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

!

. / (! 0 * ' 123034# ! * 5 ! 67883 & ! & + 9 ! % / 3 + & ! 3 + ! : *) 4 / ! , *) (& ; 8 ! < = > 6 , ? ! / 7 ' & + !) 3 @ / 4 8 ! 3887 (8 ! 3 8 ! 3 + 0) (9 3 A 2 # !
0 * + 0 () + 3 + @ ! + * 4 ! * + 2 # ! 5 *) ! 4 / (! 8 & 5 (4 # ! & + 9 ! B (2 2 C A (3 + @ ! * 5 ! : *) 4 / ! , *) (& + ! 0 3 4 3 D (+ 8 E ! A 7 4 ! 5 *) ! B *) 2 9 C B 3 9 (!
8 (0 7) 3 4 # # ! " * 4 / ! % / 3 + & ! & + 9 ! 67883 & ! 5 & 0 3 2 3 4 & 4 (! 4 / (! = > 6 , ! / 7 ' & + !) 3 @ / 4 8 ! & A 7 8 (8 ! A # ! 4) & 9 3 + @ ! B 3 4 / ! : *) 4 / !
, *) (& ! 3)) (8 1 (0 4 3 G (! * 5 ! 3 + 4 () + & 4 3 * + & 2 ! 8 & + 0 4 3 * + 8 E ! (+ & A 2 3 + @ ! / 7 ' & + ! 4) & 5 5 3 0 H 3 + @ ! * 5 ! : *) 4 / ! , *) (& + 8 ! B / * !
/ & G (! 5 2 (9 ! 4 * ! % / 3 + & E ! & + 9 ! 3 + G * 2 7 + 4 &) 3 2 # !) (1 & 4) 3 & 4 3 + @ !) (5 7 @ ((8 ! 5) * ' ! 4 / (! = > 6 , F ! I B &) (+ (8 8 ! * 5 ! 4 / (!
=> 6 , ! / 7 ' & + !) 3 @ / 4 8 ! 3887 (8 ! & + 9 ! 67883 & ! & + 9 ! % / 3 + & ; 8 ! 0 * ' 123034# # ! & 8 ! B (2 2 ! & 8 ! & 0 4 3 G (! 3 + 4 () G (+ 4 3 * + E !
8 / * 7 2 9 ! A (! & 4 ! 4 / (! 5 *) (5) * + 4 ! * 5 ! 4 / (! J F K F ! / 7 ' & + !) 3 @ / 4 8 ! 1 * 2 3 0 # ! 3 + ! *) 9 () ! 5 *) ! 4 / (! + & 4 3 * + ! 4 * ! 8 7 0 0 (8 8 5 7 2 2 # !
' 3 4 3 @ & 4 (! 4 / (! 8 # 8 4 (' & 4 3 0 ! & A 7 8 (F ! L + ! & 9 9 3 4 3 * + ! 4 * ! 4 & H 3 + @ ! + 7 ' () * 7 8 ! 1 * 2 3 0 # ! ' (& 8 7) (8 E ! 4 / (! J F K F ! ' 7 8 4 \$! < M ? !
3 + 4 (@) & 4 (! / 7 ' & + !) 3 @ / 4 8 ! 3 + 4 * ! 0 2 &) 3 5 3 (9 ! = > 6 , ! 1 * 2 3 0 # # ! < O ? ! 3 ' 1) * G (! 4 / (! 3 ' 1 2 (' (+ 4 & 4 3 * + ! * 5 ! 4 / (!
% * 7 + 4 () 3 + @ ! I ' () 3 0 & ; 8 ! I 9 G () 8 &) 3 (8 ! . /) * 7 @ / ! K & + 0 4 3 * + 8 ! I 0 4 ! < % I I . K I ? N ! < P ? ! ' & H (! & ! 0 * + + (0 4 3 * + !
A (4 B ((+ 1 4 / (! % I I . K I ! & + 9 ! 4 / (! J # @ / 7) ! Q *) 0 (9 ! R & A *) ! >) (G (+ 4 3 * + ! I 0 4 ! < J Q R > I ? N ! < S ? ! 4 & H (! & 9 G & + 4 & @ (!
* 5 ! 4 / (! : *) 4 / ! , *) (& ! K & + 0 4 3 * + 8 ! & + 9 ! > * 2 3 0 # ! T + / & + 0 (' (+ 4 ! I 0 4 ! < : , K > T I ? ! * 5 ! O U M V E ! & + 9 ! < W ? ! (+ 8 7) (! 4 / (!
1) * 1 () (X (0 7 4 3 * + ! * 5 ! 4 / (! : *) 4 / ! , *) (& ! Y 7 ' & + ! 6 3 @ / 4 8 ! I 0 4 ! < : , Y 6 I ? F ! L 5 ! 4 / (! 9 3) (! / 7 ' & + !) 3 @ / 4 8 !
8 3 4 7 & 4 3 * + 1 3 + ! 4 / (! = > 6 , ! 3 8 ! + * 4 ! 3 ' 1) * G (9 ! & + 9 ! 4 / (! J F K F ! 9 * (8 ! + * 4 ! 4 & H (! 4 / (! & 5 *) (' (+ 4 3 * + (9 ! ' (& 8 7) (8 E !
: *) 4 / ! , *) (& + ; 8 ! 8 7 5 5 () 3 + @ ! B 3 2 2 ! A (! 7 + + (0 (8 8 &) 3 2 # ! 1) * 2 * + @ (9 ! & + 9 ! 4 / (! = > 6 , ! 4 * 4 & 2 3 4 &) 3 & + !) (@ 3 ' (! ' & # !
& 0 / 3 (G (! 7 + 3 + / 3 A 3 4 (9 ! 0 * + 4) * 2 ! & + 9 ! 1 * B (3 E ! 4 / () (A # ! / 3 + 9 () 3 + @ ! 1) * @) (8 8 ! 4 * B &) 9 ! & ! 8 * 2 7 4 3 * + ! 4 * ! B *) 2 9 C B 3 9 (!
8 (0 7) 3 4 # ! 3 8 8 7 (8 F !

