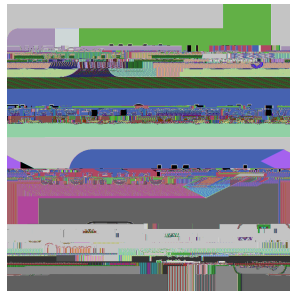


!



!
!
!
!
!
!
!
!

!''#\$%&' (\$)%*%+, -%
!
''#!''#\$%&'&()!&*!+, -. \$/0-!1/4\$/&#!
!
!''#\$!''%&'%()&!(\$%*5%+, '!



!
!
!
!
!
!
!
!
!

"#\$%&'()*+!, - , ./!*)0!12*)#&34!

!

566!&'()*3!&030&7084!

!

9)0!230!/8'3*%':2*'#; /!#&!8'330<' ;1*'#; !#=#1; %!\$1&*!#=#*)'3!\$2:6'>1*'#; /!
&0\$R>08/! *&1;3<'**08! ' ;! 1; %! <01;3/! 060>*&#; '> /! <0>)1; '>16/!
\$)#*#>#\$%'; (/! &0>#&8'; (/! #&! #*)0&?'30! 3*#&08! ' ;! 1! &0* &'0716! 3%3*0</!
?'*)#2*!*)0!\$&'#&!>#;30; *!#=#*)0!12*)#&@3A!1; 8!08'*#&'!3!1; !'; =&'; (0<0; *!
#=#! >#\$%&'()*! 61 ?/! 1; 8! '*! <1%! 163#! >#; 3*2*0! 1! :&01>)! #=#! 1>180<'>!
' ; *0(&'*%!2; 80&!B200; C3!D; '70&3'*%!E0; 1*0C3!5>180<'>!F; *0(&'*%!G#6'>%!
E*1*0<0; *4!

!
!
!
!
!
!
!
!
!

. /01,20%

!
!
!

() &! (\$%*5%+ , '!

! HFE!FE!''#\$%&! ' ()!'3!*0! ; ; *)!>#660>*# ; !#=#>&01*'70! ; # ; I='>*# ; !1 ; 8!
• <0<#&! \$R>08! :%! <%! >&01*'70I ? &'* ; (! 3*280 ; *3! 1*! B200 ; C3!
D ; '70&3'%%/! J ' ; (3*# ; 4!
! F ; ! <%! " &01*'70! K# ; IL '>*# ; ! 1 ; 8! M0<#&! 30<' ; 1&! @ " NOF! , P, A!
3*280 ; *3! 601& ; ! *)0! : 13'>3! #=#! ? &'* ; (! ' ; ! *)'3! \$#\$261&! 1 ; 8! =13*I (&# ? ' ; (!
(0 ; &04! N) #! '3! *! =#&Q! H# ? ! '3! *! 3*&2>*2&08Q! N) 1*! 1&0! '3! >#<\$# ; 0 ; *3Q!
N) 1*'R' ; 8! #=#! : 1>R (; 8! ? #&R! '3! ; 7#6708Q! H# ? ! 3) #268! ' *! : 0! &07'308Q!
9)0! >#2&30! <1R03! 230! #=#! S00! T2*R' ; 8C3! ? 066IR ; # ? ; ! (2'80! *#! ? &'* ; (!
>&01*'70! ; # ; I='>*# ; ! * &#! + (, %! . (/0! I23\$! '%##4! 56! @ , -U, A! 13! ? 066! 13!
S21 ; ; 0! 5&<3*&# ; (! 1 ; 8! V#W! S1 ; 8160C3! 0X>0660 ; *! 1 ; *)#6# (%! #=#! &0>0 ; *!
" 1 ; 18! 1 ; !>&01*'70! ; # ; I='>*# ; ! 1 ; 8! <0<#&! '7380! . 0! ' & 90! I : #2! @ , -UUA4!
9)0! 30<' ; 1&#=# ? 0 ; *%I='70! 2 ; 80& (&1821*0! 3*280 ; *3! <00*3! ? ' >0! \$0&! ? 00R!
#70&! * ? 0670! ? 00R34! F ; ! *)0! =! &3*! >6133! #=#! *)0! ? 00R! /! *)0! %! 601& ; ! *)0! >&1=#!
? &'* ; (! >&01*'70! ; # ; I='>*# ; ! 1 ; 8! <0<#&! : %! 3*28%' ; (! T2*R' ; 8! 1 ; 8!
8'3>233' ; (! 0X1 <\$603! =&# <! 5&<3*&# ; (! 1 ; 8! S1 ; 81604F ; ! *)0! 30># ; 8! >6133! #=#!
)0! ? 00R! /! *)0! %! \$2*! ?) 1*! *)0% C70! 601& ; 08! ' ; *#! \$&1>*! >0! : %! ? #&R3) #\$\$' ; (!
)0! &! # ? ; ! 3) #&#! \$'0>03! #=#! Y=613) Z! ? &'* ; (! ' ; ! *)0! (0 ; &0! /! >&'* [2' ; (! 01>)!
#*)0&C3! ? #&R! 1 ; 8! 601& ; ' ; (! =&# <! 01>)! #*)0&C3! 0=#&*34! 9)0! &! ? #&R!
>26<' ; 1*03! ; ! 1! =! ; 16! \$&# (0>*! *)1*! *)0% : &1' ; 3*#&< /! &0301&>) /! ># <\$#30! /! 1 ; 8!

C0(>)! @(%0:\$! @, -, fA/! 1;8! I20! @(\$! D%/ @(\$! @, -, dA c =&#<! <%!
80\$1&*<0;*16!N0:!3*0g!

!

%%\$67899 : : :5;<--#7<54.9.4.= ->/.9=,, (> .)9-2?&&@7!

!

! 9)1;R3! =#&! &018';(! I23\$! D\$! "#\$%! %&! '()4! F!)#\$0! %#2! 0; \#%! *)'3!
1;*)#6#(%!#!=>&01*70!;#;I='>*#;!:%!1!(#2\$!#=-!160;*08!1;8!0;*)23'13*!>!
>&01*70I?&!*';(!3*280;*3!1*B200;C3a!

!

B200;C3!D;'70&3*%!1*!J';(3*#;!

N';*0&!,-, .!

!

!

!
!
!
!
!
!
!
!
!

3245*670890 : 05)\$%

!

!! E';>0&0!*)1;R3! *#!*)0!)1&8I? #&R'; (!1; 8!808'>1*08!3*280;*3!#=#*)0!
L166!, -,d!#=#0&' ;(!#=#N&'*'; (!" &01*'70!K#; IL'>*'#;!1; 8!M0<#&!@ " NOF!
,P,A! ?)#!>#; *&': 2*08!*)0'&!#&' ('; 16! ? #&R3!#=#&01*'70! ;#; I='>*'#; !*#!*)'3!
%01&C3!1 ;*)#6#(%4!!

! 5 ; 8!3\$0>'16!*)1;R3! *#!*)0! 3*280;*3! ?)#!>#; *&': 2*08! '8013! =#&!*)0!
>#70&1803' (; !1; 8!*)0!* *60! =#&!*)'3!%01&C3!1 ;*)#6#(%4!9)0!* *60! I23\$!D\$!'#\$%!
%&' ' ()!3!: 1308!#; !1!32((03*'#; !: %!M18'3#; !J 2; b!1; 8!5 60X'1!9&##3*4!9)0!
>#70&!\$)#*#(&1\$)!6623* &1*'#; !? 13!>&01*08! : %! J #6% 1!E16*0&4!!

!

!

!

M%-!A/'-#\$!3,/ -#=#!

!

.U!

!

J %.\$! J -!N- .0-!/#!\$%-!3&<#\$. /#!

!

..!

!

B!3--'!B\$!

!

.h!

!

Q-7\$!R/,!

!

ef!

!

M%-!'#\$/2R.,? .(-!+'<?!

!

eP!

!

I -.\$%2G,&&*!.#=#! I -7/, .?'-!

!

PU!

!

U/4%/-!V .0-#7\$ J &&=7\$&4@!A-\$!

!

P.!

!

"#!" #4/-#\$!EC6-=/&#!

!

Ph!

!

G-.4-!V.66/#-77!.#=#+&>6.#)!

!

if!

!

M%-!12 J & ,=!G.77!

!

iP!

!

R<\$. ,!

!

hU!

!

!

!

!
!
!
!
!
!
!
!

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

"
"
"
"
"
"
"
"
"

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

!

!"#\$%&'()*

" "

#\$%&'()*'+,-./0,1"2.3456"7

!
!
!
!
!
!
!
!
!
!
!

!

,*24++#"F414".* "<E?0+.(<220"<*"=" - 4*:<220",*?4<2: ?0"+<:4}#:"F<+2.;4" - 0"
*4F" ?)DD06" #" - 4<*5" +) - 4:?.*/" 0), " +E4*=" +)" - , (? " :. - 4" F.:?" - , +:"
D4() - 4"<E<1:")3"0), 1"=<.20"1), :.*45"1./?:@N).*/"=<0+"F.:?" - 0"+:) - <(? "
/1)<*.*/5"<*"="+, 3341.* /"3)1"<*"?) , 1") *":?4" ' :<.1

!
!
!
!
!
!
!
!
!
!
!

M

.+"243:":)"+. - E20":?414"K, +:":)"D4"<*"<***"0<*(4B"#"+E4*:"?), 1+"<="<0"=).*/"
(<1=.)5"+F4<:.*/"<F<0"4A410"), *(4")3"4*41/0"#"?<="243:."* - 45"K, +:":)" /4:"
1./?:"D<(;" ,E" <*"="E, +?" F4./?:+" .*":?4" /0 - 5"=1.A4" ?) - 45" <*"=" 4<:" :?4"
- .*, +(, 24"< -), *:")3"3))=#"F<+<2) F4=":)"?<A4"K, +:":)"=4:"=) F*:"):?4"
, *?4<2:?.4+:"<*"="+ - <224+:"A41+.) *")3" - 0+4235"#14(4.A4=": ?4" -)+: "E1<.+4"#
?<A4" 4A41" ?<=" .*" - 0" 4*:.14" 3.:*4+ "K), 1*40B" 78), "2)); "2.; 4" - 0"=14< - "
E?0+.S, 456" 7H) F" =)" #"/4:" :) " 2)); " 2.; 4" 0), 56" <*"=" 78), " <14" - 0"
. *+E.1<:.) *56

!
!
!
!
!
!
!
!
!
!
!

T

1),.:*4".+" -)14":?<*F)1:?" .:b">*"04+5"#(<*4<:"?:<b"#(<*E1)D<D20"4<:"
-)14":?<*0),b"
"

!
!
!
!
!
!
!
!
!
!
!

W

"
"
"
"
"
"
"
"

!
!
!
!
!
!
!
!
!

