! "#\$%&""("))"*'+*%&'),""-.\$""/*"0.1"2)'+%*'

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QEJJEF	R!F&!O?SK!&FTKJA!NFOOKLKb>>>>>>>\\!
ERATF'	'VNAEFR!>>>>>>>>>>>\\\\\\\\\\\\\\\\\\\\\\\\\\
JNFHK!	? R " !WVTEJ " ENAEFR !>>>>>>> !X
HFOENE	XJ
P >	?,-'4',!\$6 F)4#%!"%28(! >>>>>>!Y
Z >	?,,#%85!N'6(-7'2(b>>>>>>>>>PP
[>	? . 1,7:7# J '26<! >>>>>>>>>>> PP
U>	?6'65.'2(!T#1'%)768!>>>>>>>>PP
\>]7-5-,#(^Q')'%-5-,#(^JO\$)#/'\$%<(^J#,:D

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Z	M7',#6-#*!A4%#\$)(!':!M7',#6-#*!\$6 "\$68#%'2(!H45(7-\$,!?-)(\$ >>>>>>>>>\Z\
[b>	H'()768! a!N4\$,0768!>>>>>> Z\
[P>	H%7=\$-5!\$6 J2%%#1)7)7'2(!T#-'%<768\\) >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
$[Z\rangle$	H%'1#%)5!O'((!'%!"\$.\$8#b>>>>>>>/ZY
[[>	&\$. 7,5!K<2-\$)7'6\$,!T784)(!\$6 H\%7=\$-5!?-)!d&KTH?e!R')7-#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</td
[U>	R + 60T # (50T
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EQHFTA?RA!NFRA?NA!ER&FTQ?AEFR!
H4'6#!dL#6#%$,ehYUXDZ[UD[Pbb!!
H4'6#!dF::7-#!':!N . 12(!O7:#ehYUXDZ[UD\Zbb!]
?<<%#((h!
\\\!R>!J4#%7<$6!T'$<!
O$0#!&'%#()*!E,,76'7(!_bbU\!
F::7-#!$6<! "#1$%) . #6)(h!
4))1(h^^;;;>,$0#:'\\#()>#<2^'::7-#(^!!
? --#((7/7,7)5!J#%=7-#(!!
N$\\#\\!?<=$6-\#.\#6)!N\#6)\#\\!
N#6)#%!: '%!?-$<#.7-!J2--#((!
N#6)#%!: '%!N47-$8'!H%'8%$. (!
"76768!J#%=7-#(!
&$-7,7)7#(!+'%0!F%<#%(!!
<u>&76$6-7$,!?7<!</u>
L,'/$,!K68$8#.#6)!F::7-#!
E-#!T760!^!&7#,<! c '2(#!!
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', 12*'3'2!)&4!5(36+!7+89:!

• "%28D&%##!J-4'',(!\$6<!N'...267)7#(!?-)!d&#<#%\$,e!!

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- "%28D&%##!J-4'',(!\$6<!N\$. 12(#(!T#82,\$)7'6(!dK"L?T!H\$%)!Y e!!
- E,,76'7(!N'6)%',,#<!J2/()\$6-#(!?-)!dJ)\$)#e!!
- E,,76'7(!N\$66\$/7(!T#82,\$)7'6!\$6<!A\$@!?-)!J#-)7'6!PbD[*!1\$\\$8\\$14!d<e!dJ)\$)#e!!
- E,,76'7(!O7G2'%!N'6)%',!?-)!':!P`[U!dJ)\$)#e!! ?-)!*!?%)7-,#!ME!L#6#%\$,!H%'=7(7'6(*!J#-)7'6!\^_DP_!H%'47/7)#<!J\$,#(!\$6<!H'((#((7'6!!
- N7)5!':!O\$0#!&'%#()!"%28!F%<76\$6-#(!dO'-\$,e!jj!P[\>bZ`!)4%'284!j!P[\>b[P!!
- N7)5!':!O\$O#!&'\\#()!?,-'4',!F\\<76\\$6-\#(!dO'-\\$,e!j!PPP\bX_!!

A4#!N',,#8#!7(!6')!\$!(\$6-)2\$%5!1%')#-)768!)4'(#!;4'!=7',\$)#!,\$;(!-'6-#%6768!7,,#8\$,!(2/()\$6-#(*!\$6<!N',,#8#!'::7-7\$,(!;7,,!-''1#%\$)#!;7)4!,#8\$,!\$2)4'%7)7#(!;4#6#=#%!6#-#((\$%5!\$6<!<##.#<!\$11%'1%7\$)#>!

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1, ;6:<'&:=>26!?:6!'@!12*'3'2!

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#> E6!%''. (!'%!\$1\$%).#6)(!; 4#%#!\$,,!%#(7<#6)(!\$%#!26<#%!)4#!\$8#!':!ZP*!1'((#((7'6!'%!-'6(2.1)7'6!':!\$,-'4',!