!

!

I 2 4 / * 7 @ / ! 4 / (! J + 3 G () 8 & 2 ! = (0 2 &) & 4 3 * + ! * 5 ! Y 7 ' & + ! 6 3 @ / 4 8 ! 1) * + * 7 + 0 (8 ! 4 / & 4 ! & 2 2 ! / 7 ' & + 8 ! &) (! ! Z A *) + ! 5) ((!
& + 9 ! ([7 & 2 ! 3 + ! 9 3 @ + 3 4 # ! & + 9 !) 3 @ / 4 8 E \ ^ !

3+G*2G(' (+! *5!4/ (!67883&+!&+9!%/3+(8(!@*G()+ ' (+48!3+! : *)4/! , *)(&;8!/7 ' &+!)3@/48!G3*2&43*+8!38!2(88!
0* ' ' *+2#!(X12*)(9F!!!

!

67883&!&+9!%/3+&;8!3+G*2G(' (+4!3+!4/ (!=>6 , !/7 ' &+!)3@/48!&A78(8!/ &G(!A((+!(G39(+0(9!4/)*7@/!4/ (3)!
5&03234&43G(!&043*+8!23H(!0*+43+7&43*+!*5!4)&9(!B34/! : *)4/! , *)(&!3))(81(043G(!*5!3+4()+&43*+&2!8&+043*+8E!
4/ (! (+&A23+@! *5! /7 ' &+!4)&5530H3+@! *5! : *)4/! , *)(&+8! B / *! / &G(!52(9!4*!%/3+&E! &+9!4/ (!3+G*27+4&)#!
(1&4)3&43*+!*5!)(57@((8!5)* ' !4/ (!=>6 , F⁵!!

: , K>T I !38!2(@382&43*+!B/30/!' &H(8!34!Z^&_!)([73)('(+4!5*)!4/(!>)(839(+4!4*!8&+043*+!(+4343(8!5*7+9!
4*!/&G(!0*+4)3A74(9!4*!: *)4/! , *)(&;8! ` a =!^<B(&1*+8!*5! ' &88!9(84)7043*+?!1)*@)& ' E!&) ' 8!4)&9(E!
/7 ' &+!)3@/48!&A78(8E!*)!*4/ (!)3223034!&043G343(8F\^14!!Q3+&22#E!4/ (!: , Y 6 I E!*)3@3+&22#!(+&04(9!3+!OUUS!
&+9!)(&74/*)3D(9!5*)!&15*7)4/!43 ' (!3+!OUOOE!Z(+87)^(^8_!4/ (!JFKF!0*+43+7(8!4*!1)* ' *4(!A&830!5)((9* ' 8!
5!81((0/E!1)(88!&+9!)(23@3+!3+! : *)4/! , *)(&!5*)!4/ (!+(X4!53G(!#(&)8F\^15!
!

I 99343*+&22#E!1*230#! ' (&87)(8!4/ (!JFKF!8/*729!4&H(!4*!57)4/ (!)348!3+4()G(+43*+!&+9! ' 343@&43*+!3+!4/ (!
: *)4/! , *)(&+!/7 ' &+!)3@/48!3887(8E! &8! B(22! &8! 67883&!&+9! % /3+&;8!0* ' 123034#! 3+!348! G3*2&43*+8E!

0/&+@3+@b3 ' 1)*G3+@!4/(!=>6 , !/7 ' &+!)3@/48!3887(8F²⁶!!L4!8((' 8!&8!4/*7@/!+*! ' &44(!)B /&4!(55*)48!
/&G(! A((+! ' &9(! A#! A*4/! 4/(! J FKF! &+9! 4/(! 3+4()+&43*+&2! 0* ' ' 7+34#E! 4/(! =>6 , !)(578(8! 4*!
&0H+*B2(9@(!348!B)*+@8!*)! ' &H(!&+#!&44(' 148!3+!3 ' 1)*G3+@!4/(!4)(&4 ' (+4!*5!348!0343D(+8N!4/(! ' *84!
3 ' 1*)4&+4!4/3+@!4*!4/(! , 3 ' !)(@3 ' (!38! : *)4/! , *)(& ;8! ' 3234&)#!84)(+@4/!&+9!9* ' 3+&+0(!&8!&1B*)29!
1*B(E)!+*4!4/(!23G(23/**9!&+9!3+/()(+4!/7 ' &+!)3@/48!5!4/(!0*7+4)#;8!0343D(+8F!Q*)!3+84&+0(E!3+!0U00!
&2*+(E!&+!&11)*X3 ' &4(14B*! ' 3223*+!9*22&8!B&8!81(+4!A#! : *)4/! , *)(&!3+!4/(!2&7+0/!5!8(G(+4#0*+(!
' 38832(8E!B /30/!3+84(&9!0*729!/&G(!Z1)*G39(^9_!8755303(+4!5**9!5*)! : *)4/! , *)(& ;8!1*172&43*+!5*)!SV!
9F\^27!!L+!9*3+@!8*E!Z4/(! : *)4/! , *)(&+!)(@3 ' (!/&8!8/*B+!744(!)938)(@&9!5*)!4/(!/7 ' &+!)3@/48!5!
348!1*172&43*+F\^28!
!

