## ! "#\$%&' (\$ ) \* + , \$ - .&/\$01'2343'54\$6#78&#9\$&'\$:3; "#1\$,9<.8&3'5\$

!

''#\$%&'(!)\*(\*+\*,!), -\*&\$.!/000102!3&4-%&5&.(\*&\$.!(6(&.4\*!4\*+',.\*4!(.'!,57#\$\$,4!&.!\*9,!''#\$%&''(!:;<0!7+=#&-!,'+-(\*&\$.!484\*,5!7%\$9&=&\*,'>!,?+(#&\*8!\$@!(--,44!%,?+&%,'1A!))BCDB(D!'#!\$%&''!()\*\$#+#,#-!.+\$(/+0+\*&#+)\*!)\*!#%-!1&\$+\$!)2!/&(-3!()')/3!\*&#+)\*&'!)/+4+\*3!)/!\$-5!,\*.-/!
#%+\$!\$-(#+)\*!#)!\$,16-(#!&\*7!\$#,.-\*#!)/!-08')7--!#)!#/&+\*+\*4!)/!+\*\$#/,(#+)\*!#%&#!-\$8),\$-\$3!8/)0)#-\$3!
&.9&\*(-\$3!+\*(,'(&#-\$3!)/!()08-'\$!\$,(%!\$#,.-\*#!)/!-08')7--!#)!1-'+-9-!&\*7!)2!#%-!2)''):+\*4!
()\*(-8#\$;!!

 $/1! < -01 - /\$! ) 2! )^* - !/\&(-3!()') / 3! * \& # + ) * \&'! ) / ! 4 + * 3! ) / !\$ - 5! \& / -! 0 ) / \&'' 7! \$, 8 - / + ) / !# ) ! 0 - 01 - /\$! ) 2! \\ \&^* ) # \% - /!/\&(-3!()') / 3! * \& # + ) * \&'! ) / ! 4 + * 3! ) / !\$ - 5 = !!$ 

<1!>!8-/\$)\*3!17!9+/#,-!)2!%+\$!)/!%-/!/&(-3!()')/3!\*&#+)\*&'!)/+4+\*3!)/!\$-5!+\$!+\*%-/-\*#'7!/&(+\$#3! \$-5+\$#3!)/!)88/-\$\$+9-3!:%-#%-/!()\*\$(+),\$'7!)/!,\*()\*\$(+),\$'7=!

E1! > !8 - /\$) \* !\$! 0 ) /&'!(%&/&(# - /!) /!\$#&#, \$!&\$! - #% - /!8/+9+'-4-.!) /!) 88/-\$\$-.!+\$!\*-(-\$&/+'7! . -#-/0+\*-.!17!%+\$!) /!% - /!/&(-3!()')/3!\*&#+)\*&'!) /+4+\*3!) /!\$-5=!

 $\begin{aligned} 21! > !8 - /\$) * 3! 17!9 + /#, -!) 2!\% + \$!) / !\% - /! /\& (-3!()') / 3! * \& # + ) * \& !) / ! + 4 + * 3!) /!\$ - 5! 1 - \& /\$! / - \$ \$ + 1 + ' # 7! \\ 2) / 3!) / !\$\%), '. !1 - !. + \$ (/ + 0 + * \& # - . !\& 4 \& + * \$ #!) /! / - (-+9 - !\& . 9 - /\$ - !# / - \& # 0 - * #! 1 - (\&, \$ - !) 23! \& (# + ) * \$! \\ () 0 0 + # # - . !+ * !# \% - !8 \& \$ #! 17!) # \% - /! 0 - 0 1 - /\$!) 2! # \% - !\& 0 - ! / \& (-3!()') / 3! * \& # + ) * \& '!) / + 4 + * 3!) / !\$ - 5 = ! \\ F1! > !8 - /\$) * 3! 17!9 + /#, -!) 2! \% + !) / !\% - /! /\& (-3!()') / 3! * \& # + ) * \& '!) / ! + 4 + * 3!) / !\$ - 5 = ! \\ \end{bmatrix}$ 

.+\$(/+0+\*&#-.!&4&+\*\$#!)/!/-(-+9-!&.9-/\$-!#/-&#0-\*#!#)!&(%+-9-!.+9-/\$+#73!-@,+#73!)/! +\*(',\$+)\*=!