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- :> E6!%''. (!'%!\$1\$%).#6)(!; 4#%#!\$65!%#(7<#6)!7(!26<#%!)4#!\$8#!':!ZP*!-',,#-)7'6!':! -'6)\$76#%(!)4\$)!-'6)\$76!'%!1%#=7'2(,5!-'6)\$76#<!\$,-'4',!
- 8> H2/,7-!76)'@7-\$)7'6!d; 4#6!\$!()2<#6)!7(!:'26<!)'!/#!26<#%!)4#!76:,2#6-#!':!\$,-'4',!'%! \$65!')4#%!(2/()\$6-#!76!\$!12/,7-!\$\\#\$f!)47(!.\$5!/#!:2\)4#\\!<#. '6()\\\$)#<!/5!76)'@7-\$)7'6!\$6<^'\\!7.1\$7\\.#6)!\4\$)!-\$6!,#\$<!)'!\4#!7692\\5!':!\4#!()2<#6)!\\$6<^'\\!8!/5()\\$6<#\\e!
- 4> ?/2(#!':!\$,-'4',!d; 4#6!\$!()2<#6)!<%760768*!76)'@7-\$)7'6*!\$6<^'%!')4#%!\$,-'4',!%#,\$)#<! /#4\$=7'%!%#G27%#(!(7867:7-\$6)!()\$::!76)#%=#6)7'6*!.#<7-\$,!\$))#6)7'6*!\$6<^'%!
)%\$6(1'%)^\$<.7((7'6!)'!)4#!4'(17)\$,>!?/2(#!-\$6!/#!<#.'6()%\$)#<!/5!\$!'6#D)7.#!
 76-7<#6)!'%!\$!(#%7#(!':!#=#6)(ef!
- 7> H'((#((7'6!\$6<^\%!-'6(2.1)7'6!':!\$,-'4',!76!'1#6!-'6)\$76#\d(e!76!12/,7-!\$\#\$(!d7\#\>!'2)<''\(*!,'268#(*!/\$,-'67#(*!'2)<''\\(!500)\$8.

"D!

#, B)E<8:!F)*=2=(=6:!

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(5+9) &=H)(='&:!

8> V(#*!1'((#((7'6*!<7()\%7/2)7'6*!.\\$62:\\$-)2\%#*!'\%!<7(1#6(768!':!(56)4#)7-!<\%28(!)4\\$)! -'6)\\$76!768\\#<7\#6)(!'\%!.7.7-!)4\#!\#::\#-)(!':!7,,\#8\\$,!<\%28(!76-,2<768!/2)!6')!,7.7)\#<!)'! (56)4\#)7-!-\\$66\\$/7(\\$!1\%'<2-)(!;7)4!7,,\#8\\$,!-'6-\#6)\\\$)7'6(!':!AcN\\$!\\$6<!(\\$,=7\\$!<7=76'\%2.

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-, K=*L*26:MN'('+*L*26:MGO)(6>')+4:MG62@PA+'<62264!G*''(6+:!)

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- J#,:D1%'1#,,#<!(-'')#%(!\$%#!/\$66#<!:%'.!-\$.12(!\$6<!.\$5!6')!/#!()'%#<!'%!2(#<!'6!-\$.12(!1%'1#%)5!
- 17-5-,#(!.2()!/#!1\$%0#<!76!\$((786#<!/70#!%\$-0!\$%#\$(!'2)(7<#!)4#!%#(7<#6-#!4\$,,(>!!
- | 7-5-,#(! . 2()!/#!\|#87()\|#\|#<!\\$)!)4\|! "\|#1\\$\\) . \|#6)! ':!H2/,7-!J\\$:\|5>!
-]7-5-,#(!.\$5!6')!)'!/#!()'%#<!76!-'...'6!\$\\#\$(!':!/27,<768(!d\#>8*!4\\$,,;\\$5(\!)()\\$7\\;\#,,(e!;\4\\\#\\!)\4\\\\#!\\$\\#!6'!/70\\\\\\$-0(\c)!
-]7-5-,#(!(4'2,<!/#!,'-0#<!)'!/70#!%\$-0(>!]7-5-,#(!,'-0#<!)'!\$65)4768!')4#%!)4\$6!)4#!
 1%'=7<#<!/70#!%\$-0(!;7,,!/#!%#.'=#<!\$6<!)2%6#<!'=#%!)'!)4#!"#1\$%).#6)!':!H2/,7-!
 J\$:#)5!:'%!-',,#-)7'6>!
- Q')'%-5-,#(!.2()!/#!1\$%0#<!76!\$11%'=#<!1\$%0768!(1\$-#(>!!A4#5!.\$5!6')!/#!1\$%0#<! \$65; 4#%#!#,(#!'6!-\$.12(>!
- J0\$)#/'\$%<(*!(-'')#%(*!\$6<^'%!76D,76#!(0\$)#(!\$%#!6')!)'!/#!%7<<#6!'%!; '%6!76(7<#!\$65!/27,<768(>!

., B)E<8:!A)+0=&9!!

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J)2<#6)!1\$%0768!\$6<!\$-\$<#.7-!5#\$%!1#%.7)!#,787/7,7)5!7(!,7.7)#<!)'!\$,,!-'..2)768!()2<#6)(!\$6<!\$65!9267'%!'%!(#67'%!,#=#,!%#(7<#6)7\$,!()2<#6)(!;4'!;7(4!)'!'/)\$76!'6#>!&7%()D5#\$%!\$6<!('14'..'%#!%#(7<#6)7\$,!()2<#6)(!\$%#!6')!#,787/,#!)'!'/)\$76!\$6!\$-\$<#.7-!5#\$%!1#%.7)!\$6<!\$%#!6')!1#%.7))#<!)'!
1\$%0!'6!-\$.12(>!!!

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>, N64=*)2!N'>=2=(L!1**'EE'4)(='&!;6R86:(:!

J)2<#6)(!; 4'!4\$=#!<'-2.#6)#<!.#<7-\$,!.'/7,7)5!6##<(!(4'2,<!-'6)\$-)!)4#!<u>F::7-#!':</u>! ?--#((7/7,7)5!J#%=7-#(*!\$--#((7/7,7)5(#%=7-#(k,\$0#:'%#())#<2>!!