a *)(*G(E)! " (3i3+@!&+9! a *80*B!&)(!0* ' 123034!3+!&+9!)(@72&)2#!0*+4)3A74(!4*!4/(!8347&43*+!5! : *)4/!
, *)(& ;8!/7 ' &+!)3@/48!&A78(8F²⁹!!)=3G(+!A#!4/(!7)@(!4*!)(' &3+!*+!@**9!4() ' 8!B34/!4/(!=>6 , !&+9!
A(+ (534!(0*+* ' 30&22#E! 67883&!&+9!%/3+&!&88384!3+!Z/7 ' &+!4)&5530H3+@!^5! : *)4/! , *)(&+!0343D(+8_E!
4)&+8&43*+&2!)(1)(883*+E!&+9!5*)03A2(!)(1&4)3&43*+!5! : *)4/! , *)(&+!)(57@((8!F!F!F!\^30!!6&4/(!4/!&+!
&0H+*B2(9@3+@!4/(!&A78(8!5!/7 ' &+!)3@/48!5! : *)4/! , *)(&+!0343D(+8!&+9!4/(!4)(&4 ' (+4!4/(!#!&)(!
3+/()(+42#!(+4342(9!4*E!67883&!&+9!%/3+&!938)(@&9!+7 ')*78!4)(&438(8!&+9!)(@72&43*+8!B34/!4/(!&3 ' !
4*! ' &H(!4/(!3)!0*7+4)3(8! ' *)(!1)*81()*78!&+9!(55(043G(2#!4/)*B8!/7 ' &+!9(0(+0#!*74!4/(!B3+9*B!
" *4/!%/3+&!&+9! 67883&! 0*+43+7*782#! /39(! : *)4/! , *)(&+!2&A*)()8³¹!&+9!G3*2&4(! J F : F! K(07)34#!
%*7+032!6(8*2743*+!<J : K% 6?!OPc j !A#!/*843+@! : *)4/! , *)(&+!B*)H()8!3+!4/(!3)!0*7+4)3(8!&+9!Z&)(!^!
_!&043G(!5&03234&4*)8! *5! 4/(!^ , 3 ' _!)(@3 ' (;8! 4)&+8&43*+&2!)(1)(883*+! k! 3F(FE! B /(+! &74/*)34&)3&+!
@*G(+ ' (+48! 4&H(!&043*+8! *74839(!4/(!3)!A*)9()8!4*!)(1)(883*+!4/(!3)!0343D(+8^E\^32!&8! *11*8(9!4*!
&A393+@!A#!4/(!)(8*2743*+!&+9!Z)(1&4)3&4^3+@!_4*!4/(!=>6 , !&22! =>6 , !+&43*+&28!(&)+3+@!3+0* ' (13+!
4/!&4! a (' A!)!K4&4(;8!i7)3893043*+!F!F!F!F\^33!!67883&!&+9!%/3+&!&28*!0*+4)3A74(!4*!4/(!=>6 , ;8!/7 ' &+!
)3@/48!3887(8!A#!)(83843+@! J F : F!8&+043*+8!&+9!0/*83+@!4*!ZA7#!^!_4/3+@8!23H(!0*2!&+9!0*11()!^5)* ' !
 : *)4/! , *)(&_E!B /30/!&)(!X0&G&4(9!4/)*7@/!2*48!*5!/7 ' &+!)3@/48!&A78(8F\^34!!

!!
TG(+!4/*7@/!34!38!&1!&)4#!4*!4/(!6(57@((!%*+G(+43*+!&+9!4/(!%*+G(+43*+!I @&3+84! . *)47)(³⁵E!&8!B(22!
&8!&1!1) ' &+(+4! J F : F!K(07)34#!%*7+032! ' (' A(E!%/3+& ;8!0* ' 123034#!3+! : *)4/! , *)(& ;8!G3*2&43*+8!5!
/7 ' &+!)3@/48!38!(G39(+0(9!A#!348!9*9@3+@! *5!&00*7+4&A3234#!5*)!&+#! *5!4/(!=>6 , ;8!&A78(8!ZA#!