 $\begin{aligned} G1! > !8 - /\$) * 3!17!9 + /\#, -!) 2!\% + \$!) / !\% - /!/\&(-3!()') / 3!\$ - 53!) / !*\&\#+) *\&'!) / +4 + *3!1 - \&/\$!8 - /\$) *\&'! \\ / -\$8) *\$ + 1 + '#7!2) / !\&* .!0, \$\#!2 - - '!4, + '#3!\&*4, +\$\%3!) /!) #\% - /!2) / 0 \$!) 2!8\$7(\%)') 4 + (\&'! . +\$\#/ - \$\$! \\ 1 - (\&, \$ - !) 2!\&(\#+) *\$3! + *! : \% + (\%!\#\% - !8 - /\$) *!8'&7 - .!*) !8\&/#3!() 0 0 + ## - .! + *!#\% - !8\&\$\#!17!) #\% - /! \\ 0 - 0 1 - /\$!) 2!#\% - !\&& 0 - !/\&(-3!()') / 3! * \&\#+) * \&'!) / + 4 + *3!) /!\$ - 5 =! \end{aligned}$ 

 $\begin{aligned} \text{H1!A}, (\%!9+/\#, -\$!\&\$!0 - /\#3! - 5(-''-*(-3!\%\&/.!:)/B3!2\&+/*-\$$3!*-, \#/\&'+\#73!) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/1/2!\&!\&\&/\#+(, '\&'+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/1/2!\&!\&\&/\#+(, '\&'+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/1/2!\&!\&\&/\#+(, '\&'+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&!\&\&/\#+(, '\&'+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&*(\#+1/2)) 16-(\#+9+\#73!\&*.!/\&(+\&'!)/2!\&*(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2) 16-(\#+1/2)) 16-(\#+1/2) 16-(\#+1/$ 

 $B=D!C\&/\&4/\&8\%!D\&E!O\&7!*)#!1-!()*$#/,-.!#)!8/)\%+1+#!.+$(,$$+)*!)2!#\%-!()*(-8#$!'+$#-.!#%-/-+*!&$!\\8\&/#!)2!&!'\&/4-/!(),/$-!)2!#/&+*+*4!)/!+*$#/,(#+)*3!8/)9+.-.!$,(\%!#/&+*+*4!)/!+*$#/,(#+)*!+$!4+9-*!+*!\\&*!)16-(#+9-!O\&**-/!:+#\%),#!-*.)/$-O-*#!)2!#\%-!()*(-8#$=!)$ 

!

## ),-\*&\$.!/00/1I<!)\*(\*,!J.&K,%4&\*8!)84\*,5!L,%@\$%5(.-,;M(4,'!N.-,.\*&K,1F!)

**B**/**D**!>!A#&#-!**G**\*+9-/\$+#7!A7\$#-**O**!**C**-/2)/**O**&\*(-HI&\$-.!"\*(-\*#+9-!\$%&''!1-!&:&/.-.!#)!\$#&#-!

,\*+9-/\$+#+-\$!,\$+\*4!8-/2)/0&\*(-H1&\$-.!0-#/+(\$!&.)8#-.!17!#%-!I)&/.!)2!J)9-/\*)/\$!)2!#%-!A#&#-!

 $G^{++9-/\$+\#7!A7\$\#-0=!I-4+**+*4!:+\#\%!\#\%-!I)\&/.!)2!J)9-/*)/\$K!.-\#-/0+*\&\#+)*!)2!-\&(\%!,*+9-/\$+\#7K\$!$ 8-/2)/0&\*(-!+08/)9-0-\*#!&\*.!&(\%+-9-0-\*#!/&#+\*4\$3!&\*.!#\%-!/-'&#-.!.+\$#/+1,#+)\*!)2!&\*\*,&'!2+\$(&'!

7-&/!&88/)8/+&#+)\*3!#%-!8-/2)/0&\*(-H1&\$-.!0-#/+(\$!0,\$#!+\*(',.-;!

B(D!L% - !MH7 - &/!4/&., &#+) \* !/&#-!2)/!2+/\$#H#+O - H+\*H()''-4-!\$#, .-\*#\$N!

B=D! I -4+\*\*+\*4!+\*!2+\$(&'!7-&/!OPOOHOPOQ3!#%-!QH7-&/!4/&.,&#+)\*!/&#-!2)/!&\$\$)(+&#-!+\*!&/#\$!#/&\*\$2-/! \$#..-\*#\$N!

**B-D!R**-#-\*#+)\*!/&#-\$N!

B'D!C)\$#4/&.,&#+)\*!-.,(&#+)\*!/&#-\$N!

B,D!S-4/--!8/)., (#+)\*N!

B@D!>22)/.&1+'+#7N!

B6D!C) #4/&., &#+)\*!-08')70 - \*#!&\*.!&'(', .+\*4!: &4-!#%/-%)'. \$!#%&#!/-2'-(#!#%-!&..-.!)

9&', -!)2!&!1&((&'&, /-&#-!.-4/--N!))

**B9D!**>((-\$\$!/&#-3!1&\$-.!)\*!#%-!8-/(-\*#&4-!)2!,\*.-/4/&.,&#-!\$#,.-\*#\$!-\*/)''-.!.,/+\*4!#%-!2&''!#-/O! :%)!/-(-+9-.!&!C-''!J/&\*#!.,/+\*4!#%-!2&''!#-/O!!&\*.!