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J)2<#6)(! . \$5!/\%768!- ' . 1,\$76)(!\\$8\\$76()!)4\#!N',,\#8\#!\\$/ '2)!\\$65!\\$-\\$<\# . 7-!'\\!6'6D\\$-\\$<\# . 7-!(\#\\=7-\#(! 1\\' =7<\#<!)'!() . 2(-)0 . 2(7)0 . 2(\#)0 . 2(!\\$)1\# . '!

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), X6&6+)2!A+=&*=<26:!

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H%7'%7)7#(!; 4#6!.\$6\$8768!\$!1%')#()!'%!<#.'6()%\$)7'6!\$%#h!!

- -> H\\(\pi\(\pi\)=768!\)4\(\pi\)!26-\)7'6!':!N',\(\pi\)8\(\pi\)!\$-\)7=7\)7\(\pi\)16-,2<768!\(\pi\)\$-4768\(\pi\)\(\pi\)4\(\pi\)16\(\pi\)5<. 767(\)\(\pi\)3\)7'6\(\pi\)186<!'\)4\(\pi\)126-\)7'6\(\pi\)1'6\(\pi\)56<!'\:!-\$. 12(!!
- K<2-\$)768!\$6<!-'...7))768!)'!; '%0!\$11%'1%7\$)#,5!; 7)4!<#.'6()%\$)'%(!\$6<!:',,';!21!
 '6!7((2#(!':!-'6-#%6!)4\$)!; #%#!7<#6)7:7#<!)4%'284!)4#!1%')#()!%#(',2)7'6!
 </p>

%#1%#(#6)\$)7=#!; 4'!=7(7)(!)4#!N',,#8#!(4\$,,!/#!1#% . 7))#<!)'!)\$0#!14')'8\\$14(!':!<# . '6()\\$)'\(!'\\!1\#=#6)!()2<#6)(!:\" . !#@#\-7(768!)4#7\!\784)!)'!<# . '6()\\\$)#!1#\$-#:2,,5>!

6, J&(6+06+6&*6!S=(3!G<66*3!'0!5(36+:!

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H%')#-)768!(1##-4!76-,2<#(!6')!76)#%:#%768!;7)4!')4#%(0!(1##-4!%784)(!\$6<!1%')#-)768!)4#!(1#\$0#%0!)

E6<7=7<2\$,(!'%!8%'21(!.\$5!6')!(211\\((!)4\)(!#+-4!':!\\$6')4\\(16<7=7<2\),!g!)4\(15!.\$5!6')!4\=\(11\)(1\)#-0,\(11\)(!=\)'m!'=\(14\)(1\)#-4!;7\(47-4!)4\(15!<7\)(8\\)\\(14\)!

@, ?:6!'@!G'*=)2!N64=)!

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9, Y=16:(+6) E=&9\(\frac{1}{2}\)E=&9\(\frac{1}{2}\)! \(\frac{1}{2}\) \(\frac{1}{2}\)! \(\frac{1}{2}\) \(\frac{1}{2}\)! \(\fra

O7=#!()\|\daggerup .768!\|\sigma 6!\|\daggerup 40!\|7(!6')!\|1\|\widen .7)\|\daggerup 4!\|6(!\),\|7.7\|\daggerup 4!\|7\|6-2\|. ()\|\sigma 6-\|4!\|4\|\daggerup 4!\|\daggerup 4.7\|68!\|\\daggerup 1!\|7\|64!\|7.7\|\daggerup 4!\|7\|\daggerup 4!\|7\

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?65!%#G2#()(!:'%!#=#6)(!\$)!; 47-4!8\$.#(!':!(07,,!;7,,!/#!1,\$5#<!.2()!/#!\$11%'=#<!/5!)4#!L\$)#(!
N#6)#%>!
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! ! \$> N4#\$)768*!1,\$87\$%7(. *! '%! ')4#%!: '% . (!':!\$-\$<# . 7-!<7(4'6#()5!\$(!'2),76#<!76!)4#! N',,#8#!N\$)\$, '8>!

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- /> &2%67(4768!:\$,(#!76:'%.\$)7'6!)'!\$65!N',,#8#!'::7-7\$,*!:\$-2,)5!.#./#%*!'%!'::7-#!'%! 2)7,7C768!76:'%.\$)7'6!'/)\$76#<!26<#%!:\$,(#!1%#)#6(#(>!!
- -> &'%8#%5*!\$,)#%\$)7'6*!'%! . 7(2(#!':!\$65!N',,#8#!<'-2 . #6)*!%#-'%<*!'%!76()%2 . #6)!':! 7<#6)7:7-\$)7'6>!!
- Q7(%#1%#(#6)\$)7'6!\$6<^'%!:\$,(7:7-\$)7'6!':!.\$)#%7\$,(!(2-4!\$(!:\$/%7-\$)7'6!'%!\$,)#%\$)7'6!':!</p>
 <'-2.#6)(*!%#-'%<(*!\$6<^'%!7<#6)7:7-\$)7'6>!

#\$, $Z6)2(3!)&4!G)@6(L!; 6<'+(!1E&6:(L![7+89!T!12*'3'2!U='2)(='&:\!$

#-, N'I=6!)&4!F=2E!G*+66&=&9!

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), X6&6+)2!A'2=*L!

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=, K=):!J&*=46&(:!!