² @*>
² -, =4)
² @*>

² U2'X'(8\$)(*\$L"-/"#&;&)42\$+2-="(-': '0'!<\$? "4\$L)(<\$"?"\$3 "4!&\$5 "42)6-\$! , 7)(\$+'8&l-\$
W""0)l'"/(-

02&3 ' 3+@!4/&!4/ (!&)(!+*! : *)4/! , *)(&+!9(5(04*)8!3+!%/3+&E! *+2#!322(@&2!)(839(+48F\^36!!Q7)4/ (!E!
)(@&)92(88!*5!&28*!A(3+@!&!1() ' &+(+4!JF : F!K(07)34#!%*7+032! ' (' A)E!%/3+&!/&8!A((+!H+*B+!4*!78(!
: *)4/! , *)(&+!0343D(+8!B / *!/&G(!52(9!4*!%/3+&!5*)!5*)0(9!2&A*)!Z5*)!71!4*!Md!/*7)8!&!9&#!(+97)3+@!
/&)8/!B*)H3+@!0*+9343*+8!&+9!23G3+@!B34/!84)304!0*+4)*28! *+!4/ (3)! ' *G(' (+4E!&H3+!4*!&!84&4(!*5!
0*+53+(' (+4F\^37! 38! ! T88(+43&22#!% /3+&! 1&)4&H(8!3+!Z1&! ' 747&22#!A(+5303&2!&)&+@(' (+4E! B34/!
%/3+(8!5&04*)3(8!@!(443+@!&!0/ (&!&+9!0* ' 12&3+4!B*)H5*)0(!&+9!4/ (! : *)4/! , *)(&+!)@3 ' (!)0(3G3+@!
' 3223*+8!*5!9*22&)8!3+!) (47)+F; \^39!!L+84 (&9!*5!4&H3+@!3+343&43G(!4*!&44(' 14!4*!174!&!84*!14*!4/ (!/7 ' &+!
)3@/48!&A78(8!*5! : *)4/! , *)(&+!0343D(+8E!%/3+&!i784!4&H(8!&9G&+4&@(!*5!4/ *8(!B / *!/&G(!80&1(9!4/ (!
=>6 , !A#!783+@!4/ (' !5*)!4/ (3)!0*7+4)#;8!*B+(0*+* ' 30!A(+534E!&+9!4/ (A#!1()1(47&4(8!4/ (!/7 ' &+!
)3@/48! G3*2&43*+8!0* ' ' 344(9!A#!4/ (! , 3 ' !)(@3 ' (F! Q7)4/ (!E! B34/3+!4/ (! JF : FE! 67883&! &+9!%/3+&!
) (1)(8(+4&43G(8! &39!3+! : *)4/! , *)(&+8! &G*39&+0(! *5! Z3+4)+&43*+&2! 8&+043*+8! &+9! /7 ' &+!)3@/48!
A23@&43+8E\!&+9!&11*3+4! ' (' A)8!4*!G&)3*78! JF : F!A*93(8!3+!*)9(!)Z4*!9380*7)&@(!3+343&43G(8!
&9G&+03+@! : *)4/! , *)(&+!/7 ' &+!)3@/48F\^40!!Y&G3+@!%/3+(8(!&+9!67883&+! ' (' A)8!B34/3+!+7 ' (!)*78!
A*93(8!*5!4/ (! JF : F!8((' 8!4*!0&78(!4/ (!23H(23/**9!*5! : *)4/! , *)(&!A(3+@!1)*1()2#!/(29!)(81*+83A2(!
5*)!348! /7 ' &+!)3@/48!G3*2&43*+8!&+9!4/ (!3 ' 12(' (+4&43*+!*5! ' (&87)(8!4*!0* ' A&4!870/!&A78(8!4*!A(!
' *)(!823 ' !4/&+!35!4/ (!=>6 , !939!+*4!/&G(!4/ (3)!0* ' 123034#!&+9!&88384&+0(F!!

!
I 99343*+&22#!1*4(+43&2!*11*)47+343(8!5*)!4/ (! JFKF!4*!1&)4&H(!3+!+(@*43&43*+8!B34/!4/ (!=>6 , !&)(!
0* ' ' *+2#!8[7&+9(9!&+9!7+1)*97043G(!97(!4*!4/ (!&+4&@*+38430!)(2&43*+8/31!4/ (!4B*!0*7+4)3(8!4!
4/ (!#!/&G(!/9!+*!0* ' ' 7+30&43*+!5*)! ' *)(!4/&+!5*7)!#(&)8!&+9!Z/&G(!*+2#!(+@&@9!3+! *55303&2!
8(07)34#!93807883*+8!3+! *+(!*74!*5!4/ (!2&84!^(2(G(+!#(&)8^E!&+9!9*!+*4!&11(&!4*!A(!1)3*)343D3+@!

4*!h3C `**H!K/3+E!&93843+@738/(9!1)*5(88*)!5& ' 323&!)B34/!3+4()+&43*+&2!84793(8EIZ^4_/(! : *)4/! , *)(&+!
+702(&!)1)*A2(' E!3+4()C , *)(&+!)(2&43*+8E!&+9!/7 ' &+!)3@/48!3887(8!&)(!02*8(2#!3+4()C!4B3+(9E!B/30/!
+(0(8834&4(8!&!0* ' 1)(/+83G(!&11)*&0/!4*! : *)4/! , *)(&!1*230##!L@+*)3+@!/7 ' &+!)3@/48!9*(8!+*4!
' &H(!34!(&83!)4*!&0/3(G(!1)*@)(88!*+!8(07)34#!3887(8F\^45!
!