X

<*" E14+4*:" <*" <2.A4" .* <22" :?4" F<0+ " :?<:" :?4" -)=41*" +(144* </41"
3, *=- < 4* :<220" (<*4A41"D4B"
" > /))="31.4*=" <*"#"D) , / ?:" ()*(41:.(;4:+)*" <" F ? . - "2<+:" -)*:?5"
3244.*/") ,1":)L="2.+:" <*"="E2<*41+."*3<A) ,1")3"+E4*=".* / f1.=<0"*. / ?:"
+(14< - .*/") ,1" D2))=0"2,*/+") , :".*":?4" *)+4D244=" +4<:+")3"])*:14<29+
Q4*:14" R422B" ' :<*=.* / ".*":?4" < , =.4*(4" <+:"?4" 2. / ?:+ "D4 / <*" :)" = . - 5" <*"
424:(1.((, 114*:")3" <*:. (.E<:.)*K)2:4=":?) , / ?" - 0"D)=0B" Q? .* , E5" 404+
<2. / ?:"5" # / 2<* (4="4J (. :4=20" <(1)+:" :?4" = <1 ; 4*4=" +4<")3" < , =.4*(4" - 4 - D41+
D43)14" , + V <*"="31)G4B" H414B" \$?414B" &A410F?414"#2)) ; 4=" :?4" D<(; +)3"
?4<+5"=4(; 4=") , :".*":?4" +.* / 419+ :1<=4 - <1 ; "()S, 4:..+?"D) F+5".22, - . * <4="
D0":?4"2. / ?:")3" <:?) , +<*"=" . \ ?) *4" (< - 41<+B" >+:"?4" +.* / 41"D, 1+:" , E"31) - "
D4*4<:?" :?4" + < / 4" <*"=" :?4" (1) F=" <1) , *=" - 4"1) <14=" :)"2.345" # () , 2=*9:"?<A4"
342:" -)14"2. ; 4" (10.* / B" >22":?4+4"E4)E24" F ?)9="E<.=+") - , (? -) *40:")"D4"
: ?4145" F ?)9=" :1<A4224=" +)"3<1 V <22")3":?4 - " ?<=" (?) +4*:")" () *3.*4":?4.1"
4JE41.4*(4")3":?4" -) - 4*:" :)" :?4" - 414"+2.A41")3" . :":?<:"3. :".*") :?4"31< - 4"
)3":?4.1":F)LDOL3) , 1"+(144*+B"%) +. / ? :B"%) +) , *="B" [, +:"+?< ; 0"14()1=.*/+
.*"E2<(4")3" - 4 -)1.4+5"2<:41":)D4"+(144*4="3)1"7E)+<D.2.:06" <*"=" , E2) <=4=
)" f <(4D)) ;)1" # + : < / 1< - ".3":?40" - 4:" +) (<2" <((4E: <*(4" - , +:4B"
" # / , 4++":?4" S, 4+:") *" D4? .*=" . : " <22" .+5" + ?) , 2=" F4" ?<A4" E. (; 4=" :?4"
<EE24@" P <+ " . : " F)1:?" . : " :)" :1<=4" (? <1<(:41"3)1" () *A4*.4*(45":)E1.)1.:G4"
. - - 4=.(0" <*"=" <((4++":) ".*3.*.:4" ; *) F24=/4")A41" ?<A.* / 3.1+ : L ?<*"="2.34"
4JE41.4*(4+@" P ?4*"F4"2.*4" , E") , :+.=4":?4">EE24" ' :)14":) "D, 0")1" , E / 1<=4"
) , 1") F*"E41+) * <2"3)1D.==4*31 , .:5" <14" F4" - < ; .*/" <="4<2" F . : ?" :?4" =4A.2@" #
=) *9:" ; *) F# #9 - "K, +:" < / , EE0" + F. - - .*/" <(1)+:" :?4" g , 44*9+ (< - E , +
E)*=".*" <+ (?) 2")3") :?41"3.+?" F ?)" ?<A4":?4.1"?4<=E?) *4+ . *5":?4.1"+ (<20"
3<(4+)=) F *B"] 0") F * " - , +. ("D2<14+."* - 0"4<1+5"+.24*(.*/":?4" F)12=" <1) , *="
- 4" <+ "# F <2 ; " :)" (2<+B" ' .24*(.*/" - 0" =.+ () * :4* :B" ' .24*(.*/" - 0" : ?) , / ? :+5"
- 0"E<+.) *+5"4A410: ? .*/":?<:" - < ; 4+ - 4" F ?)" # < - "D40)*=" <" - 414" / 2) F .*/"
* < - 4") * " <" + (144* B"
"

!
!
!
!
!
!
!
!
!
!
!
!

F.22"+, 33.(4B"R4(<, +4" F4" ;*) F"*)"D4::41B" c , 1"2.A4+" ?<A4"*4A41"4 - ..:4="

!
!
!
!
!
!
!
!
!
!
!

h

"
"
"
"
"
"
"
"
"

@+'!+'A;#B237'2'"?;)C'

!

+ , # * & ! % ' + () % !

" "

&"' &\$"), l" (< - E" <: " = , + ; b" "

" #*"+E.:4")3"4<12.41"=42<0+5" F4" ?<=3) , *=") , 1+42A4+" <" =1.A41b" H4"

?<=("<11.4=" , +"

!
!
!
!
!
!
!
!
!
!
!

k

" #*":?4"<(:)3"1<.+.*/"),1":4*:"#+,+:<.*4="<*. *k,10":) " - 0" ?<*=5"<*=

!
!
!
!
!
!
!
!
!
!

!j!

?) , 1")3") , 1"3.1+:"=1.* ; +5"&=F<1="<*">2:<*"?"<="(, :"?)24+ ".*") , 1"D2<*" ; 4; +"
<*"=" F)14":?4 - " 2. ; 4"E)* (?)+5" . - .:.<.* /" +) - 4"E</<*"1.: , <2"D40)*=" - 0"
, *=41+:<*=.* /B"\$?40"1<A4=")3"F422L4*=() F4="F) - 4*5"<*"="3)14. / *41+5"<*"="

!
!
!
!
!
!
!
!
!
!
!
!

!!

/144:4="?. - "2.;4":?4" - 41(O")3"/)=B"\$?4"3),1"+?<=4+")3" F?<:")*(4" F414"

!
!
!
!
!
!
!
!
!
!
!

!M!

"
"
"
"
"
"
"
"
"

B\$ 3 +'A%+4'B\$ 3 +'0 88D'

!

%%%'%' + (&&!0"!

" "

\$9 'R& '\$")"+:<1:"=1.*;.*/"4<120".*":?4"=<0"3)1" - <J. - , - "(?<)+B" #"
- ./?:"?<A4"D44*":?4")*20"+; ,=4*:".*"U.* /+;)***)":=1.*;.* /"3)1" f c Q c B"
#" ?<="<"E<E41"=, 4"<:" - .=*./?:5" F?.(?" ;4E:" - 4"<*J.), + "<*=".*":?4"1./?:"
+;<:4")3" - .*=B"#:"F<+":4*".*":?4" -)1*.* /5"<*="#+:4EE4=")*:)" :?4"34+:.A4"
+:144:+ "F.:?"+)D41"?4+.:<:.) *B">"D<*41"? , * /"E1) - .*4*:20"31) - "<"+; ,=4*:"
?), +45"K);.* /"<D), : "<"(424D1.:0" F?)"?<="+, ==4*20"=.4=": ?4" F44;"D43)14B"
' :)EE.* /".*31)*:)"3":?4" F<A.* /" F?.:4"+?44:5"#:); "<"E.(, 14":)" +?) F" - 0"
31.4*="B"# (<2(, 2<:4="

!
!
!
!
!
!
!
!
!
!
!
!

!T!

>24J"24<*4=-)+:")3" ?41" F4./?:")*" - 4B"7#":?.*;" F4"+?) ,2=+2)F"
=)F*B"#9 - "*"):3442.*/"F422B6"
" P4" - <=4" .:" ?<23" <"D2) (;" D43)14">24J" () ,2=*9:" F<2;")*" ?41")F*5"
+:)EE.*/" :)" 14+:")*" +) - 4)*49+ 31)*:" +:4E+B"] 0"): ?41" 1)) - <:45"
f1<*(4+(<5":1.4=":)" +*<E" ?41"D<(;" :)" () *+(.) ,+*4++<+:" ,=4*:+":)EE4=
<*=" +: <14= V *):") ,:")3" () *(41*5"D ,:" F.:?" <" ?.*.:*/"+, +E.(.) *": ?4"+?) F"
F<+"K, +:" <D) ,:" :)" +: <1:B" \$?4"+E4(:<:)1+ /<: ?414=" <1) , *=" F.:?" =1.*; +:" *"
: ?4.1" ?<*=" +<*=" - <2.(4" *4<:20" ; , (; 4=" D4? .*=" : ?4.1" 34./ *4=" () *(41*B" #"
F<:(?4=" : ?4.1" 404+5"/2) ++4=") A41" 31) - "2.S,) 15":<; 4" (1, 42"+<.: +3<(:.) *"<+"#"
(<24="k ! !B"#342:" 2. ; 4"#9="D44*"E2, */4=" .*:): ?4"3.+?D) F2") 3"4* :41:<. * - 4*:"
F ?414" : ?4" , *34=" +?<1; + (.1(24=5" +4<1(?.*/" F.:?" D<14=" :44:?" 3)1" : ?4"
.**) (4*:" - .**) F+B"H) F) F) , 2=" : "D4"3, * .3": ?414" F<+*9:" <*0"D2)) =+ ?4=@
#9="*4A41"342:" +) ?) E424++" (<22.* /"3)1" ?42EB"\$?4"E<1< - 4=(+F) , 2=" () - 4 V
#"; *4F": ?40" F) , 2= V D, ; : . *" - 0" 404+5" ? , - <* : .0" () , 2=*9:" D4"14+ (, 4=B" c *4"
=<06" : ?4+4" 0) , */" <=, 2:+ F) , 2=" /") *":) " D , 2=" D1.= /4+5" () - E<* .4+5" <*="
3< - .2.4+5" 04:" : ?4+4" 04<1+) *" (< - E, +F) , 2=" *4A41": 4<(?": ?4 - () - E<+.) *B"
" \$?4" F) 1+4">24J"/): : ?4" -) 14"E4) E24" K) . *4=" , + . *31)*":) 3": ?4" ?) , +4B"
&A410" 34F" - . * , :4+": ?414" F<+ "<*4F"/1) , EB" &A410" 34F" - . * , :4+">24J"/):"
F) 1+4B"
" 7#+?4" =4<=@6" <"/ , 0"+:) EE4=":)" <+; B"
" >*) : ?41" /1) , E"E<+4=" D06" f1<*(4+(<"E)+:.) *4=" >24J") *"?41"+. =4" <+
+?4": ?14F" , E" < /< . *B"
" 7#"?4<1=" : ?414" F<+ "<=4<=" / . 12") , : "31) * : I6") *4" 3": ?4 - "+< . =B"
" >24J" F<+ "+" : .22" , * () *+(.) , +5"+ : .22": ?1) F.* /" , E5"+ : .22" D4.* /" /<F ; 4=" <:"
2. ; 4" <" (<1" (1<+?) *": ?4"+?) , 2=41" 3": ?4" 1) <=" F ?4* "<" /1) , E") 3" D) 0+" (1) F=4="
<1) , *=" , +5" E) . * : .*/5" F ? . +E41.* /5" E. (; .*/" , + <E<1:" 2. ; 4" A, 2. ; 14+
() *+ , - .*/" : ?4" =4<=B" \$?4" K) ; */" : , 1*4=" :)" (1, 42: 0" <+ : ?4" =1 , * ; 4* " D) 0+
2< , / ?4=" 2. ; 4" ?04* <+ " (.1(2.* /" : ?4.1" E140B" \$?4145" #) =.() A414=" : ?4"
(424D1<.:) *") 3" + (?) 2" +E.1.: " F<+ " <" () *A. * (.*/" - .1</4B" R4*4<: ?" : ?4"
< (<=4 - <5" : ?414" .+ " <" 2, 1 ; .*/" D<1D<1. + - 5" F<.: .*/" :)" D4" +4:" , E) * : ?4"
 , * =4+41A.* /" - <+ +4B"# F<* : 4=" :) " D1<* =. + ?" - 0" F<: 41" D) : : 24" 2. ; 4" <+ F) 1=5"

!
!
!
!
!
!
!
!
!
!
!
!