 $N '6-\# 6(!\%\#8\%<768!<7(-\%7.76\$)7'6*!/7\$(*!'\%!4\$\%\$((.\#6)!;7,,!/\#!.\$6\$8\#<!767)7\$,,5!)4\%'284!)4\#! \\ KG2\$,!F11'\%)267)5*!c\$\%((.\#6)*!\$6<!R'6<7(-\%7.76\$)7'6!1',7-5h!4))1(h^{\(\)^{\(\)}; \(\)^{\(\)}; \(\)^{\(\)},$0\(\)!\(\)^{\(\)},$1',7-7\(\)^{\(\)},$1',7-$

==, 7=:)>=2=(L!1**'EE'4)(='&:!)&4!7=:*+=E=&)(='&!

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00.240601.92cm-70767.9443-731T537.4261T.2>!

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I, B'EE=(E6&(!('!_+)&:96&46+!J&4=I=48)2:!

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1, X6&6+)2!X8=462=&6:!

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- ?,,!()2<#6)!\$6<!()2<#6)!'%8\$67C\$)7'6!:,5#%(*!1\$. 14,#)(*!\$6<!1'()#%(!d . \$@7 . 2 . !(7C#! [bm!/5!Ubme*!-4\$,0768!\$6<!')4#%!1'()768! . \$)#%7\$,(!d1'()768(e! . 2()!/#!\$11%'=#<!\$6<! ()\$. 1#<!/5!)4#!L\$)#(!N#6)#%!/#: '%#!)4#5!\$%#!4268!'6!-\$. 12(!'%!76!)4#!-' . . 267)5>! "#1\$%) . #6)!\$6<!'::7-#!:,5#%(*!1\$. 14,#)(!\$6<!1'()#%(!<'!6')!6##<!)'!/#!()\$. 1#<!/5!)4#! L\$)#(!N#6)#%!/2)! . 2()!-' . 1,5!; 7)4!N',,#8#!1',7-7#(>!
- ? 11% '=#<!,7)#%\$)2%#! . \$5!/#!1 ' ()#<!: '%!\$! . \$@7 . 2 . ! ' :!); '!; ##0(!26,#((!\$6!#@)#6(7'6! 7(!\$11%'=#<!/5!)4#!L\$)#(!N#6)#%! + 7)476!ZU!4 ' 2%(! ' :!- ' . 1,#)7 ' 6! ' :!)4#!#=#6)*!)4#! 76<7=7<2\$,!'%!'%8\$67C\$)7 ' 6! . 2()!%# . '=#!\$,,!1 ' ()#%(>!
- F6,5!1'()768(!1%'.')768!N',,#8#D\$11%'=#<!#=#6)(!;7,,!/#!#,787/,#!:'%!1'()768*!#@-#1)!
 -\$.1\$786!1'()768(!:'%!()2<#6)!#,#-)7'6(>!
- ?!.\$@7.2.!':![b!1'()768(!.\$5!/#!1'()#<!/5!\$65!'\%8\\$67C\\$)7'6!'6!-\\$.12(\>!
- ?,,!1'()768(! . 2()!4\$=#!)4#!6\$. #!':!)4#!(1'6('%768!<#1\$%) . #6)^()2<#6)!'%8\$67C\$)7'6! -.#\$%,5!7<#6)7:7#<>!

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- ?,,!1'()768(!\$<=#%)7(768!('-7\$,!#=#6)(!.2()!,7()!/#8766768!\$6<!#6<768!)7.#(\frac{1}{2})!
- ?,,!:,5#%(!\$6<!1'()!/#ETQq0.24000.240%&#PRB(7'6!

- H'()768(!76!%#(7<#6-#!4\$,,(!\$\\#!,7.7)#<!)'!'6\\!;,5\\\!1\\\!T\\!(7<\\)6)!?((7()\\$6)\!!
- A4#!F::7-#!':!T#(7<#6-#!O7:#!;7,,!<7()%7/2)#!)4#!:,5#%(!)'!)4#!T#(7<#6)!?((7()\$6)(!)'!/#! 4268!'6!#\$-4!:,''%>!

4, 1*)46E=*!K8=24=&9:!

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\$#, A+'<6+(L!Y'::!'+!7)E)96!

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 $E4\% (@.00\%2\% (3'(\&."(*\%',.\&'350\%(.*(03)50\%(/.*('"#$\%\&"(,*.,\%*":(0.''(.*(\$)9)2\%(./()\&:('.*"6(3\&-0\#$3\&2(0.''(.--\#**3\&2(\$\#\%(".('3"\#)"3.\&'(5\%:.\&\$(3"'(-.\&"*.06(3\&(@.00\%2\%(,*.2*)9'(.*()-"3>3"3\%'6(.*(.\&(@.00\%2\%(,*.93')')';(E4\%(@.00\%2\%(3'(\&."(*\%',.\&'350\%(/.*("4\/"(.*(\$\""#+-"3.\&(./(,\%*'.\&)0(,*.,\%*":;(B)?\%(8.*\"'(@.00\%2\%(\$."(*..,**'.8)0(5\%).\&23\&2';($

\$\$, F) E=2L!Q48*)(='&)2!;=93(:!)&4!A+=I)*L!1*(![FQ;A1\!^'(=*6!!

O\$0#!&'\\(\frac{1}{1}\),\(\frac{1}\),\(\frac{1

\$%, $^{\prime}$ &P; 6()2=)(='&!

\$/, GE'0=&9!

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J. '0768!':!\$,,!076<(!7(!1%'47/7)#<!76!\$,,!-\$. 12(!/27,<768(!\$6<!;7)476!Z\!:##)!':!\$65!/27,<768! #6)%\$6-#>!J. '0768!%#:#%(!)'!\$65!076<!':!-78\$%#))#*!-78\$%*!171#*!9'76)*!4''0\$4*!;\$)#%!171#*!#H#6*! =\$1768!<#=7-#*!\$6<^'%!\$65!7867)#<!1\$%\$14#%6\$,7\$>!