. /78E!3+!)(@&)9!4*!4/(!/7 ' &+!)3@/48!G3*2&43*+8!4&H3+@!12&0(!B34/3+!4/(! =>6 , E!+*4!*+2#!38!4/(! , 3 ' !
)(@3 ' (!&!0*+0()+!5*)!4/(! J FKF!A74!8*!38!4/(! (+&A23+@!&+9!&88384&+0(!A#!67883&!&+9!%/3+&!3+!4/(3)!
(55*)48!4*!A(+534!4/(3)!*B+!0*7+4)3(8F!! `*)H3+@!B34/! : *)4/! , *)(&!38!83 ' 12#!+*4!(+*7@/N!4/(! J FKF!
' 784!&28*!8(4!348!83@/48!*+!B!4*!174!&!84*!14*!&+9!17+38/!67883&!&+9!%/3+&!5*)!4/(3)!0* ' 123034##!
3+!4/(! =>6 , !/7 ' &+!)3@/48!G3*2&43*+8F!
!

. /(!4*4&234&)3&+! =>6 , !)(@3 ' (E!&8!4/(!1()1(4)&4*)!*5!/7 ' &+!)3@/48!G3*2&43*+8E!38! ' &3+2#!)(81*+83A2(!
5*)!4/(!&A78(8!0* ' ' 344(9!&@&3+84!348!0343D(+8E!#(4!%/3+&!&+9!67883&! ' 784!&28*!A(!/(29!23&A2(!&8!
&39)8!&+9!&A(44*)8F^46!! f G()!4/(!#(&)8E!(55*)48!870/!&8!0(+4()3+@!J FKF!5*) (3@+!1*230##!+!/7 ' &+!)3@/48!
3887(8!4/)*7@/!4/(!78(!*5!4)32&4()&2!87 ' ' 348E^47!&11*3+43+@!&!K1(03&2!T+G*#!5*)!Y7 ' &+!63@/48!3+!
: *)4/! , *)(&E^48!&+9!)((+4()3+@!*+4*!4/(! J F : F!Y7 ' &+!63@/48!%*7+032^49/!&G(!A(+! ' &9(!4*! ' 343@&4(!
&+9!)(84)304!4/(!/7 ' &+!)3@/48!G3*2&43*+8!B34/3+!4/(! =>6 , !3+!*!)9()!4*!1)*4(04!4/(!B(25&)(!*5! : *)4/!
, *)(&+!0343D(+8E!A74!9*3+@!8*!38!+*!(&8#!5(&4F^50! I 24/*7@/!4/(!1)(G3*782#! ' (+43*+(9! ' (&87)(8!/&G(!
&39(9!3+!4/(! ' 343@&43*+!*5!4/(! =>6 , !/7 ' &+!)3@/48!3887(8E!57)4/()!&043*+!38!84322!3 ' 1()&43G(!&+9! ' 784!
A(!&!4*!1!1)3*)34##!*5!0*+839()&43*+!A#!4/(! J FKF!3+!*!)9()!4*!1)*4(04! : *)4/! , *)(&+!0343D(+8!&+9! ' &H(!
1)*@)(88!4*B&)9!B*)29CB39(!8(07)34##!

0*+8724&43*+8! A(4B((+! ^4/(_! 0*7+4)3(8F\ ^53!! I 4! 4/(! 87 ' ' 34E! %*2F! =&G39! a &XB(22! 81*H(! *5! 4/(! 87 ' ' 34;8!3 ' 1*)4&+0(!&+9!348!1*4(+43&2!4*! ' &H(! ' 70/!+((9(9!1)*@)(88!3+!)(@&)9!4*!4/(!=>6 , ! , 3 ' !)(@3 ' (E!8+@!4/ &4E!Z!^4_/38!38!4/(!43 ' (!4*!3+343&4(1&!+(B!84)&4(@#!!L!8/*729!A(!A&8(9!*+!4/)(!123+(8! *5!(55*)4\$!&!/7 ' &+!)3@/48!715)*+4!&11)*&0/E!&!0* ' 1)(/+83G(!3+5*) ' &43*+!&+9!3+527(+0(!0& ' 1&3@+E! &+9!4/(!17)8734!*5!&!5)(!&+9!7+353(9! , *)(&F\ ^54!!Q)* ' !4/(!87 ' ' 34!0& ' (!8* ' (4/3+@!0* ' 12(4(2#!+(B! &+9!+(G!)9*+(!A(5*)(] &+!&+*7+0(' (+! *5!Zi*3+4!/7 ' &+!)3@/48!9(' &+98\!*+!4/(!=>6 , F^55!!L+! &99343*+! 4*! 4/(! 3+8384(+0(! 4/ &4! 4/(!=>6 , ! 1)*G39(! 3+/(+! /7 ' &+!)3@/48! 4*! 4/(! 3)! 0343D(+8E! 4/(! 9(' &+98! &28*! 3+0279(9! 4/ &4! &A9704(9! e&1&+(8(! 0343D(+8! &+9! K*74/! , *)(&+! 1)38*+(8)! *5! B&)! A(!)(!&4)3&4(9!4*!4/(! 3)!)(81(043G(!/* ' (!0*7+4)3(8F^56!!!