<1 -), 14=".*" - 0"(1)EE4=" - 41(?5"<*"="+ (14< - 5"7>14"0) , "*"): "4*:41:<.*4=@6"
,*:.2"#2)+:" - 0"A).(4B"
" #*":?4"1<=. , +")3" g , 44*9

!
!
!
!
!
!
!
!
!
!
!

!X!

" 7#3"+?4"F<+*9:" , *()*(.) , +5"#F) , 2="?"<A4"F<2; 4="?"41"?) - 456"#<.<.=B"
7#; *) F" .:9+)*):"14<220"<*4 - 41/4*(0B6"
" 7#:9+<2F<0+"/)=":"("<2256"+?4"+<.=B"
" #:=".*9:"3442"/))=B"
" i E)*<11.A.* /5":?40"E<1; 4=":?"4"/ , 1*40"*4J:.")<"/1) , E")3"E<1< - 4=.(+"
<+"F4"F<.:4="3)1"<D4=B"
" 7 P49A4"<214<=0"/)::4*"<"34F" (<22+:")=<0B6"<*) :?41"E<1< - 4=.("+"<.=5"
+?<; .*/" ?.+?"4<="F.:"<"+ - .24B"7#:9+ (1<G0B" P ?4*"# F<+"0) , */415" F49="
+244E" .:")33")*" :?4" D<:?)) - "32))1" *4J:." :)" :?4" .):.24:B" \$?414" F<+"*)"
-) *.:)1.* /")1"< - D, 2<*(4+B6"
" # , *.: , (; 4=" - 0"+?1:."<*=":)) ;)33" - 0"+ , */2<+4+5" F.+?.* /"#9="*4A41"
<+; 4="3)1":?4.1" ?42E8">24J" F) , 2=*9:" 14 - 4 - D41":?4" =.+<EE1)A<2")3" :?4"
E4)E24"F?) F414"+ , EE)+4=":)"?42E5"D , :#"F) , 2="*4A41"3)1/4:":?4"+?< - 4B"
" 7>"D4="?"<+)E4*4=" , E"3)1"0) , 56"<"E<+.* /"* , 1+4" *3)1 - 4=" , +B"
" \$?4" - <24"E<1< - 4=.("32<+?4=":?"4" F) - <*"<"+ - .24"<*="<+; 4="?"41"<D) , :"
?41" , E() - .*/"H<22) F494*"E2<*+B"H4"F<+."***)1 , +?"<+"?4"<+; 4="?"41"<D) , :"
?41" ()+ : , - 4B" Y) F*":?4" ?<225") *4")3":?4" - <*0" D4="+ (1< - E4=" .*) :?4"
?<22F<0"+<.:4 - E:0B"
" \$?4":?1:0L - . * , :4" F<2; ?) - 4"31) - "U.* /+:) *N4*41<2"H) +E.:<2" F<+ "
+ .24*:" 4J(4E:"3)1":?4" =1 , * ; " / , 0+ D2<1.* /" 1<E" 31) - " :?4.1" +E4<; 41+B"] 0"
E<E41" F<+"= , 4" .*" +4A4*"?) , 1+B"#F1):4" .:" *D4=5" .*:?"4" =<1; 5"3144")3"D441"
(<*+5"+: , - D2.* /" =1 , * ; +5"<*=" ?) +E.:<2" 4S , .E - 4*:"R43)14"#3422"<+244E5"#
+(1)224=":?)1) , /?":?4"34F"E?) :)+#9=":<; 4*4<12.4B"#"+<14="<:"?4"E?) :)")3"
:?"4"D<*41" -) (; */":?4"=4<="(424D1.:0B"] 0"31.4*="?"<="(1.4="F ?4*?"4"=.4=B"
#="424:4=":?"4"E?) :)"<*="F)*=414="."3".:"F) , 2="?"<A4"D44*3 , ** .41".3"#F414"
=1 , * ; 5")1".3"(1 , 42:0" F<+)*):+") - 4:?.*/:")"D4" (, 2.:A<:4=5"D , : , * ()A414=B"
"
"
"

!
!
!
!
!
!
!
!
!
!
!
!

"
"
"
"
"
"
"
"
"

!+#+%1E7E"/'

!

"# / !% ' / % ' # * * 1 / #!

" "

H&"P c ZY"2\$%\$ "5': '#<"?<+"<2F<0+"?42="<"+E4(.<2"E2<(4".*" - 0"?4<1:B"
#9

!
!
!
!
!
!
!
!
!
!
!

!_!

)2) /41"14 - 4 - D41".3".: "F<+"mk!")1"mkM\$?4.1"+:)10"+:<1;+)*1 - <20":?40"
F414"D):?"<:4*="*/<"F4==*/5" - 0" -):?41"<+"<"D1.=4+ - <.=<*"=" - 0"3<: ?41"
<+":?4"3.2 -)/1<E?4lB"\$?40"+E4*="?) , 1+"=<*(.*/<*"="(?<:.* /5"<*"="D0":?4"
4*=")3":?4"*/ ? :5":?40</144":)"/)" *"<="<:4B"
" \$?4.1" 3.1+:"=<:4" F<+"<:" :?4" U4/B" \$F) " ;.=+ +.::*/" .*" :?4" (1) F=4=
14+:<, 1<*:5" 2<, /?.*/" <*"=" 24<1*.* /" <D) , : " 4<(?"): ?4lB"] 0" -): ?41"
14 - 4 - D41+:" ?<:" - 0"3<: ?41" F) 14"7<" F?:.4"+? .1:"<*"="+?) 1: +5"<*"=" ?4"D1) , /?:"
<"14="1)+4B6"] 0"3<: ?41"14 - 4 - D41+"7&A410)*4"() - .*/" ,E:")" ?41":)"+<0"?5"

!
!
!
!
!
!
!
!
!
!
!
!

!h!

" \$?<*;3,220" - 0" -):?41"14:,1*4="?.+" (<22":?.+":. - 4B"\$?40"2.;4":)" +<0"
 :?40"+E4*":?4"*4J:"04<1"7(),1:.* /56"<+":?40"F),2="+E4*=": ?4.1"F44;4*="+
 :1<A42

!
!
!
!
!
!
!
!
!
!
!

!k!

+4<1(?)3)JO/4*b">"(? ,1(?".+<2+)"<*" .(4"E2<(4:")"E1<06")3:4*"3.224="F.:?"
.*:1.<:4"+(,2E: ,14+<*"="<1:5"F?414"0) ,("<*"2) ; , "E"<*"="+44":?4"3<(4)"3"
[4+ ,+B"R ,: V "
\$?4"(4<*" .+":?4")1./.*<2":4 - E24B" P ? .24"#9 - " .*" .:5"#2<0" .*":?4"+)3:"
?<*"=")3"N)="<*"="E4+:41"?. - "F.:?" - 0"4*="24+ "A)F+"<*"="=14< - +B"#*":?4"
04<1+"D43)14":?.+:1.E5"#)3:4*"/. :<:4="?. - "F.:?" - 0"() *+<*"="E)*="41.*"/)3"
7F?0@6"
7 P ?0"<14"<2":?4+4"D<=":?. */+?"<EE4*.*"/:)" - 4@6"#F) ,2="<+ ;"?. - B"
7 P ?0" - ,+:"#/)" :?1) , /?":?4+4":?. */+@6"
" &A4*=" , 1.*"/:?"<1;4+:"*./?:+":?414"F) , 2="D4"*"<*" +F415"<*"="+)) *"
 :?4+4" S , 4+:.) *+"D4(< - 4"+.*.+41"+4< -) *+ :41+" F.:?" :)) L

!
!
!
!
!
!
!
!
!
!
!
!

M!