\$0, G'2=*=()(='&!

J',7-7)\$)7'6!7(!<#:76#<!\$(!\$65!\$))#.1)!)'!1%'.')#*!(#,,*!<7()%7/2)#*!'%!-',,#-)!:'%!-'..#%-7\$,*!
1',7)7-\$,*!-4\$%7)\$/,#*!%#,787'2(*!'%!1#%('6\$,!12%1'(#(>!T#1%#(#6)\$)7=#(!':!'::D-\$.12(!8%'21(!;7,,!6')!/#!1#%.7))#<!)'!(',7-7)!'6!-\$.12(!;7)4'2)!)4#!\$11%'=\$,!':!)4#!L\$)#(!N#6)#%>!

$C = G = G = G = C + A \cdot 2 = L!$

F6,5!()2<#6)!'%8\$67C\$)7'6(!'::7-7\$,,5!%#-'867C#<!/5!)4#!N',,#8#*!)4#!N',,#8#!7)(#,:*!'%!%#-'867C#<!N',,#8#!'%8\$67C\$)7'6(!.\$5!76=7)#!\$!(1#\$0#%!)'!)4#!-\$.12(>!F)4#%!)4\$6!:\$-2,)5!76!)4#!-'6)#@)!':!)4#7%!-,\$((%''.(*!6'!76<7=7<2\$,!'%!26%#-'867C#<!8%'21!.\$5!76=7)#!'2)(7<#!(1#\$0#%(!)'!-\$.12(>!!

 $\begin{array}{l} J)2<\#6)!\$6<!\,')4\#\%!N\,'\,,\#8\#!\,'\%8\$67C\$)7\,'6(!\,.\,2()!\#6(2\%\#!\$11\%\,'\,1\%7\$)\#!1,\$66768^*!\$6<!6\,')7:7-\$)7\,'6!\,':!\\ N\,'\,,\#8\#!\,'::7-7\$,(>!H,\$66768!76-,2<\#!\%\#(\#\%=768!\%\,'\,'\,.\,(!d(\#\#!J1\$-\#!T\#(\#\%=\$)7\,'\,6(e^*!-\$)\#\%768^*!(\#)21(!\$6<!)\#-467-\$,!\%\#G27\%\#\,.\,\#6)(^*!)7-0\#)(^*!12/,7-7)5^*!-\$)\#\%768^*!\#)->!A\,'\,!(-4\#<2,\#!\$6!\,'\,2)(7<\#!(1\#\$0\#\%!\$-7)7=7)5!\,'\%!\#=\#6)>! \end{array}$

- &'%!'2)(7<#!(1#\$0#%!\$-)7=7)7#(!'%!#=#6)(!,7.7)#<!)'!)4'(#!;4'!1\$%)7-71\$)#!76!\$6!'::7-7\$,,5!
 %#-'867C#<!'%8\$67C\$)7'6*!)4#!\$<=7('%!':!)4#!'%8\$67C\$)7'6!.2()!1%'=7<#!;%7))#6!\$11%'=\$,*!
 \$6<!)4#!'%8\$67C\$)7'6!.2()!(4\$%#!)47(!\$11%'=\$,!;7)4!)4#!M7-#!H%#(7<#6)!:'%!N\$.12(!O7:#!'%!
 <#(786##>!A47(!)51#!':!#=#6)!.\$5!6')!/#!12/,7-7C#<!/#5'6<!)4#!()2<#6)!'%8\$67C\$)7'6>!
- ?65!12/,7-7C768!: '%!'%8\$67C\$)7'6D(1'6('%#<!'2)(7<#!(1#\$0#%!\$-)7=7)7#(!'%!#=#6)(! . 2()! #@1%#((,5!()\$)#!)4\$)!7)!7(!(1'6('%#<!/5!)4#!%#G2#()768!()2<#6)!'%8\$67C\$)7'6d(e!\$6<!6')!/5!)4#!N',#8#*!\$6<!(4'2,<!(1#-7:5!)4#!,'-\$)7'6*!)7 . #^<\$)#*!\$6<!\$2<7#6-#!:'%!;47-4!7)!7(! 76)#6<#<!

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A\$7,8\$)768!7(!\$,,';#<!/5!\\#87()\#\\#<!()2<\#6)!'\\8\\867C\\$)7'6(!76!-'6926-)7'6!;7)4!J\\$)2\\<\\$5!'\\!J26<\\\$5!'2)<''\\!=\\(7)5!-'6\)\#()(\!T\#G2\#()(!.2()!/\#!(2/.7))\#<!6'!,\\$)\#\\!)4\\86!X!<\\\$5(!76!\\$<=\\$6-\#!=7\\$!\#D.\\$7,!)'!?((7()\\$6)!?)4,\#)7-!"7\\#-)'\\!Q70\#!T\\$5.'6<!d

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J)2<#6)(!; 4'!#68\$8#!76!)4#!N'<#!':!J)2<#6)!N'6<2-)!1%'-#((!; 7,,h!!