!

" 74E!34!/ &8!A((+!1*3+4(9!*74!A#!4/(!93)(04*)!*5!4/(!11)*@)& ' !*+! J FKFC , *)(&!1 *230#!&4!4/(!%*7+032! *+!Q*)(3@+! 6 (2&43*+8!<% Q 6? !4/ &4!4/(!4)32&4(&2!)(2&43*+8/31!A(4B((+!4/(! J FKFE!K*74/! , *)(&E!&+9! e&1&+!38!1)*@)(883+@!83 ' 724&+(*782#!B34/4/(!)(2&43*+8/31!A(4B((+! : *)4/! , *)(&E!67883&E!&+9!%/3+&E! &+9!4/ &4!4/38! ' &#!Z9((1(+!0* ' 1(4343*+!&+9!3 ' 1(9(!1)*81(048!5*)!0**1()&43*+!A(4B((+!4/(!4B*! 0*&2343*+8F\ ^57! I 8!4/(!)(2&43*+8/31!84)(+@4/ (+8!A(4B((+!4/(! J FKFE!e&1&+E!&+9!K*74/! , *)(&E!34!38! 3 ' 1()&43G(!4*!H((!1!3+! ' 3+9!4/ &4!4/(!Z1 *230#!0***)93+&43*+!\!A(4B((+!4/(!=>6 , E!%/3+&E!&+9! 67883&!38!)(3+5*)0(9!&8!B(22F^58!!Q7)4/(!E!&54(!)!(' &3+3+@!7+*00713(9!5*)! ' *) (4/ &+4B *!1)(839(+43&2! &9 ' 3+384)&43*+8E! >)(839(+4! " 39(+! 53+&22#! 5322(9! 4/(! 1*8343*+! *5! J FKFE! K1(03&2! T+G*#! 5*)! Y7 ' &+! 63@/48! 3+! : *)4/! , *)(&! A#! &11*3+43+@! K4&4(! =(1&)4' (+! *55303&2! e723(! .7)+()F^59! ! .7)+();8! &11*3+4' (+!38!4/*7@/4!4*!A)3+@! ' 70/C

I 11 *3+43+@!e723(!.7)+(!&8!4/(!JFKF!K1(03&2!T+G*#!5*)!Y7 ' &+!63@/48!3+! : *)4/! , *)(&!B&8!&!2*+@!
G()97(!84(1!3+!4/(!)3@/4!93)(043+!5*)!4/(!JFKF!&+9!8((' 8!4*!A(![734(!1)* ' 383+@!5*)!4/(! ' 343@&43*+!
5!/7 ' &+!)3@/48!&A78(8!3+!4/(!=>6 , F!! I 99343+&22#!K4&4(!=(1&)4 ' (+! *55303&28!/ &G(!)(C84)&4(@3D(9!
&+9!8(4!4/ (3)!83@/48! *+!A)3+@3+@!&B&)(+(88!4*!4/(!93)(! /7 ' &+!)3@/48!8347&43*+!3+!4/(!=>6 , !A#!
9(G(2*13+@!&!A(44!)!84)(& ' !*5!3+5*) ' &43*+!3+4*!&+9!*74!*5!4/(!=>6 , !&+9!/ &G(!&28*!12&0(9!(' 1/ &838!
*+!Z&00*7+4&A3234#!5*)! : *)4/! , *)(& ;8! /7 ' &+!)3@/48!&A78(8!&+9!G3*2&43*+8E!&+9!0*7+4()3+@! : *)4/!
 , *)(&+!4)&+8+&43*+&2!)(1)(883*+F\ ^62!!

!

I 28*E!&8!&!)(8724!*5!4/ (!)((+4)#!*5!4/ (!JFKF!*+4*!4/ (!JF : F!Y7 ' &+!63@/48!%*7+032!&54!)!B34/9)&B3+@!
7+9()4/ (!.)7 ' 1!&9 ' 3+384)&43*+!3+!OUMdE^63!4/ (!JFKF!O&+!*B!A(! ' *)(!3+G*2G(9!3+!)(4&23&43+@!&@&3+84!
67883&!&+9!%/3+&!B34/3+!4/ (!JF : FF^64!!I!)(G3G&2!*5!K(07)34#!%*7+032!8(883*+8!4*!9380788!/7 ' &+!)3@/48!
3+!4/(!=>6 , !/&8!&28*!A((+!3+843@&4(9!A#!*55303&28!*5!4/ (! " 39(+!&9 ' 3+384)&43*+F^65!!h)(&4!1)*@)(88!
B&8!23H(2#!4*!A(! ' &9(! B/(+! &+! I))3&C5*) ' 72&! ' ((43+@! <&+! 3+5*) ' &2! ' ((43+@! *5!4/ (!K(07)34#!
%*7+032?^66!

