7#;/#/%'*!\8#\$!@!I9#.-#/%'*0!;\$8;#\$87!J:!"#\$%&'!()#*+!('*,-./%*+0!1*23!!!**E**L

b >:] **RS**>**D**%**7 I** : **P**CM

 $[&]quot;-\$\$\#:!6/\#/8!F5GFH(I!F7\#;/\#/\$'*! \ 8\#\$!@!I9\#.-\#/\$'*0!;\$8;\#\$87!J:!"\#\$\%\&'!()\#*+!('*,-./\%*+0!1*23!!!EO$

b >:] RS>D%7 I : PCM2% 0 %()#. ''#!&1#2 (3#&) +# 4 '' - #. ''#!&1#5 ''# U8J\$-#\$: !?S0!?Z?Z!

!

@3! R8*78\$[!!

- ?3! D#28cI/)*%2%/:[!!
- E3! ('..8+8cM*%/[!!
- L3! D#*&cD'.8[!
- 03! W8C'\$8!/)%,!/\$#%*%*+0!)'<!<'-.7!:'-!\$#/8!:'-\$!&*'<.87+8!'Cm!]H'*80!N%=%/870!"'78\$#/80! 6/\$'*+^!
 - #3! d'<!/'!89#.-#/8!\$8_-8,/,!*!/8\$=,!'C!/8*-\$8!8b;82/#/\'*,!
 - J3! d'<!/'!89#.-#/8!\$8_-8,/,!*!/8\$=,!'C!:'-\$!;8\$,'*#.!<8..>J8*+!
 - 23! d'<!/'!/8..!/)8!7%CC8\$8*28!J8/<88*!\$8_-8,/,!:'-!,)'-.7!#228;/!#*7!/)',8!:'-!,)'-.7! 782.\$*8!
 - 73! d'<!/'!,#:!h*'i!<%/)'-/!C88.%*+!+-%./:!
- !
- X3! FC/8\$!/)%,!/\$#%*%*+0!) ' <! < ' .7!: ' !\$#/8!: ' \$!&* ' < .87+8! 'Cm!!]H ' *80!N% = %/870! " ' 78\$#/80! 6/\$ ' *+^!
 - #3! d'<!/'!89#.-#/8!\$8_-8,/,!%*!/8\$=,!'C!/8*-\$8!8b;82/#/%'*,!
 - J3! d'<!/'!89#.-#/8!\$8_-8,/,!*!/8\$=,!'C!:'-\$!;8\$, '*#.!<8..>J8*+!
 - 23! d'<!/'!/8..!/)8!7%CC8\$8*28!J8/<88*!\$8_-8,/,!:'-!,)'-.7!#228;/!#*7!/)',8!:'-!,)'-.7! 782.\$*8!
 - 73! d'<!/'!,#:!h*'i!<%/)'-/!C88.%*+!+-%./:!
- Q3! P'!<)#/!8b/8*/!7'!: '-!#+\$88!<%/)!/)8!C'..'<%*+!,/#/8=8*/,!]6/\$'*+.:!7%,#+\$880!5%,#+\$880! H8-/\$#.0!F+\$880!6/\$'*+.:!#+\$88^[! #3! 1!%*/8*7!/'!-,8!,/\$#/8+%8,!;\$8,8*/87!%*!/)%,!<'\$&,)';!/'!89#.-#/8!\$8_-8,/,!%*!/)8!C-/-\$83! J3! P)8!;8\$, '*#.!8b#=;.8,!5\$3!D%,&%*!;\$'9%787!<8\$8!-,8C-.!/'!=83! 23! 1!<'-.7!\$82'==8*7!/)%,!<'\$&,)';!/'!=:!2'..8#+-8,3!