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- V6<#%()\$6<!)4#!#<2-\$)7'6\$,!=\$,2#!':!)4#!N'<#!':!J)2<#6)!N'6<2-)!1%'-#((!\$6<!)4#!/#4\$=7'%(!)4\$)!=7',\$)#!()2<#6)!-'6<2-)!#@1#-)\$)7'6(>!!
-] #!\$/,#!)'!\$%)7-2,\$)#*!%#:,#-)*!\$6<!<# . '6()%\$)#!)4#7%!26<#%()\$6<768!':!4';!)4#7%!
 1#%('6\$,!=\$,2#(!\$6<!\$-)7'6(!7 . 1\$-)!)4#7%!#<2-\$)7'6\$,!8'\$,(!\$6<!:2)2%#>!!
-] #!\$/,#!)'!\$%)7-2,\$)#*!%#:,#-)*!\$6<!<# . '6()%\$)#!)4#7%!26<#%()\$6<768!':!4';!)4#7%!
 1#%('6\$,!=\$,2#(!\$6<!\$-)7'6(!7 . 1\$-)!)4#!0\$0#!&'%#()!-' . . 267)5!\$6<!')4#%(>!!
-] #!\$/,#!)'!7<#6)7:5!/#4\$=7'%(*!\$-)7'6(*!\$6<!=\$,2#(!)4\$)!#64\$6-#!)4#7%!\$/7,7)5!)'!-%#\$)#*! . \$76)\$76*!\$6<!-'6)%7/2)#!)'!4#\$,)45!%#,\$)7'6(471(!;7)476!)4#7%!-'...267)7#(>!!

 $\begin{array}{l} 1\#!\$/,\#!)'!7<\#6)7:5!\%\#('2\%-\#(*!\$\%)7-2,\$)\#!4';!)'!2)7,7C\#!)4\#.!\#::\#-)7=\#,5*!\$6<!\$11,5!\%\#(1'6(7/,\#!2-7)7)7C\#(1':!)4\#!8,'/\$,!-'...267)5!\$6<!(',=\#!1\%'/,\#...(!76!)8!-7=7,!..\$66\#\%*!-',,#-)7=\#,5*m!\$(!\%#:,\#-)\#<!76!)4\#!N',,\#8\#I(!..7((7'6!()\$)\#..\#6)>! \end{array}$

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- > G(846&(!b!@'%!12%1'(#(!':!)4#!N'<#!':!N'6<2-)*!()2<#6)(!76-,2<#!\$,,!1#%('6(!)\$0768!
 '6#!'%!.'%#!-'2%(#(!'%!')4#%;7(#!#6%',,#<!\$)!)4#!N',,#8#f!1#%('6(!;4'!;7)4<%\$;!
 <2%768!)4#!1#6<#6-5!':!\$!N'<#!':!N'6<2-)!1%'-#((!\$:)#%!\$,,#8#<,5!=7',\$)768!N',,#8#!
 H',7-5f!1#%('6(!;4'!;#%#!/2)!\$%#!6')!-2%%#6),5!'::7-7\$,,5!#6%',,#<!:'%!\$!1\$%)7-2,\$%!)#%.!
 /2)!;4'!4\$=#!\$!-'6)762768!%#,\$)7'6(471!;7)4!)4#!N',,#8#!d\$6<!;4'!4\$=#!6')!8%\$<2\$)#<!
 :%'.!)4#!N',,#8#ef!\$6<!1#%('6(!;4'!4\$=#!/##6!\$--#1)#<!:'%!\$<.7((7'6!)'!)4#!N',,#8#!
 /2)!6')!5#)!.\$)%7-2,\$)#<!
 </pre>
- . > **G(846&(!'+9)&=H)(='&!**D!\$65!8%'21!':!()2<#6)(!)4\$)!7(!%#-'867C#<!/5!)4#!N',,#8#!\$(!\$! ()2<#6)!'\%8\\$67C\\$7'6!

=, G(846&(!5+9)&=H)(='&:!)&4!B'&48*(!

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?!()2<#6)!'\8\\$67C\\$)7'6!.\\$5!/#!<7(-71,76#<!:'\%!\\$!=7',\\$)7'6!':!\N',,#8#!\H',7-5!/5!\\$6!76<7=7<2\\$,*!

\$> "7(%21)7'6!'%!'/()%2-)7'6!':!)#\$-4768*!%#(#\$%-4*!\$< . 767()%\$)7'6*!<7(-71,76\$%5!1%'-##<768(*!')4#%!N',#8#!\$-)7=7)7#(*!76-,2<768!7)(!12/,7-!(#%=7-#!:26-)7'6(!'6!'%!'::!-\$. 12(*!'%!':!

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A4#!M7-#!H%#(7<#6)!: '%!N\$. 12(!O7:#!7(!<#(786\$)#<!/5!)4#!N',,#8#!H%#(7<#6)!) '!/#!%#(1'6(7/,#!:'%!)4#!\$< . 767()%\$)7'6!':!)47(!N'<#!':!J)2<#6)!N'6<2-)>!!A4#!M7-#!H%#(7<#6)!: '%!N\$. 12(!O7:#! . \$5! <#(786\$)#!'6#!'%! . '%#!N',,#8#!F::7-7\$,(!d7>#>!)4#!"#\$6!':!J)2<#6)(*!"7%#-)'%!':!T#(7<#6-#!O7:#*!#)->e!)'!-\$\%5!'2)!\%#(1'6(7/7,7)7#(!\$((786#<!/5!)47(!N'<#>!

#, U='2)(='&!'@!Y)S!)&4!(36!B'22696!A'2=*L!

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O\$0#!&'\\#()!\N',\#8#!<7(-71,76\\\5!1\\\'-\##<768(!.\\$5!/\#!76()7)2)\#<!\\$8\\76()!\\$!()2<\#6)!\\\!()2<\#6)!

0, 14E=&=:(+)(=I6!Z6)+=&9!