+ - <22" - 41(06"+) , *2.; 4":?4" - , 1; 0"Q<*<=<.*"2<; 4+"# F<+<((, +:) - 4=":)B"
c , l" D)=.4+" ?) F4=" :?4.l" 4J?<, +:.) * V) , l" 2. - D+" 2.; 4" - 4:<2" <*(?) 1+5"
=4+E41<:4":) E2, * /4":):?4"D)::) - B"# +?) A4=" - 0"3<(4".*):":?4" F<:41":)"
/<, /4") , l"=4E:?? P ?<:"<2<1 - 4=" - 4" F<+*9:"?) F" - , (?3<1: ?41" F4"?<=":)"
E<==245"D, : " F ?<:"+F< - " *4<1":?4"D)::) - B"\$?414 V <"/.<*:":. , *<3.+? "<*=":. :+"
() - E<*.) *+ + F< - " . * " E4134(:"3) 1 - <.:.) * B" & J ?<, +:.) * " . / * : 4=" - 0"34<15"< *="
" D4 / < * " ; . (; * / " < 1) , * = " 2 . ; 4 " < " - < = F) - < * B" \$?4" 2 < 1 / 4 + : ") 3 " : ?4" / 1) , E5"
<241:4=" DO" - 0" 31 < * : . (" -) A4 - 4 * : + 5 " 3 . J 4 = " . : + " , / 20 " 404 ") * " - 4B" P 4 " F 414"
2) (; 4 = " *) , l" / < G45" D) : ? " + 44 - . * / 20 " , * + , 14 ") 3 " F ?< : : ?4 ") : ?41" F < + =) . * / B"
\$?4 * 5 " < + " . 3 " () - . * / " :) " < " = 4 (. +) * 5 " . : " E , 1 + , 4 = " - 4 " < : " 3 , 22 " + E44 = B" # : +"
() - E < * .) * + 5 " + 2 . / ? : 20 " + - < 2241 " < * = " , / 2 . 415 " 3) 22) F 4 = + , . : B " # /) : " > * < + : < + . < 9 + "
< : : 4 * : .) * 5 " < * = :) " ?41" (14 = . : 5 " + ?4 " : 1 . 4 = " A < 2 . < * : 20 " :) " E , 22 " , + " D) : ? " :) F < 1 = + "
+ ?) 145 " < + : ?) , / ? " + ?441 " 433) 1 : () , 2 = " - < ; 4 " , + " / ") 3 < + : 4 B " \$?4 " + E44 = ") 3 ") , l"
+ F . - " D , 1 * 4 = " - 0 " 2 , * / + < + : ?) , / ? " : ?40 " F 414 " / 1 < G4 = " DO " ?) : () < 2 + B "
" \$?4 " 34 < 1 ") 3 " - 0 " :) 4 + " D4 . * / * . EE4 = ") 33 " DO " + ? < 1 E " : 44 : ? " ? < = " - 4 " + , = = 4 * 20 "
4 * : 1 < * (4 = " * " < " = 14 < - + (< E4 " 2 < * = ") 3 " - 0 ") F * " (14 < : .) * B "
" H414 V : ?4 " : , * < 3 . + ? " 3 < (4 + " - 4 B "
" H414 V F4 " < 14 " < 2) * 45 " < * = " ?4 " + E4 < ; + " E4134 (: " & * / 2 . + ? B "
7 P ? 0 " F 414 " 0) , " E2 < 0 . * / " . * " : ?4 " F < : 41 @ 6 " ?4 " < + ; + B "
7 # " F < + " (< 14 = B6 "
H4 " 2)) ; 4 = " E , GG24 = B " 7 P ? 0 " F 414 " 0) , " + (< 14 = @ " # 9 - " K , + : " < " 3 . + ? B6 "
7R4 (< , + 4 " # : ?) , / ? : " 0) , " F) , 2 = " D . : 4 " - 4 B6 "
7 # " (< * 9 : " D . : 4 +) - 4 : ? . * / " :) , / ?41 " : ? < * " - 456 " ?4 " 14E2 . 4 + B " 7R , : " # " (< * : 10 "
) " + (< 14 " . : B " # " (< * 4 < : " + - < 2241 " 3 . + ? 5 " D , : " # " (< * 9 : " 4 < : " : ?4 " D . / / 41 " D4 < + : B6 "
P4 " + ? < 14 " < " ?4 < 1 : 0 " 2 < , / ? 5 " < * = " # " < - " E41E24J4 = " DO " - 0 " 4 < 12 . 41 " 34 < 1 ") 3 "
? . - B "
7 # 3 " 0) , " < 14 " *) : " = 4D . 2 . : < 4 = " DO " : ?4 " : ? . * / + : ? < : " + 44 - " + 4 * : " :) ; , 22 " 0) , 5 "
0) , " F . 22 " 2 . A4 " < " ? < EE0 " 2 . 3456 " ?4 " + < 0 + B "
" > * = " + , = = 4 * 20 " # " < - " D < (; " . * " N) = 9 + " E < 2 - B " ' , = = 4 * 20 " : ?4 " D , 1 * . * / " . * "
- 0 " - , + (24 " . + 3 < = . * / 5 " : ?4 " + F4 < : = 1 . EE . * / " < F < 0 " - 0 " A) F + " < * = " S , 4 + : .) * + B "
4 - 41 / 4 = 31) - " - 0 " = < G4 " < + " > * < + : < + . < < * = " # 14 < (?4 = " < + : < * = < D24 = 4E : ? B "

!
!
!
!
!
!
!
!
!
!
!
!

MM!

" >*" F ?4* F4"3.*<220"(1<F24="), :")3":?4")(4<*5")*) ,1" ?<*=+<*=
;*44+5" # F<:(?4=" <22" :?) +4" E1<041+ " #")*(4" E24<=4=" =<*(4" <1) , *=" - 0"
+?) , 2=41+ "<*=":?4*"24<A4" - 4B"#2)) +4*4=" - 0" /1.E") *7 P ?0@6"<*=": :"))"
: , - D24="D<(; . * :) : ?4") (4<*B" P ?414" . : " , +4=" :) "2.A4" . * " - 0" ?4<1:5":?414"
F414"*) F "<*=+F41+": , (; 4=" . * : : ?4.1"E2<(4+B"> * + F41+ "<*= "14+E) * +4+ " . * : : ?4"
3)1 - ")3":F)"D4< , : . 3 , 2"31.4*="+B"
" c*45"F?) "F<2; 4="F.:?" - 4"<+ "F4"24<*4=") , 1"F4. / ? :) * "4<(?) : ?419+ "
+?) , 2=41+5"D1<A. * / " : ?4" ?) : "+<*=B"> * = : ?4") : ?415" F ?) "F<.:4="3)1" , + " , E" : ?4"
+?) 145"4*) 0. * / " : ?4" + , * B !
!

!
!
!
!
!
!
!
!
!
!
!
!

MT!

" #* "<*"433)1:)"3442", +43, 2".*" - 0"/<E"04<1 V <*"="D4(<, +4" - 0" -) - "?<=" D44*", 1/.*/" - 4:")"3)1":?4"+<;4")3" - 0"1b+, - b V#"A)2, *:4414=".*" <"?./?L +(?)2" (2<+1)) - B"#"?<="<A).=4=".: "3)1" <" F?.245"?)E.*/" :)")=)/4":?) +4" :?) , /?:+"4*:.1420'd0) , "<*"9:"3442" , *=41S , <2.3.4="3"0) , "*"4A41") "<*"0:?.*/5"

!
!
!
!
!
!
!
!
!
!
!
!

MXI

14A4<2.* / "<" 32<F" :)") +) - 4)*4" F?)") +) - 4?) F" ?<="*)*4B"#:" F<+" <2 -)+:"
. - E14++A45":?4" - 4*:<2"/0 - *<+:(+"#"?<=":)"=):)/4:"":?<:"E).*B

!
!
!
!
!
!
!
!
!
!
!

M^!

" "

. (*)'+!-%/!

" "

7# - E)+:41" 'O*=1) - 486"62<34()(<*<C(5&<5" ,++4J" \ ,D2.+?41+B"

" "

" "

"

!
!
!
!
!
!
!
!
!
!
!

M_!

"
"
"
"
"
"
"
"
"

I 21+'J/'2'K2+'

!

% 4 '7* (&!+)!

" "

Zc] "] 8" l<.*D)F"+?)l:+ " F.:?"<" +. (;"3)l"<"D42:" :)":?4"E, 1E24" ?<:"

!
!
!
!
!
!
!
!
!
!
!

Mh!

" \$?4*"+?4"F), 2=" /4:)", :")3":?4"(<1"<*"="() - 4"<1), *=":):?4"E<+4*/41"
+.=4B"#2)(;4=":?"4=")1+)"+"?4"(), 2="*9:"E4*":":)" /4:" - 4B" ' ?4"?<=":?"4"
;40"<*"=" , *2)(;4=":?"4=")1+5"D, : "#"?<=" - 0"3.* /41" 14<=0")*":?"4"2)(;"
D, ::) *B" \$?.+" F4*:") * "<() , E24":. - 4+" , *:.2"+?4" 04224="<*"=" # /):" +(<14=B"
' ?49="E442" - 4")33" - 0"+4<:"<*"=" #F), 2="D4/"<*"="(10B">3:41":?<:" :." F<+) *4"
- 4*:<2L?4<2:?"E1)34++.) * <2"<3:41"<*) :?41B" f42:"2. ;4"<="<1; "(424D1<:.) *4<(?
: - 4":?144"/ , .=<*(4"(), *+422)1+5":F)"=.33414*:"=) (:)1+5")*4"E+0(?.<:1.+5"
) *4" ?0E*):?41<E.+5") *4"E+0(?2) / .+5") *4"+) (<2" F)1; 415") *4":?41<E.+5"
<*"="<"E<1:1.=/4".*"<"E4<1":144B"] 0"E<14*:"+F414"34=" , E" F.:?" - 0"D4?<A.) , 1"
<*"=":); " - 4":)"8)1; :) F*"F<2; L.*"(2.*.(3)1"<" - 4*:<2L?4<2:?"<EE).*: - 4*:"B"
P ?4*":?4"3.1+:"E+0(?2) / .+:"+.*(4"# F<+4./?:" (< - 4"<*"=":)2=" - 0"E<14*:"+

!
!
!
!
!
!
!
!
!
!
!
!

Tj!

" 7 P ?<:"<14"0), ".*"3)1@ P 4225"# (<*" :422".:9+ "*"): "<" +423L4+:44 - ".+, 456"
?4"+<.=5"E).*.:*/<:" - 0"3<(4B"
" #=".=*9:" 14<220" - .*= " ? . - B" H4" /<A4" - 4") *4")3":?4" -)+: " () - -) *"
<*:.=4E14++<*:+5"+41:1<2. *4"do)2)3:e":?<:"?42E4="+./ * .3. (<*:20"F.:?"<*J.4:O"
#* "<() , E24" -) * : ? + "# + : < 1 : 4 = " :) " 3442" 2 . ; 4" - 0 + 423" < / < . * B "# =) * 9 : " 14 - 4 - D41"
4J<(:20" F ?4* " . : " (< - 4"D<(; 5"D, : " - 0"2<, / ?" + : < 1 : 4 = " ? < A . * / " < " + *) 1 : 0 " (? < 1 - "
:) . : " < / < . * B "# : " F < + " < + " . 3") * " > , / , + : " ! + : " F ?4* "# : ? 14 F " , E "# " ? < = " 4JE4224 = " - 0"
+41): * . * "< * = "# K , + : " * 44 = 4 = " :) / 4 : " +) - 4" D < (; B "# 9 - " + : . 22") * " : ? 4 " ? . / ? 4 + : " =) + 4"
)3"o)2)3:5"D, : "#9A4"D44* "<2): " (2)+41":) - 4"3)1" < " F ? . 24" *) F B "
') - 4"4A4* " (<22" - 4" F4.1 = " < * = " , * . S , 4B"
" "
" "
" . (*) "" + ! - % / !
" "
7 > * J . 4 : 0 " < * = " Y4E14+ .) * " . * " Q ? . 2 = 14 * " N4 : " : ? 4" f < (: + B6" = \$ " # % \$ 2 * - (% *
> ' 2 \$ & 2 \$ * = (" # % () * & " 5 * 6 % \$ / \$ " # ' (" 5 " h "] < B " M j M T B "
7 # * = . < * " Z) < = " Q14 + (4 * : " [, * .) 1 " \ , D2 . (" ' (?)) 2 B6 " C > ? K5 " M j M W B "

!
!
!
!
!
!
!
!
!
!
!
!

"
"
"
"
"
"
"
"
"

!"#;<C'L+" - ++%'K+2#2%1'M#2"E";1+'

!

8%6 - (0', !+) ""!

" "

8" %>pa&5" (?2=2.;4" E41+E4(:.A4" . - - 4=.<:420" (?<*/4=" :?1) , /?"
: ?4"2.34L<2:41. * /" -) - 4*:"#F<+":1, (; "D0"2./?:*.*/B"\$?4"<.1"<EE4<1+"

!
!
!
!
!
!
!
!
!
!
!