,*)(&!38!1&)&' *7+4!3+!*)9(!5*)!348! '(88&@(!4*!A(!02(&)2#!0*+G(#(9!4*!/7' &+!)3@/48!G3*2&4*)8F!!
.)(&43+@! /7' &+!)3@/48! 3887(8! Z&8! &+! *+C*55! 8B340/E\! 23H(! 4/(#! B(! 4/)*7@/*74! 4/(! .)7' 1!

8&+043*+8! B34/!)(81(04! 4*! :*)4/! ,*)(&E! & ' (+9(9! 4/(! :*)4/! ,*)(&! K&+043*+8! &+9! >*230#!
T+/&+0(' (+4! I 04! *5! OUMV! &+9! Z0)(&4(9! &!)(A744&A2(! 1)(87 ' 143*+\^{92!}^{93!})(@&)93+@! @**98! ' &9(!
4/)*7@/!4/(!78(!*5! :*)4/! ,*)(&+!2&A*)F!! . /(!% I I . K I !5*) ' &22#!84&4(8!4/ &4!

!

&+#! 83@+3530&+4! @**98E! B&)(8E! &)4302(8E! &+9! ')0/&+938(! ' 3+(9E! 1)*970(9E! *)!
' &+75&047)(9!B/*22#!*)!3+!1&)4!A#!4/(!2&A*)!*5! :*)4/! ,*)(&+!+&43*+&28!*)!0343D(+8!
8/&22!A(!9(' (9!4*!A(!1)* /3A34(9!7+9!)!8(043*+!PUj!*5!4/(! . &)355! I 04! *5!McPU!<Mc!
JFKF%F!MPUj?!&+9!8/ &22! +*4!A!(+4342(9!4*! (+4)#!&4!&+#!*5!4/(!1*)48!*5!4/(! J +34(9!
K4&4(8F⁹⁴!!

!

I 24/*7@/!4/(!% I I . K I !(55(043G(2#!174!3+4*!B*)98!4/(!1)(87 ' 143*+!4/ &4!&+#!&+9!&22!5*) ' 8!*5! =>6 , !
2&A*)! [7&2353(8! &8!5*)0(9!2&A*)E!4/(!% I I . K I ! /&8! *+2#! 1)(G(+4(9!&!8 ' &22!+7 ' A!)! *5!8/31 ' (+48!
B/*22#!*)!1&)42#!0* ' 1)38(9!*5!5*)0(9! :*)4/! ,*)(&+!2&A*)!5)* ' !(+4()3+@!4/(!JFKF⁹⁵!! I 043*+8!A#!4/(!

8/*729!0*+43+7(!4*A(!78(9!A#!4/(! J FKF!&@&3+84!%/3+&!&+9! 67883&!A74!0)34308!1*3+4!*74!4/ &4!4/ (#!
8/*729!A(!74323D(9!3+!&!823@/42#!9355() (+4! ' &++(!3+!*)9(!4*!A(' *84!(55(043G(F!!L4!/ &8!A((+!+*4(9!
4/ &4! ' &+#! *5!4/(! 1&84! &9 ' 3+384)&43*+8! /&G(!Z5&32(9!4*! (+5*)0(! J FKF! 2&B8!&+9! J : !8&+043*+8^E_ \!

JQR>I!3 ' 12(' (+4&43*+!&8!B(22!&8!4/(!X1())3(+0(!*5!%/3+(8(!5*)0(9!2&A*)!87)G3G*)8!0*729!Z&112#!
4*!4/(!:*)4/!,*)(&+!0*+4(X4\!&+9!@)(&42#!A(+534!/ *B!4/(!JFKF!@*G()+ ' (+4!&88(88!348!84)&4(@#!&+9!
4/(! ' (&87)(8!34!0*729!4&H(!4*!3+4()G(+(!3+!4/(!=>6 ,!/7 ' &+!)3@/48!G3*2&43*+8F¹⁰⁹!! a *)(*G()E!34!/ &8!
A((+!87@@(84(9!A#!4/(!%* ' ')03&2!%784* ' 8! f 1()&43*+8! I 9G38*)#!%* ' ' 344(!<% f I %?!Q*)0(9!
R&A*)! `*)H3+@!h)*71!4/&4!0* ' ' 7+30&43*+!&+9!4)&3+3+@!&(!1&)*7+4!3+!4/(!(+5*)0(' (+4!*5!4/(!
JQR>I!&+9!4/(!Z()&930&43*+!*5!5*)0(9!2&A*)^E_\!4/78!4/(!8& ' (





(55(043G(!3+!348!53@/4!&@&3+84!/7 ' &+!)3@/48!&A78(8E!78(!*5!A*4/!2(@&2!&+9!1*230#! ' (&87)(8!38!H(#!
!

8(07)34#F\ 137!!L+!9*3+@!8*E!4/(!JFKFE!&8!B(22!&8!4/(!3+4()+&43*+&2!0* ' ' 7+34#!&8!&!B/*2(E! ' &#!A(! ' *)(!
' *43G&4(9!A#!4/(!1)*81(04!*5!A(44()3+@!4/(3!)(2&43*+8!B34/! : *)4/! , *)(&!4/()(A#!+79@3+@!4/('!
4*B&)9!(X/&7843+@!&22!1*883A2(! ' (&87)(8!4/&4!0*729!174!&+!(+9!4*!4/(!3+/(+4!/7 ' &+!)3@/48!
G3*2&43*+8!*5!4/(!=>6 , F!! " 74!&8!38! ' (+43*+(9!A#!/7 ' &+!)3@/48!81(03&2384!6*A()4&!%*/(+E!4/(!JFKF!