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? (!<#)#% . 76#<!\$11% ' 1%7\$)#*!\$!()2<#6)! '%!()2<#6)! '%8\$67C\$)7 ' 6! ; 7,,!/#!<7%#-)#<!) ' !\$))#6<!\$6! ?<. .767()%\$)7=#! c #\$%768! ; 7)4!\$!N ' ,,#8#!F::7-7\$,!) ' !%#=7# ; !)4#!\$,,#8#<!=7 ' ,\$)7 ' 6d(e>!!

A4#!?<..767()%\$)7=#!c#\$%768!;7,,!/#!(-4#<2,#<!6'!,#((!)4\$6!);'!dZe!6'%!.'%#!)4\$6!:7=#!d\e!
/2(76#((!<\$5(!\$:)#%!)4#!()2<#6)^'%8\$67C\$)7'6!4\$(!/##6!1%#(#6)#<!;7)4!\$!R')7-#!':!?,,#8#<!
M7',\$)7'6>!E6!-#%)\$76!-\$(#(*!<#1#6<768!'6!)4#!(#=#%7)5!'%!)4#!-7%-2.()\$6-#(!':!)4#!\$,,#8#<!
=7',\$)7'6*!)4#!N',,#8#!F::7-7\$,!.\$5!(-4#<2,#!\$!.##)768!;7)4!)4#!()2<#6)^'%8\$67C\$)7'6!/#:'%#!)4#!
);'!dZe!<\$5(!.767.2.>!!!

?)!\\dagger #\\dagger 68\!\\dagger 1.7\; #\\dagger 4\!\\dagger 7\; #\\dagger 6\!\\dagger 1.7\; #\\dagger 6\!\dagger 1.7\; #\\dagger 1.7\; #\

C, B'&48*(!K')+4!Z6)+=&9!

N# ()\$76!=7',\$)7'6(!)4\$)!-'2,<!%#(2,)!76!(\$6-)7'6(!)76=',=768!(2(1#6(7'6!':!8%#\$)#%!)4\$6!Pb! $76()\%2-)7'6\$,!<\$5(*!\#@12,(7'6^<7(.7((\$,!'\%!\%\#='-\$)7'6!':!<\#8\%\#\#\#*!'\%!.\$))\#\%(!76!;47-4!\$!()2<\#6)!$ '\$8\$67C\$)7'6!:\$-#(!1'((7/,#!,'((!':!%#-'867)7'6!.\$5!/#!%#+!)'!\$!N'6<2-)!]'\$%<!c#\$%768! d76()#\$<!':!\$6!?<..767()%\$)7=#!c#\$%768e>!"#-7(7'6(!)'!%#:#%!)'!\$!N'6<2-)!]'\$%<!\$%#!.\$<#!.\$)!)4#! $<7(-\%\#7'6!':!)4\#!N',,\#8\#!F::7-7\$,!<\#(786\$)\#<!/5!)4\#!M7-\#!H\\(7<\#6)!:'\(18.12(!O7:\#!)'!\$<..767()\#\%!)$ $)4\#!()2<\#6)!-'6<2-)!1\(18.12(!O7:\#!)'!\$<..767()\#\%!)$

N'6<2-)!]'\$%<!c#\$\%768(!(4\$,..!/#!-'6<2-)#<!76!\$--'\%<\$6-#!;7)4!)4#!:',,';768!827<#,76#(h!

- \$> ?!N'6<2-)!]'\$%<!;7,,!/#!-4\$7%#<!/5!\$!<#(786\$)#<!:\$-2,)5!'%!()\$::!.#./#%!\$6<!-'6(7()!':!'6#!:\$-2,)5!.#./#%*!'6#!()\$::!.#./#%*!\$6<!'6#!0\$0#!&'%#()!N',,#8#!()2<#6)>!
- -> Q#./#%(!':!)4#!N'6<2-)!]'\$%<!;7,,!/#!1%#(#6)!)4%'284'2)!)4#!N'6<2-)!]'\$%<!c#\$%768>! ?<..7((7'6!':!\$65!')4#%!1#%('6!)'!)4#!c#\$%768!(4\$,,!/#!\$)!)4#!<7(-%#)7'6!':!)4#!N'6<2-)!]'\$%<!N4\$7%>!

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- #> +7)6#((#(!;7,,!1%'=7<#!76:'%.\$)7'6!)'!\$6<!\$6(;#%!G2#()7'6(!:%'.!)4#!N'6<2-)!]'\$%<!
 t 2#()7'6(!.\$5!/#!(288#()#<!/5!)4#!()2<#6)^'%8\$67C\$)7'6!76=',=#<!)'!/#!\$6(;#%#<!/5!
 ; 7)6#((#(>! t 2#()7'6(!:'%!;7)6#((#(!.2()!/#!<7%#-)#<!)'!)4#!N'6<2-)!]'\$%<!N4\$7%*!%\$)4#%!
)4\$6!)'!)4#!; 7)6#((!<7%#-),5>!!
- 8> A'!\$--'...'<\$)#!\$65!%#\$('6\$/,#!-'6-#%6(!:'%!)4#!1#%('6\$,!(\$:#)5*!;#,,D/#768*!\$6<^'%!
 :#\$%(!':!-'6:%'6)\$)7'6!\$..'68!76<7=7<2\$,(!76=',=#<*!)4#!M7-#!H%#(7<#6)!:'%!N\$..12(!O7:#I!
 <#(786##!..\$5!<#)#%..76#!\$11%'1%7\$)#!\$--'...'<\$)7'6(*!1%'=7<#<!)4\$)!%#G2#()(!:'%!(2-4!
 (1#-7\$,!:\$-7,7)7#(!\$%#!(2/..7))#<!)'!)4#!<#(786##!\$)!,#\$()!);'!dZe!/2(76#((!<\$5(!/#:'%#!)4#!
 c#\$%768>!!!