TM!

:?<:"F<1*+" - 4"#9A4"(1)++4="+) - 4".*A.+D24"2.*4"<*"=" (<*"4A41"/)"D<(;"b"
\$?4"F)12="3442+=".33414*:*")F5"4A4*".3":?4"+;)1 - ".+":.22"1</.*/"<22"<1), *=" -
4B"\$?4"<.1"3442+ -)14"<,:?4*:.("<*"="?4<A.41B"\$?4"+;0"?<+"(?<*/4="31) - "

!
!
!
!
!
!
!
!
!
!
!

TT!

4A4*:+ " :?<:" # " ?<=" E14A.),+20" =.+14/<1=4=" +,==4*20" ?<=" . - - 4*+4"
+./*.3.<*(4B"\$?4+),*=")3?<,/?:415":?4"() - 3)1:")3"<*4 - D1<(45"<*=:". - 45"
F?.(?"?<="E14A.),+20"

!
!
!
!
!
!
!
!
!
!
!

TW!

" \$?4149+":?."E?1<+4" ().*4="D0"

!
!
!
!
!
!
!
!
!
!

T식

] 0" = <= " <1 / , 4 = ") * - 0 " D4 ? < 235 " < * = " # 14 (4 . A4 = " < " H4 < 2 : ? " Q < 1 = +) * *
< 3 : 4 B " R , : " : " F < + " < : < 1 ; " 14 - . * = 41 ") 3 " ?) F " - , (?) 3 " - 0 " 2 . 34 " ? < = " *) : ? . * / : ")
=) " F . : ? " Q < * < = < B " "

+ : . 22 " =) * 9 : " ; *) F " ?) F " : ? 4 " E . 4 (4 + ") 3 " - 4 " + 2) : " :) / 4 : ? 4 B " "
< \ < 1 : ") 3 " - 4 " . + 3) 14 A 4 1 " 4 2 4 A 4 * 5 " + . : . * / " D 4 2) F " : ? 4 " - < + . A 4 " 4 + (< 2 < :) 1 + " . *
g , 44 * " > 2 . < " > . 1 E) 1 : 5 " F < . : . * / " 3) 1 " - 0 " * 4 F " 2 . 34 :) " D 4 / . * B " \ < 1 : ") 3 " - 4 " . +
3) 14 A 4 1 " + 4 A 4 * : 44 * 5 " < 1 . A . * / " . * \$) 1 * :) ") * " < * " > . 1 " Q < * < = < " 32 . / ? : " F . : ? : ? 4 "
< : + 4 ") 3 " < " = < 0 9 + " F) 1 : ? ") 3 " : 1 < A 4 2 " < * = " & J (4 2 " (? 4 F . * / " / , - " . * " - 0 " -) , : ? B "
P ? 4 * " < + ; 4 = " F ? 4 1 4 " # 9 - " 3 1) - 5 " # " D 2 < * ; 5 " F . : ? " * . * 4 " < = = 14 + + 4 " < * = " : ? 1 4 4 "
() , * : 1 . 4 + 1 , + ? . * / " : ? 1) , / ? " - 0 " ? 4 < = B " # 1 4 : , 1 * 4 = " :) " Q < * < = < (: F) " 0 4 < 1 + < /) 5 "
D , : # " (< * * 4 A 4 1 " 1 4 : , 1 * " :) " : ? 4 " + . - E 2 . (: 0 ") 3 " Q < * < = < " D 4 . * / " ?) - 4 B "
') - 4 " = < 0 + # " 3 4 4 2 " Q < * < = . < * 5 " F < 2 ; * / " F . : ? " < " \$. - 9 + () 3 3 4 4 " . * : ? 4 " (1 . + E "
3 < 2 2 " -) 1 * . * / + B " ') - 4 " = < 0 + 5 " # " F < * : " :) " : < + : " ? 4 & " & * C (/ & ") 1 " I & O & 5 & " *
M & % \$ \$ 0 " < * = < - " < D +) 2 , : 4 2 0 " (4 1 : < . * # " D 4 2) * / " 4 2 + 4 F ? 4 1 4 B "]) + : ") 3 " : ? 4 " . - 4 5 "
3 < 2 2 " +) - 4 F ? 4 1 4 " D 4 : F 4 4 * 5 " 2 ; 4 " F ? 4 * " R , (; "] < 1 : . * 4 G " * < 1 1 < 4 + " : ? 4 " [< 0 + "
/ < - 4 + < " _ b j _ " E B - B " & ' \$ 5 " < * = " # " . - - 4 = . < : 4 2 0 " ; *) F " . : 9 + " M b j _ " < B - B " . *
H 4 1 G 2 . 0 < B "

% 4 : : ? 4 1 " 7 \$ Q U 6 " *) 1 " 7 Q < * < = . < * 6 " (< E : , 1 4 " - 0 " () * : . * , 4 = = 4 * : : 0 " (1 . + . + 5 "
D , : # 9 - " 2 4 < 1 * . * / " :) " D 4 ") ; < 0 " F . : ? " : B " # =) * 9 : " D 4 2) * / " :) : ? 4 " = E 2) - < : . ("
+ E ? 4 1 4 " < * 0 -) 1 4 B " # + : . 2 2 " D 4 2) * / " :) : ? 4 " F) 1 2 = 5 " : ?) , / ? B "

\$? < : 9 + /) = " 4 *) , / ? 3) 1 " - 4 B " "
" "

. (*) ' ' + ! - % / !

> - - < * 5 " [] 1 = < * " > - 4 1 . (< * " Q) - - , * : 0 " ' (?)) 2 " M j M T L M j M W " f < (: "
' ? 4 4 : B 6 * N I ? I * > \$: & % # 0 \$ " # * (- * ? # & # \$ E * c (:) D 4 1 " X 5 " M j M T B *
> > E E 4 * = . J " R " \) + : " Z < : . * / " C 4 A 4 2 + " < * = " > = = . : .) * < 2 " > 2 2) F < * (4 + B 6 * O & # ' (" &) *
+ (' " # = (, " 3 ') * = & " & 5 & 5 " M j M T B *
c 9 R 1 0 < * 5 " ' ? 4 1 0 2 B " 7 \$? . 1 = " Q , 2 : , 1 4 " U . = " Y 4 3 . * : .) * B 6 " ! " # \$ % & 3 # ' (" *
! " # \$ % " & # ' (" &) 5 "] < 0 " T ! " M j M M B "
" "

!
!
!
!
!
!
!
!
!
!
!
!

Th!

"
"
"
"
"
"
"
"
"

088N)'K2E#E%!\$27'2%1'@2#'

!

.!&&!# 4', 1 - - 4 # 0!

" "

%\$#C">R c i \$"3.A4"=<0+</)5"#?<="*4A41")*(4".*" - 0":F4*:0L)*4"
04<1+)3"2.A.* /"2<."=404+",E)*"<"(;1)<(?"\$?.+."*) F" - 0"14<2.:06"
+44.* /"<+ - 0"=4E<1:, 14"31) - ":?4"=.+?"E.:="=*):" -):A<:4" - 0"1)) - - <:4+ "
:)E.(;,"E":?4"+2<(;B" 8), "+445" - 0"1)) - - <:4+ "?<A4"<:411.D24"<2241/0":)"
(24<*.*/" ,E" <3:41":?4 - +42A4+5" F.:?" :?4" -)+: " 4/14/.) ,+" 4334(:+")3":?+. "
=.+)1=41"D4.* /"<*4A41L4J:4*=".* /" -), *:<.*")3"=1:06"=.+/, +:.* /"=.+?4+B"
\$?4+4" =.+?4+5" (<;4=" .*" /14<+4" <*=" 1,.*), + .*" +:4*(?5" D, .2=" - <*0"
;.* /"=) - +"(1)++ - 0":.*0";.:(?4*B"\$?40"+4:24".*":?4"3.1+?"<23")3":?4+.*;5"
:?4*.*":?4"+4() *=" ?<235"D43)14":<;.* /":?4"4*:.14"(), *:"41"3)1":?4 - +42A4+B"
#: +44 - +* *) F" :?40" ?<A4" 4*2.+4=" <" - .2.:<")3" (;1)<(?4+5" E<=" "
?<*="+) - 420".*F44;L)2=" - <(<1)*.5".*)1=41":)"14E42"<*0"F?)")F), 2="+44; "
:)"(24<*":?4"=1:0"=.+?4+B"
" \$?4.1"E2)0"?<+ F)1;4="</<.*+: - 0"1)) - - <:4+5"(24<1206"D,:4*), /?"
.+4*), /?"C)* /"</)"# - <=4"<"E1) - .+4":) - 0+423":?<:"*4A41"</<.*"F), 2=" "
#"(24<*="=.+?4+":?<:" F414*9:" - 0") F*5"D,:" - 0"<D.2.:0":)" ,+4":?4";.:(?4* "
3<(2.:4+ ".*":?4"3.1+:"E2<(4" ?<+"D44*":?14<:4*4="D0":?4".*+4(:+<*=" :?4.1 "
E)1(42<.*")A412)1=+B"\$)" <1 - +5":?4*B"#"+?<22"+, ((44=" F?414"): ?41+ "?<A4 "
3<.24=5" F?414" #"?<A4"+, ((44=4=" </<.*" <*=" </<.* V

!
!
!
!
!
!
!
!
!
!
!
!

Tkl

3.*<*(.<2"4JE4*+4B"#<- "<"+:1<*/41".*" - 0")F*"?) - 45" (,1+4=":) "D4:1<0"
- 0+423")A41"<*"=")A41"</<.*"D0"(24<*.*/",E":?4" - 4++4+":?40"24<A4"D4?.*=")
3)1" - 4B"\$?414".+)*"7\$?<*; "0),56":?414".+)*"7C4<A4":?4 - "D4I#922"=)"
:?4 - "2<:4156":?414".+)*20":?4"=4+)2<:.)*")3":?4"+.*;5"<*"=:?4"1):")3":?4"
?) - 4B"# (<*"3442":?4.1"/<G4"4A4*")F5" F<:(?.*/":?1), /?:?4" F<22+"<+"#
(24<*5"+?.:L

!
!
!
!
!
!
!
!
!
!
!

W!!

"
"
"
"
"
"
"
"
"

K8+1&8E%&'!";1+%''

!

4 # / ! ' (0 ') 1 0 2 !

" "

H&'' \$>#%&YLNC>' '

!
!
!
!
!
!
!
!
!
!

WT!

" 7#+<F"0),1"A.=4)5"<*"#"F<*:4="0), ".*+:<*:200">"D<224:"/.12".+"1<145"
0), ";*)Fb6"

!
!
!
!
!
!
!
!
!
!
!

WW!

<*"] .(?4224" ?<=" D44*":?414" 3)" <22")3" :?4 - B" H41" 404+" F414" <22" :?<:"

!
!
!
!
!
!
!
!
!
!