3 ' 1*)4&+42#@7&)&+4((!4/&4! : *)4/! , *)(&+8!B322!+*4!/ &G(!4*!)(47)+!&+9!8755(!57)4/ (!)/7 ' &+!)3@/48!
&A78(8!A#!4/ (!)(@3 ' (F!

!

Q3+&22#&! &24/*7@/! 4/(! =>6 , ! 38! H+*B+! 4*! A(! (X4)(' (2#!)(1)(883G(! 3+! 348! 0(+8*)8/31! *5!
0* ' ' 7+30&43*+!*5!3+5*) ' &43*+!3+4*!&+9!*74!*5!4/(!0*7+4)#!4/ (!)/&8!)(0(+42#! A(+!Z0*+43+7(9!
@)*B4/! 3+! 4/(! +7 ' A(!) *5! : *)4/! , *)(&+! 0(221/*+(! 87A80)3143*+8!9(8134(! 4/ (!)@3 ' (;8!
87)G(322&+0(F\ ¹⁴⁵!! ` 34/!4/38!3+! ' 3+9E!4/ (! J FKF!8/*729!&04!*+!4/38!* 1 1*)47+34#!*5! : *)4/! , *)(&+!
0343D(+8!A)(&H3+@!5)((!5)* ' !4/(!=>6 , !0*+4)*2!*G(!)(X4()+&2!3+5*) ' &43*+b ' (93&!&+9!53+9!+(B!
B! 4*! Z74323D(! 4/38! @)*B3+@! 8*7)0(! *5! 3+5*) ' &43*+! 52*B! 3+4*! 4/(! 0*7+4)#! 1*4(+43&22#!
3+0)(&83+@!&B&)(+(88!*5!3+5*) ' &43*+!0*+87 ' 143*+!& ' *+@!4/(! : *)4/! , *)(&+!1*172&43*+F\ ¹⁴⁶!L+!
4&H3+@!870/!3+343&43G(E!4/ (! J FKF!B*729!A(!&A2(!4*! ' &H(!@)(&4!@&3+8!3+!348!(55*)48!4*!&22(G3&4(!4/ (!
8755(3+@! *5! : *)4/! , *)(&+8!A#! ' &H3+@!0343D(+8!*5!4/(!=>6 , !&B&)(!*5!4/ (!G3*2&43*+!A#!4/ (!
, 3 ' !)(@3 ' (!*5!4/ (3)!3+/()(+4/7 ' &+!)3@/48!&+9!B*729! (+&A2(!4/ (! J FKF!4*!Z9(G(2*1!&! ' *)(!
0* ' 1)(/ (+83G(!&+9!(55(043G(!84)&4(@#!4*!1)* ' *4(!/7 ' &+!)3@/48!3+! : *)4/! , *)(&E!A)39@3+@!4/ (!
@&1!A(4B((+!3+4()+&2!&+9!(X4()+&2!(55*)48F\ ¹⁴⁷! . / () (5*)(E!34!38!3 ' 1())&43G(!5*)!4/ (! J FKF!4*! ' &H(!
1)*@)(88!3+!3+5324)&43+@!4/ (!=>6 , !B34/!3+5*) ' &43*+!4/ &4! ' &#!A(!/ (21572!&+9!A(+5303&2!4*! : *)4/!
, *)(&+8!B/32(!4/ (!0*7+4)#;8!787&22#!84)*+@!0(+8*)8/31!38!B (&H(+9!8*!&8!4*!&2()4!4/ (' !*5!4/ (!
/7 ' &+!)3@/48!&A78(8!4/ (!&)(!(+97)3+@!&+9!81)(&93+@!4/ (!B*)9!4/ &4!4/ (! J FKF!0&+!&+9!B322!&88384!
3+!!&887&@3+@!4/ (8(13887(8F!

!

TG(+!4/*7@/!4/ (! J FKF!/&8!&2)(&9#!A(@7+!4&H3+@!8* ' (! ' (&87)(8!B34/!4/ (!&3 ' !*5!3+4()G(+3+@!3+!4/ (!
/7 ' &+!)3@/48!8347&43*+!3+! : *)4/! , *)(&E!3+!*)9()!5*)!4/ (! J FKF!4*!&88384!3+! ' 343@&43+@!4/ (!/7 ' &+!)3@/48!
&A78(8!3+!4/ (!=>6 , E!34! ' 784!57)4/ (!)3+4()G(+!&+9! ' &H(!&0*+803*78!(55*)4!4*!174!4/ (!&A78(8!3887(8!
&4!4/ (!5*)(5)*+4F!! . /38!0*729!A(!9*+(!A#!4/ (! " 39(+!&9 ' 3+384)&43*+!3+4(@)&43+@!/7 ' &+!)3@/48!3+4*!
02&)353(9! =>6 , ! 1*230#! &+9! 12&03+@! 81(03&2! &44(+43*+! 92(3)0 . FO . 2(&00)0 . . 2(*78)48 . !+4*!