K\$-4!N'6<2-)!]'\$%<!c#\$%768!(4\$,,!-'6(7()!':!:'2\%!14\\$(\#(\h!

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P>! J-4#<2,768!

 $\begin{array}{l} A4\#!N'6<2-)!\]'\$\%<!\ c\#\$\%768!\ ;\ 7,,!/\#!(-4\#<2,\#<!6'!,\#((!)4\$6!)\ ;\ '!dZe!6'\%!\ .\ '\%\#!)4\$6!:7=\#!d\ e!\\ /2(76\#((!<\$5(!\$:)\#\%!)4\#!()2<\#6)!'\%!()2<\#6)!'\%8\$67C\$)7'6!4\$(!/\#\#6!1\%\#(\#6)\#<!\ ;\ 7)4!\$!R')7-\#!':!\\ ?\ ,\#\#<!M7'\ ,\$)7'6>!N'6<2-)!\]'\$\%<!\ c\#\$\%768(!\ .\$5!/\#!<\#,\$5\#<!'\%!1'()1'6\#<!\ ;\ 4\#6!\%\#G27\%\#<!<2\#!)'!\\)517-\$,!/\%\#\$0(!76!)4\#!\$-\$<\#\ .\ 7-!-\$,\#6<\$\%!'\%!\$)!)4\#!<7(-\\\#)7'6!':!)4\#!M7-\#!H\\\#(7<\\\#6)!':!N\$.\ 12(!O7:\#I!)< (\\\#786\\\\##!\; 7)4!6')7-\\\#!)'!)4\\\#11\\\\%)7\\#(!76='\,=\\\<!$

Z>! K=7<#6-#!

\$> A4#!()2<#6)d(e!'%!()2<#6)!'%8\$67C\$)7'6d(e!76=',=#<!(4'2,<!(2/.7)!1#%)76#6)!%#-'%<(*! #@47/7)(*!'%!;%7))#6!()\$)#.#6)(!)'!)4#!N'6<2-)!]'\$%<!N4\$7%!\$)!,#\$()!);'!dZe!/2(76#((!<\$5(!

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1%7'%!)'!)4#!(-4#<2,#<!c#%768>!?65!\$<<7)7'6\$,!<'-2.#6)\$)7'6!;7,,!/#!\$--#1)#<!<2%768!)4#! c#%768!\$)!)4#!<7(-%#)7'6!':!)4#!N'6<2-)!]'\$%<!N4\$7%>!!

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\$> **a**)+&=&9!g!?!6')7-#!76!; %7)768!)4\$)!)4#!()2<#6)!4\$(!-'...7))#<!\$!=7',\$)7'6>!

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-> ; 6:=46&*6!Z)2!G8:<6&:='&!'+!QW<82:='&g!T#.'=\$,!':!)4#!()2<#6)!:%'.!)4#!
%#(7<#6-#!4\$,,(!:'%!\$!<#:767)#!1#%7'<!\$:)#%!; 47-4!)4#!()2<#6)!7(!#,787/,#!)'!%#)2%6*!'%!
1#%.\$6#6),5>!N'6<7)7'6(!:'%!%#\$<.7('6>'6(!:'%!%#\$#0.2(#)0.2(#)>.2406010.2(7)924-71Tm!(d2(!:'<

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#, J&(6+=E!K)&!@+'E!B)E<8:!

"2%768!\$6!E6)#%7 . !] \$6!:%' . !N\$. 12(*!\$!()2<#6)!(4\$,,!/#!<#67#<!\$--#((!)'!\$,,!'%!-#%)\$76!N',,#8#!
1%# . 7(#(>!?--' . . '<\$)7'6(!;7,,!/#! . \$<#!)4%'284!#@1%#((!;%7))#6!1#% . 7((7'6!':!)4#!M7-#!
H%#(7<#6)!:'%!N\$. 12(!O7:#!'%!)4#7%!<#(786##!:'%!1\$%)7-71\$)7'6!76!)4#!N'<#!':!J)2<#6)!N'6<2-)!
1%'-#((>!

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 $R'!N'6)\$-)!F\%<\#\%(!\$\%\#!\#G2\$,,5!\$11,7\#<!)'!\$,,!1\$\%)7\#(*!26,\#((!)4\#!'2)-'.\#!':!\$!\%\#,\#=\$6)!N'<\#!':! \\ J)2<\#6)!N'6<2-)!'\%!A7),\#!Ei!-\$(\#!76<7-\$)\#(!)4\$)!)4\#!()2<\#6)!\%\#(1'6(7/,\#!-\$\%\%7\#(!\$!/2\%<\#6!':!8\%\#\$)\#\%! \\ \%\#(1'6(7/7,7)5>!! \\$

A4#!N'<#!':!J)2<#6)!N'6<2-)!; 7,,!/#!\#=7#; #<!'6!\\$6!\\$662\\$,!/\\$(7(!/5!)4#!J)2<#6)!O7:#!
N'...7))##\!?:)#\\\#=7#; !/5!)4#!M7-#!H\\#(7<#6)!:'\\!N\\$..12(!O7:#\!)4#!
!8'#(!)'!
)4#!N',#\##!H\\#(7<#6)!:'\\!\#=7#; !\\$6<!\\$11\\'=\\$,\!

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