WXI

<*=(") - E4.:.)1+<+"R.+?)E+5"D, : "F ?4*#"K). *4=" \1)K4(: "Z4=5#"D4(< - 4":?4"
E2<04lB"\$?4"D)<1="32.EE4=5"<*="#3), *=" - 0")F*"+:024B"
" 7#*44=":)" />5"] + "] .(?422456"#+:)="=, (;.* / ".*:)"<"(, 1:+06"D, : "<+"#"
: , 1*4=":) "24<A45" ?41"()2="3.* /41+"4*(.1(24=" - 0" F1.+:"<*=": F.124=" - 4".*:)"
<"? , /B"
" 7#:9+"K, +:"] .(?4224"*) Fb6"
" "
" " . (*) ""+! - % / !
" *
K)&3B?D&"^"Mj ! j5"Y.lB"Y<114*:">1)*3+;05"f)J" ' 4<1(?2./?: "\.(: , 14+B"
YF<1. ; <5"] .(?4224" ' (?<(?:2415" <*=" H4.=."] <1.<* " H<1<2=+4*B" 7] 4*:<2"
H4<?:?"*Y<*(4">"')E.* / "Z4A.4Fb6" P%(" # '\$ % 2 * ' * 62 < 34 () ; < 5 " A) 2B"
! W5" Mj MT5" EB" _B"
" "
"

!
!
!
!
!
!
!
!
!
!
!
!

W^!

"
"
"
"
"
"
"
"
"

F*+'K#\$0+% 'G\$))'\$>'K2 3 E8/'5)'#2%&+ 3 +/%'''

!

9%++# '&& (6 /!

" "

H&"C> ' \$":. - 4#"<F" - 0"/1<*= -):?4I5"#F<+*.*4B#"14(<22":?4"/24< -)3":?4"<.1E)1:"32))15":?4"/140"<*=D2,4"2./?:"3.2:41.*/"?:?1),/?:?4" F.*=)F+5"?41"+:*=.*/"D0":?4"/<:45"F<A.*/"B"H41"+.2?),4::4"+?1,*;" + - <2241" F.:?"4A410"+:4E"<+ "F4" F<2;4="<F<05"?41"3<(4"=.++)2A.*/"*.):?4"D2,1")3" +:1<*/41+B" # F<+ "/4::.*/"14<=0":)"D)<1=" - 0"2<+: "32./?:"31) - "&*/2<*=5" 24<A.*/"D4?.*="<22"#";*4F5":)"<:1:" - 0"*4F"2.34".*Q<*<=<B" " f)1":?4"3.1+:"34F"04<1+.*"Q<*<=< - 0"/1< - - 09"<D+4*(4"=.=*9:"3442" E41 - <*4*:B"#";*4F"+?4" F),2="(<22")1"A.+:")1"4A4*"+4*="(<1=+B"R,:)"*4" =<0"#*"):.(4=":?"4"+.24*(4" F<+ "+:14:(?./B" c *4"4A4*.* /5"#S,4+.:)*4=" - 0" =<="<*=<+;4="F?0" F4"?<=*9:"+44*"/1< - - 0".*"+,(?"<2)*"/":. - 4B" H.+>3<(4" :./?:4*4=B" 7N1< - - 0"=.="+) - 4:?.*/"D<="<*=?"<+:")"24<1*":?<:"<(.) *+"?<A4"() *+4S,4*(4+56"?4"+<.= "" " 7#+":.3)1/.A<D24@P .22" F4"+44"?41"</<.*@6"#E14++4=B" " H.+> 4JE14++)*" /14F" =.+<*: " <*= " ?4" <2 -)+: " 2));4=" +<=B" 7 i *3)1:,*<:4205":?+.:. - 4":.9+)*):B"#") *9:"F<*:0),:)"()*<:(:"?41",*24++ "#+<0":.9+");<0

!
!
!
!
!
!
!
!
!
!
!
!

W_!

! ! ! ! ! ! ! ! ! !

Wh!

.*:41:F.*4="F.:?" - 0"/1<*- -):?41",*:.2"+?4"F<+/"*4B"\$?4" , *=<0"1)<+:+5"
:74"2<:4L*./?:"(,E+)3":4<5":?4"S, .4:"4A4*.*/+ "F<:(?.*/"R1.:+?"\$ a5":?4+4"
F414" -)14":?<*"k,+:)1),.:*4+?"\$?40"F414"<(")**4(:.)**:")" - 0"?41.:</45"<
D1.=/4"D4:F44*" F?)#" F<+ ".*&*/2<*"<*"=" F?)#"< - "*"F".*" Q<*"<=<B"
P.:?) ,:"?415":?<:"D1.=/4"3442+"D1);4*B"
" \+0(?)2)/.+:&=F<1="Q<+40"(<22+?:.++?.3:.*" - 4 -)10"<*"4 -):.)*"
74 -):.)*<2"14()2),1.*//B6" c ,1"14()224(:.)**+":<;4")** *4F"+?<=4+"<+" F4"
(?<*/4B"f)1" - 45" - 4 -)1.4+"3" - 0"/1<*- -):?41"?<A4"D4() - 4"D1./?:41"<*"=" -
-)14"A.A.=)A41":. - 45"2.;4"E.4(4+)3"<"E,GG24"#(<*:9:"3,220"<+4 - D24B"H41"
<D+4*(4"?<+" - <=4":?) +4" -) - 4*:+"+44 - "2<1/41":?<*"2.345". - D,4="F.:?"D):?"

!
!
!
!
!
!
!
!
!
!
!
!

Wkl

. (*) "" + ! - % / !

" "

>/22.<+5" U02.4B" 7f<- .20" &+:l<*/4 - 4*:'" >"] <:41")3" \41+E4(:.A4B6"
Z) ,:24=/45"MjMWB"

Q<+40B" &=F<l=" 'B" 7Z4 - 4 - D41.*/^" >" \?4*) - 4*)2)/.(<2" ' ; ,=0B6"
64')6&.\$%25" ! "[<*B" !kh_B""

N.==4*+5">*:?) *0B"7])=41*.:0"<*= "' 423L#=4*.:0" ' 423"<*= "') (.4:0".*":?4"
C<:4"])=41*">/4B6" !kk!B""

" "

" "

"

!
!
!
!
!
!
!
!
!
!
!

Xj!

"
"
"
"
"
"
"
"
"

F*+'!E8+%''K#E+%1'

!

+ , & (%'4 #+%!

" "

"Qc iCY%9\$3.*=? . - B"

" P ?0" (, 2=*9; #3.*=? . - @H49+)*): . * - 0"D</5"*): "<":?4"+: , =.)5"<*=
?4" F<+*9:)*" - 0"D4=") * (4"# /): "D<(; " ?) - 4B" P ?414" . + ?4I" \$4<1+ + : <1: " :)
3<22" =) F* - 0" 3<(4B" 7]) - 5" Y<=56" # + ?) , : 4=" 3) 1" : ?4 - B" 7# (<*9: " 3.*=
\$14<+ , 14I" 8) , "?<A4:") "?42E" - 4"3.*=? . - I6"#4J(2< . - 4=B"\$4<1.* / " - 0"1)) - "
<E<1:5"E.22) F+<*"="D4=+?44:+":?1) F*":): "?4"32)) 1" . * "<"E<*. (; 4="1 , +?5":? . +
= , 22"3442.* / ") 3"<(?4" F<+? . * / ") A41" - 45"3.22.* / " - 0"4* . 14"D) = 0B"# ?<="2) + :
? . - B"%4. : ?41" - 0+423"*) 1" - 0"]) - "<*"="Y<=" () , 2="3.*=? . - B" P ? . 24" : ?4
: 4<1+ () * : . , 4" :) " 3<225" - 0"E<14* : + + : <1: " :) "?42E" - 4"E , : " - 0"1)) - "D<(; "
:) / 4: ?4B"

" \$?<:"* . / ? : "# : 1.4=" :) " 3.*=" +) - 4" () - 3) 1: " . * - 0") : ?41"+ : , 334="<* . - <2+
F ? . 24" - 0"E<14* : + " ?42E4=" - 4" / 4: " 14<="0"3) 1"D4=5"3442.* / " / , 2:0": ?<": ?40"
F414*9: / .A.* / " - 4"<+ " - , (?" () - 3) 1: " : ?<:" # * 44=4=" . * : ?<:" -) - 4* : B"] 0"
]) - "<*"="Y<=" + : <04=" D0" - 0" + . = 45"

!
!
!
!
!
!
!
!
!
!
!
!

X!!

" #9A4" /1) F*")2=415" +):?4" F<0" # +<F" \$14<+, 14" (?<*/4=ß" # +:)EE4=" ?)2=.*/"? . - "<+ " - , (?5" +:)EE4=":422.*/"? . - "+4(14:+".*:) "?."2.:24":1.<*/24" 4<1+")1" :422.*/"? . - "<D) ,:" - 0" =<0ß" H49+" D4() - 4" -)14")3" <" S ,.4:" () - E<*.)*5"<"+.24*:")D+41A41")3" - 0"2.34ß" H.+ "3, 1" .+*9:"<+"+)3:"<*0 -)14ß" #*+:4<=5" .:"?<+":? .+" -)14" F)1*L) ,:"2)) ;5"<*=":?4"2.:24"E<:(?)3" F?.:4")*" ?."3<(4"?<+"D44*"+<.*4="31) - "04<1+")3"? , /+(+) - 10.24267 , 14")*"

!
!
!
!
!
!
!
!
!
!
!
!

XT!

. (*) "" + ! - % / !

"
7\$?4" ':1)* / "R)*="R4:F44*"Q?.2=14*"<*"="Q) - 3)1:" cDk4(:+B6" =&%\$*-(/%*
M'525"MjMTB"
a<*"="41"])24*5"] <:?.2=<B"7 P ?4*" ' ?), 2="8) , "P)110">D) , : "8) , l"Q?.2=9+ "
>::<(? - 4*:" :) "Q) - 3)1: #:4 - +@6"C4\$*=("/\$%2&#'("5"M"] <0"Mj !hB"
P .22.< - +5">*="0B" 7Q<*9:" \$<;4"] 0" &04+" c 33" 8) , B6" C4\$*9 "5<* A'))' &02*
?4(D5"Q)2, - D.<5"!k^_B"
" "
" "
"

!
!
!
!
!
!
!
!
!
!
!

XW!

.*" - 0" ?<*=5"3)1(*./":?4"())25"()EE41L()2),14="+:442":)" - <:(?" - 0"D)=0"

!
!
!
!
!
!
!
!
!
!
!

X^!

F)*=41"+:<*=.*/"D4?.*=" - 45" - 0"3<:4" F<+"4<24=ß" H) F" 14<2" .:" 342:5"D, :"
F?<:"<"+.220" 1.:,<2" .:" F<+ß" R4(<,+4" - </.("=)4+*9:" () - 4" 31) - " F?<:" F4"
24<A4" .*":?4"3) , *:<.*ß"R, :":?414" .+" -):"(41:<.*20" - </.(".*":?4"(,2:, 14"<*= "
:1<=.:.) *5"<*= " .*":?4"<1:"<*=<1(?.:4(: , 14":?<:"D1.* /+"E4)E24"31) - "<1) , *="
: ?4" F) 12=:)" *4"E2<(4":)" +?<14" .*":?4"K)0")3":?1) F.*/<F<0"+E<14" (?<*/4ß"
&*k)0.* /"+. - E20" .*":?4"E1)+E4(:)3"+?<1.* /".*":?4"? , - <*"4JE41.4*(45" - 0"

!
!
!
!
!
!
!
!
!
!
!
!