B&D! I -4+\*\*+\*4!+\*!2+\$(&'!7-&/!OPOTHOPOO3!#%-!UH7-&/!4/&.,&#+)\*!/&#-!2)/!\$#,.-\*#\$!:%)!&/-!&:&/.-.!&! C-''!J/&\*#!+\*!#%-+/!2+/\$#!7-&/=!

L%-!I)&/.!)2!J)9-/\*)/\$!0&7!&88/)9-!)#%-/!0=#/+(\$!+\*!&!8,1'+('7!\*)#+(-.!0=-#+\*4=!L%-!1)&/.! \$%&''!&.)8#!1=\*(%0&/B\$!#)!=9&',&#-!=&(%!\$#&#-!,\*+9-/\$#7K\$!8=/2)/0&\*(-!)\*!#%-!0=#/+(\$!#)!

0 - &\$, / - ! # % - ! \$ # & # - !, \* + 9 - / \$ # 7 K \$ ! & (% + -9 - 0 - \* # !) 2! + \* \$ # # , # + ) \* & '! - 5(-'' - \*(-!) / ! \* - - . ! 2) / ! + 0 8 / ) 9 - 0 - \* # !

&\*.!0+\*+0,0!/-@,+/-0-\*#\$!2)/!-'+4+1+'+#7!#)!/-(-+9-!8-/2)/0&\*(-!2,\*.+\*4=!I-\*(%0&/B\$!&\*.!

0 - #/+(\$! 0 & 7!\*) #! 1 - !&.6, \$#-.!&2#-/!, \*+9-/\$+#7!8-/2) / 0 & \*(-!.&#&!%&\$!1--\*!/-(-+9-.!17!#%-!I)&/.!)2! J ) 9 - /\*)/\$=!

 $B < D! V & (\%!2+\$(\&'!7-\&/3!\#\%-!\&O), *\#!) 2!2, *.\$! & 9\&+'\&1'-!2)/!\&'')(\&\#+)*!\#)!\#\%-!\$\#\&\#-!, *+9-/\$!\#+-\$!1\&\$-.!2) \\ ) *!\#\%-!8-/2)/O & *(-H1\&\$-.!2, *.+*4!O).-'!\$\%\&''!()*\$+\$\#!) 2!\#\%-!\$\#\&\#-K\$!+*9-\$\#O-*\#!+*!8-/2)/O & *(-!!) \\ (-H1\&\$-.!2, *.+*4!O).-'!\$\%\&''!()*\$+\$#!) 2!#\%-!\$\#\&\#-K\$!+*9-\$\#O-*\#!+*!8-/2)/O & *(-!!) \\ (-H1&\$+...*2) \\ (-H1&\ast+...*2) \\ (-H1&\ast+.$ 

2,\*.+\*4!8',\$!+\*\$#+#,#+)\*&'!+\*9-\$#0-\*#\$!()\*\$+\$#+\*4!)2!2,\*.\$!.-.,(#-.!2/)0!#%-!1&\$-!2,\*.+\*4!)2! -&(%!\$#&#-!,\*+9-/\$+#7!+\*!#%-!A#&#-!G\*+9-/\$+#7!A7\$#-0!+\*!&\*!&0),\*#!8/)9+.-.!17!#%-!W-4+\$'&#,/-=! L%-!I)&/.!)2!J)9-/\*)/\$!\$%&''!  $\label{eq:heading} \$, 1\$\#\&*\#+\&\#-.=!A, 1\$\#\&*\#+\&\#-.!2+*.+*4\$!\&/-!\#\%)\$-!\&\$!.-\#-/0+*-.!17!\&!(), /\#!)2!'\&:3!\&!\$\#\&*.+*4!$ 

() 0 0+##--!)2!#%-!W-4+\$'&#,/-3!)/!#%-!I)&/.!)2!J)9-/\*)/\$=!

**BFD!** I 7! \ (#) 1 - /!T!)2!-&(%!7-&/3!#%-!I)&/.!)2!J)9-/\*)/\$!\$%&''!\$,10+#!#)!#%-!J)9-/\*)/3!#%-!

C/-\$+.-\*#!)2!#%-!A-\*&#-3!&\*.!#%-!A8-&B-/!)2!#%-!]),\$-!)2!R-8/-\$-\*#&#+9-\$!&!/-8)/#!)\*!#%-!8/-9+),\$!

 $2 + (\&'!7 - \&/\& !8 - /2) / 0 \&^{(-!2, *. + 4!\&'')} (\&^{\#+}) * !: \% + (\%!0, \$^{\#!/-2'} - (\#!\#\% - !/\&^{*}B + 4\$!\&^{*}. !\& : \&/. !)$ 

.+\$#/+1,#+)\*\$=!

BGD!L%-!I)&/.!)2!J)9-/\*)/\$!\$%&''!&.)8#!/-4,'&#+)\*\$!#)!&.O+\*+\$#-/!#%+\$!\$-(#+)\*=!