Xh!

"
"
"
"
"
"
"
"
"

('K++8'('"

!

4 ((*%#'*# - "+" , !

" "

"Yc%9\$ 14 - 4 - D41" :?4" 3.1+:" :. - 4" # 342:" 4*AO# " ; *) F" :?<:" #9A4" 342:"
4*A.) , +) 3"E4)E24" - 0"F ?)24"2.345"F ?.(?"+<"+(<10":?) , /?:5"() *+=41.*/"
:?<:" F?4*#"F<+ "/1)F.* /" ,E5#"F<+":< , /?":?<:" 4*AO" F<+ "<*+;0"*4/<:.A4"
4 -) :.) *"<*=": ?<:" #+?) , 2="*4A41"<= - .":?<:" #342:" :.B"

R, :#"3442" :.B"

" Y, 1.*/":?4":?.1="04<1")3" - 0" , *=41/1<=5" - 0"2)* /L=,+:<*(4"D4+:"31.4*="

c2.A.<(<224=" - 4"</<.*"<*="</<.*" , *:.2#"E.(; 4=" , EB"

" 7]))14<I"8) , "F)*9:"D42.4A4" :.I6"

" 7#"F)*9:"D42.4A4" F ?<:@6"

" 7H4"3.*<220"<+; 4=" - 4I6"+?4"+S , 4<24=B"

" 7\$)"D4"?.+ / .1231.4*=@6"

" 784+I6"

" 7c?@

!
!
!
!
!
!
!
!
!
!
!
!

Xkl

"
"
"
"
"
"
"
"

L+) "'ME#8'
!
&

!
!
!
!
!
!
!
!
!
!

^T!

" >*"=")5#"D4(< - 4" ?0E41<F<14")3" - 0"D14<:?"<*"=:?4" F<0" - 0"D)*4+"
3.: ".*":?4"<==24"] 0"2. - D+" F414"<2 -)+": "2. - E5"<"+./ *<2":)"?41":?<:"# F<+"

!
!
!
!
!
!
!
!
!
!
!

^W!

"
"
"
"
"
"
"
"
"

F*+'0%"EPM2#J2&+'B8;J'

!

4#33!%*(, *#1%*!

" "

\$9'"%%&")9

!
!
!
!
!
!
!
!
!
!
!

^_!

! ! ! ! ! ! ! ! ! !

^h!

+ - 422" 4 - <*<.:*/" 31) - ":?4" -), *="+)3" -)*:?L:)L04<1")2=" :1<+?" +.: ,334="
D4*4<?:?:?4.1"D4=+B"
" #14 - 4 - D41":?4"3.1+:". - 4"#F<2;4=".*:)">***<2,+49+<E<1: - 4*:5#"?<=" :)"14+.+:":?4", 1/4":)/</"<*=E2, /" - 0"*)+4B" P ?<:"342:"2.;4"<:?.(; "2<041")3"

!
!
!
!
!
!
!
!
!
!
!
!

^kl

F) - 4* d[, */24" [,2.<5" 7R, ::413206" >124*45" ' ?<*<e" 31) - " D<1" :)" D<15"

!
!
!
!
!
!
!
!
!
!

_M!

" 7#:9

!
!
!
!
!
!
!
!
!
!

_W!

"
"
"
"
"
"
"
"
"

QE<*E+'R26+%)'N @\$ \$1)"\$<C' !+""

!

- , (4 # "" "" % + , ! # * ! !

" "

f" # () , 2 = " : 1 < A 4 2 " D < (; " . * " : . - 4 5 " # " F) , 2 = " 1 4 : , 1 * " :) " : ? 4 " 7

!
!
!
!
!
!
!
!
!
!
!

" Z.(?4"<*"?"+"D<*"="D4/<*"")E2<0":?1), /?"?."E1)E?4:.("<*"="+), 23, 2"
+)*/+"F?24":?4"=.+)1/<*.G4=")1/<*.G41+"+(1<-D24=":")"3.*.+?"D,.2=.*"/":?4"
+;</4"<1), *="?. - "d P<2:41eb"#:" F<+" F?4*"?"4"3.*.+?4="?.+)"1./.*<2"+4:"2.+:"
:?"<:"?4" F<+";)2="?"4" F), 2="?"<A4":);44E")*"E413)1 - .*/", *:.2":?4"*4J:"<(:"
(, 2="D4"32)F*)"A41":?4":1<33.("<*"=".*:")":?4"34+.:A<2"A.<"?42.()E:41B"Z.(?4"
E2<04="4A410" +)*/" ?4" ;*4F" <*"=" /<A4" <"2.:24"E.4(4")3" ?.+ +), 2".*"4<(?"
+)*/B"H)F4A415")*20"<"34F"?), 1+.*.):?4":?144L=<0"34+.:A<25":?4"3.42="F<+"
<214<=0":, 1*.*"/".*:

!
!
!
!
!
!
!
!
!
!
!
!
!
!

"
"
"
"
"
"
"
"

!
!
!
!
!
!
!
!

_k!

! ! ! ! ! ! ! ! ! !

hj!

" >+ F4" <EE1) <(?:?4" .+2<*=5"), 1" D) <: " () - 4+ " :) " < " +2) F" +:) EB" c , 1"
(<E: <. *D, GG4+) *": ?4" 1<=.) B" H4" - , +: <+ ; "3) 1" E41 - .+.) * "D43) 14" F4" (< *
4*: 41": ?4" P <: (? - 4* "+. : 45" < " +0+ : 4 - " : ? <: " , * .S, 420" E1) : 4 (: + " H <. = < " A. 22 < / 4+ 5"
- 4 < * . * / " 4A410" +. : 4" .+) A41+44* " DO" < " H <. = < " E41+) * " < * = " 4A410) * 4" F ?)"
F .+ ?4+ :) " A. +. : " - , +: <+ ; " E41 - .+.) * " d7H <. = < " NF <. 6eb"
" 7H422) 5" P <: (? - < * B" Q < 22. * / " . * " < * = " <+ ; . * / " 3) 1" 2 < * = . * / B6"
" # " ?) E4": ? < : ? 4" 3) / " F . 22" (24 < 1" , E" D43) 14") , 1" 1. = 4" D < (; 0" - < OD4" # 922" / 4 : "
:) " + 44": ? 4" -) , * : < . * + 5" < * = " - < OD4" % < * < " F . 22" +: < 1: :) " + - . 24B"
" !
" (*) "' + ! - % / !
" "
7

!
!
!
!
!
!
!
!
!
!
!

hM!

"
"
"
"
"
"
"
"
"

:+2<+4'R277E%+))4'2%1'B\$ 3 72%/'

!

"(0#&!'"(4#!#!

"

" i '&Y":)3.*=".:. - E)++D24":)" ?<A4"<" -) - 4*:")3"E4<(45" F?414" - 0"
- .*="3) , *=" .:+"+)2.: , =4" <*=" - 0" +) , 2" 342:" () **4(:4=" :)" - 0"D)=0# "#:
F<+*9:" , *:.2"# -)A4=".*"F.:?"%.*<5"<"F) - <*2.;4"*") :?415":?<:"#24<1*4=
F?<:".: - 4<*:" :)" ?<A4"<" +4*+4")3"+423B"%.*<"<*=" #?<A4"D44*"2.A.*/"F.:?"
) *4<*):?41"3)1":?144"04<1+5"<*="+?4"?<+"F.: *4++4=" - 4"<:" - 0"2) F4+: "E).* :+
<*=" (424D1<:4=" F.:?" - 4" = , 1.* /" - 0" :. - 4+")3" E1.=4B" ' ?4" .+" :?4" ;.*=")3"
F) - <* "F?"<+;+"S,4+:.)*+=", 1.* /"<+;)10"+)O) , " ;*)

!
!
!
!
!
!
!
!
!
!
!
!

hT!

El<(:.<220"4A410:?.*/"#":?.*;5"<*=":1,+;" - 45" F.:?"R\Y":?4149+<"2):")3"
/1),*=":)"()A4B"
" 7\$?.+,"K,+:"+) - 4:?.*/"#"?<A4":)" ;44E=).*/56"#":)2="?415"?)E.*/"+?4"
F),2=*9:"()*:.*,4":)"E,+?5"24::*/" - 4"Y,2#*4&/\$*#4'2I"# F<+"14(4*:20"),:"
)3":?4"?)+E.:<2"=,4":)"<"E+0(?):.("D14<";:1./ /414="D0"+4J,<2"<+<+,2:5"+):)"
+<0"# F<+2)) ;*/"3)1" ()*:1)2" F),2="D4"<*" ,*=41+<:4 - 4*:B"# (),2="*):"
<33)1="):<4":. - 4")33" F)1;5"+) "#=.=*9:B"#=.="*):"?<A4":?4":. - 4":)"<==14++
:?.*/"+D40)*="+,13<(4"24A425"+) "#=.=*9:B" ')" F?4*"): ?41+5".*(2,=.*"/%.*<5"
<+;4=" - 4" F?0"#342:"+) "=4:<(?4="31) - " - 0"D)=0"<*= "F?0":?.+:411.D24"<(:"
)3"+423L?<:4"7?42E+56"# F),2=" ,+,<220"<+;":?4 - "D<(;5"7H) F" - <*0" -)14"
:. - 4+=")0" , "F<*:." - 4":)" /4:"D4::41"K,+:")"D14<";</<.*@6"
" f)1"<" -) - 4*:"F4"+<":?414".*"+.24*(45"<*= "#:1,20"=.="*):"4JE4(:?"41"
:)"<0"<*0:?.*/B"#:?) , /?:"# F<+"D1);4*"D40)*="14E<.B"# F<+ F<.:*/"3)1"
?41:")"<0+) - 4:?.*/" <2)*/":?4"2.*4+)35"X(, *5'5*" (#5\$2\$%/\$*#4")15"/*&0*
2(*2(%<#4&:.\$"\$5B"#*+:4<=5"+?4"E<(;4=" - 4"<"D)* /5" ?<*=4=" - 4"<
2./?:415"<*= "+<.:5"78) ,"<14"*):"D1);4*B"8) , ;*) F":?<:5"1./?:@6"#+ -);4="
40D)"/"

!
!
!
!
!
!
!
!
!
!
!
!

hW!

F),2="D4"</<.*B"#:."+"<E1.A.24/4":)"(4J.+: "F.:?"+) - 4)*4"2.;4"%.*<B"#< - "
E1),=")3"F?)#"?<A4"D4() - 45"<*"="#")F4"+)" - ,(?"3":?.+"E1.=4":)"?4B"

!
!
!
!
!
!
!
!
!
!
!

h^!

"
"
"
"
"
"
"
"
"

F*+',P@ \$#1':2))'

!

#&%5!#'-* (" -!

" "

> "H&"

!
!
!
!
!
!
!
!
!
!
!

h_!

" 7C4J5".:9+K,+:<"F)1=6"
" #=",*=9:,*=41+<*= "F?0":?.+F<+*9:"<+D./"/<=4<2:")"? . - <+ ".:F<+:")"
- 4B"&+E4(<.220".3"24F<+:"?4"E41+)*"#:(?) , /?:?:?.+F)1="?, 1:B"
" \$?414" ?<+"D44*"+) " - , (?="+() , 1+4") A41":?4" , +4") 3":?4" *LF)1="3)1"
F?:.4" E4)E24B" P ?4: ?41" .:" 4J< - . *4+ " :4<(?41+ " 14<=.*/" C(* M')* &*
@ (3B'"; 7%5".*(2<+5")1"<"/1) , E")3"+)1)1.:0"/.12+ "1<EE.*/":)"<U<*04" P4+:"
+)*/df20**eB"#:(?) *4+:20"D<3324+ " - 4":?<:?.+.+"<(" *A41+<:.) *F4"<14+:".22"
?<A.*/B"# ?<A4" F.:*4+4+= "E4)E24" <+; " - 0" D4+:"31.4*="3)1":?4" E<+ "<*= "
F<:(?4=": ?4="<1.*/"4J (:4 - 4*:"3.22"E4)E249+ "3<(4+ "F ?4* " ?4":422+": ?4 - ".)
7K, +:"<0".:."3":?40"F<*:":)"+"D<=2066" i *3)1: , *<:4206":?.+)*":)"<*" +)2<4=" "
)((, 114*(4" D, : " < :14*=" < -)*/" R2<(; " + : , =4*:+5" E<1:.(, 2<120" . *
E14=) - . *<*:20"F?:.4+(?)2+"d% / , .4:"<2eb"
" \$?4" F)1=" - 4<*+ " +) - 4:?.*/"=.33414*:")*" <"R2<(; "E41+)*9+ :)"*/ , 4"
: ?<*) * "<"F?:.4"E41+)*9+B"\$?4"R2<(;) () - - , *.:0"?<+"14(2< - 4=": ?4" F)1=" "
<+:"?4.1") F*5"<*=0) , */41"/4*41<:.) *+4+E4(<.220" , +4": "<+ "<+ , D+ : . : , 4'3)1"
7D1)96"dQ<D141<4:"<2eb">+ "<"F?:.4"E41+)*5" F?) "< - "#:)" ?<A4"<*)E.)*"
) *?) F"R2<(; "E4)E24" (?) +4":)" , +4":?<:" F)1=@"R, : " F ?4* " F?:.4"E4)E24"
, +4" .:5" .:" (<11.4+ " +./ *3. (<*: F4./?:5" 14/<1=24+ ")3": ?4" (.1(, - +: <*(4+ " *
F?(.?) .:" .+ " , :414=B" P?:.4"E4)E24" *A4*:"4=" :?4" *LF)1=" :)" +:1.E" R2<(; "
E4)E24")3":?4.1"? , - <*:.:0"dU4*="."4:"<2eb"#:." + "<"F)1=": ?<:" () , * :24+ "R2<(; "
E4)E24" ?4<1=" <+ " :?40" =.4=" A.)24*:"206" #:." .+ . - E)++ .D24" :)" +4E<1<:4" : ?<:"
F4./?:31) - ":?4" F)1=B""
" 7R, :?) F" (<*:"*):"D):?41"0) , @6"#<+; 4=" - 0" D4+:"31.4*="B"
" 7#(=) *9: ; *) F" r :?414"<14" F)1+4":? .*/+B6"
" H4"<*= "#=",*=9:":<2; "<D) , : "1<(4" - , (?5"4+E4(<.220"D<(; :?4*B"] 0"D4+:"
31.4*=" F<+ " R2<(; 5" D, : " .:" F<+*9: " +) - 4:?.*/" "#" +E4*:" - , (? " .: - 4"
() * :4 - E2<:.* /B"N1) F.*/" , E5"?."R2<(; *4+ " - 4<*: " ?4" () , 2=".*:1) = , (4" - 4"
) *4F" - , +. ("<*= "d<::4 - E:e":) :4<(?" - 4"?) F":)" = <*(4":) .:B" H. + "R2<(; *4+ "
F<+ " *4A41" +) - 4:?.*/" "#34<14=" , *.:2" 4<120" . * " ?./ ?" + (?)) 2B" P4" F414" . * "<
+ (?)) 2"D<*= :) / 4: ?41" <*= ") 3:4* " + : <04=" . * : ?4" - , +. ("1)) - "E1<(: . + .*/" *4F"

!
!
!
!
!
!
!
!
!
!
!
!

hh!

:):?4"D,+:+)E"<"(),E24".*:41+4(:.)*+<F<0"31) - ":?4"+(?))2B"\$?<:"F<06"?"4"
=,=*9:" ?<A4":)" F<2;" <2)*4".*":?4"=<1;" <*<=" ()2=B" c *4"=<06" <3:41"+<0.* /"
/))=*./ ?:"?)", +5"?4"+:4EE4="), :")3":?4"(<1"<*<="F<2;4=":)" :?4"D,+ +?42:41"
F.:?"?.+?"?))=, E3"] 0" -) - "<*<="F414"+:)EE4="<:"?4"2./ ? :5"+)"#F<:(?4="<+
<+" ?4" +.:,<:4=" ? . - +423".*+,=4B" #<2+) " F<:(?4=" :?4" - .==24L</4=" F?:4"
F) - <*. *":?4"+?42:41"+.G4"? . - ", E"(<,:.), +206"(2,:(?"?41"E,1+45"<*<=" -)A4"
<+"3<1"<F<0"31) - "? . - "<+"E)++D24B""
" \$?<:"F) - <*<="=*):"+44" - 0"D4+:"31.4*5")*4")3" - 0"3<A),1.:4"E4)E24"
) *":?4" E2<*4:B" ' ?4" =,=" *):"+44" :?4" 3),1:44*L04<1L)2=" F?) " ?<=" :<, / ?:"
? . - +423":)"E2<0"+4A4* . *+:1, - 4*:+B" ' ?4" =,=" *):"+44":?4" / , 0" F?) "2<, / ?4="
F.:?"?.+?"F?)24"D)=0"<*<="F<+<2F<0+:"10.* / :)"D1.* / :):?41+.*") *":?4"K);4B"
' ?4" =,=" *):"+44":?4"+)3:" / .<*: "F?) / <A4":?4" -)+:() - 3)1:.* / "? , / + " F ?4*"
+) - 4)*4" F<+()2=")1"+<=")1"7 ' ?4"

!
!
!
!
!
!
!
!
!
!
!
!

hkl

"
"
"
"
"
"
"
"
"

M;E"2#'

!

&#*#' . #&' ,!

" "

&" 'QiZZ#&Y"

!
!
!
!
!
!
!
!
!
!
!

k!

" 7#:9+"D4<, :.3, 256"#14E2.4=5"14<(?. */) ,:":) "D1, +?" - 0"3.* /41:.E+"<2) */
:?"4"+:1.* /+B""
" P ?<:"F4"?4<1="F<+"<"+4A41420"), :L)3L: , *4"+4:")3*"):4+5"D, : "F4"=. =*9:"
- .*=" <+ " F4" 4J(:.4=20" 1<* " ,E+<:1+" :)" +?) F"), 1" /1<*="E<14*:" +) , 1"
=.+(A410B" P 4"24<1*4=": ?<:" : "F<+"), 1" =<=9+ / , :<1" ?4"<A4=" , E"3) 1". *"? / ?"
+(?))25" <*=" +44.* /": ?<:" : "F<+" +. :. * /" . *": ?4"D<+4 - 4* :5"), 1" /1<*="E<14*:" +
. *+. +:4=": ?<:" F4": <: 4": : "?) - 4":)": 10"), :5" F?. (?". +4J<(:20" F?<:" F4" =. =B""
" ') - 4")3" - 0"4<12.4+:" - 4 -)1.4+." *A)2A4" - , +.(5"<+:" : "?<+<2" F<0+ "D44*"
<? , /4"E<1:")3" - 0"2.34B"# /14F" , E"+, 11) , *4="DO": 5" F ?4: ?41" : "F<+" (2<+.(
R4<(?"R)0+))"Y<A4"] <:: ?4F+"R<*=" ? :.+31) - " - 0" =<=5")"Z.(; 0"] <1. *"
31) - " - 0" -) - 5" F?. (?" +?4" (2<. - 4=" F<+" ?41" 7(2, D" - , +.(6" d, +, <220"
<((- E<* .4="DO"+) - 4" S, 4+.:) *<D24" =<* (4" -)A4+eB"] 0"2)A4"3)1" - , +.(
) *20" /14F") * (4" - 0")2=41"D1): ?41" [+?": <, /?": - 4" ?) F":) "E2<0": ?4" / , :<1"
F ?4*"# F<+:" 4* "04<1+)"2=5" F?. (?" .*:1) =, (4=" - 4":) "<" F ?) 24" *4F" F")12=")3"
. :B"] , +. (" ?<="<" *4F" - 4<* . * /") * (4"#24<1*4=": ?<:"#() , 2=" (14<:4": - 0+4235"
<*=" +. * (4": ?4*"# ?<A4"3<224* . *2) A4" F.: ?" :B"#+.: 22"14 - 4 - D41": ?4" =<0+": ?<:"
3)22) F4="), 1" =.(A410")3": ?4" / , :<15" F?. (?" - <. *20" () *+. +:4=")3" - 4"
F<:(. ? /" - 0"D1): ?41"<+" ?4"3)22) F4="8) , \$, D4"A. =4+) *"?) F":) "E1)E4120"
E2<0" (

!
!
!
!
!
!
!
!
!
!
!
!

" \2<0.*//,.:<1"F<+" -)14":?<*"K, +:"<"?)DD0:")" - 45"D, : "1<: ?41" <"E.4(4
)3" - 0+423":?<:" F<+"4A)2A.*/"4A410":. - 4"#E413)1 - 4=B"#24<1*4="+) - , (?
<D) , : " - 0+423":?1) , / ?" - , +.(5"<*"=":?.+/" , .: <1"342:"2. ; 4"<"14E14+4*:<:.)*)3"
: ?4" , E() - . * / "+: < / 4")3" - 0"2.34B"[, +:"2. ; 4": ?4"A410"3.1+:")*4" - 0"D1): ?41"<*"="
#"=.(A414=".*") , 1"/1<*"="E<14*:+9D<+4 - 4*:"+4A4*"04<1+"D43)145#"() , 2=*9:"
F<.:")"+44"F ?<:"?:?+)"*4"?<=".*"+:.)14"3)1" - 4B"
" "

.

!
!
!
!
!
!
!
!
!
!
!
!

kW!