"#\$%&#!'(!'&)#)\*!
'+,-!. /O+!12334546!\*47/+894-8!2:!;7/-<>!
?@?!A(!. 4+<2-!#B4(!
'+,-!. /O+6!C#!?D@?@!
E9/,4+FG+,-9/O+(4HI!

## ! " #\$%&'() \*

J@@K! C>(\* (!<-!; 7/-<>!#7734H!%<-51 <&L=6!M42+5482O-!N-&4+=&,!

\* <=4+8/8<2-!8&340!PQ>4!R/L&8/8&4!&::4L8=!2:!8>4!#LS1 <&&2-!2:!2-4!%<-51 <&L!; 8+1 L81+4!

2-!/!; 4L2-H0!C4H/525\(\_/3!T973\(\_/8<2-=!2:!8>4!129748&2-!. 2H43U!V\* <=4+8/8<2-!

\* <+4L82+0!\* +(!1+<8<-/!; /-WX!

J@@Y! 12973484H!L2I+=4O2+E!:2+!C>(\*(!<-!;7/-<=>!Q>42+48\(\)/3!%<-5I <=8\(\)=!?;, -8/[!/-H!;49/-8\(\)=\(\)(!M42+5482O-!N-\(\)84+=\(\),!

J@@]! . (; (!<-!; 7/-<>!%<-5| <=6!M42+5482O-!N-&4+=&,!
1297+4>4-=&4!4[/9!/+4/=0!; ,-8/[6!; 49/-84=6!^<=82+,\_\* </34L82325,6!#773</4H!
%<-5| <=84=\_; 4L2-H!%/-5|/54!#LS| <=&2-!

?DDK! 1297+4>4

\_\_\_\_

\_\_\_\_

```
$; 6?717*&<65>8*<8*C?D4*E<F?*$; //151*GH<//*IJJKL. ?17148MI*
: 7/-<>!@@?0!' 45<--<-5!: 7/-<>!T!
; 7/-<>!@@J0!' 45<--<-5!; 7/-<>!TT!
; 7/-<>!?@@!' /=d.!T-84+94H</84!; 7/-<>!
: 7/-<>!?@?0!T-84+94H</84!: 7/-<>!T!Z-20!: C#A!?@?0!T-84+94H</84!: 7/-<>\!
; 7/-<>!?@J0!T-84+94H</84!; 7/-<>!TT!Z-2O!; C#A!?@J0!#HB/-L4H!%/-51/54!Q>+215>!11381+4\!
; 7/-<>!?@Y0!T-84-=\B4!T-84+\94H</84!; 7/-<>!
; 7/-<>!J?b0!./0#1, )$$23/&"&+"&+2/456702$"&%2789/2$"&
$; 6?717*&<65>8*<8*@1; ?518; F4*#4001?708D*GH<//*IJJPL, 6QQ1?*IJJKMM*
; 7/-<=>!@@?0!' 45<--<-5!; 7/-<=>!
; 7/-<>!@@]0!T-8+2HIL82+,!; 7/-<>!T!
; 7/-<>!@??0!T-84-=<\(\B4!\)\ /=\(\L\); 7/-<>!
: 7/-<>!@@c0!T-8+2H1L82+.!: 7/-<>!TT!
; 7/-<>!?@?0!T-84+94H</84!; 7/-<>!T!
%$%"!E'$*%) " *&! %$- ') @*%R%+" ,*
       RI33!M+/HI/84!; L>23/+=><76!M42+5482O-!N-&4+=&,!ZJ@@?aJ@@K\!
       d/384+!*(!d-5>89/-!T-84+-/8<2-/3!) 28/+,!#0/+H!ZI-H4+5+/HI/84!=L>23/+=><7\!
       #C!; L>23/+!O&>!^2-2+!#O/+H!
       %4884+=!:+29!* <+4L82+!:2+!218=8/-H<-5!84/L><-5!4B/31/8<2-=6!M42+54820-!N-&4+=&,!
       ; 59/! * 438/!CdZ; 7/-<>!>2-2+!=2L<48,\!
       C>d; \leq 9/!128/!2:2+4\leq -!3/-51/54!>2-2+!=2L<48, \!
       M23H4-!" 4. !T-84+-/8<2-/3!^2-2+!; 2L<48.!
       * 4/-E!%<86!: 8/84!N-&4+=&.!2:!A4O!$2+E!7: NA$\!/8!M4-4=42!
(&-!+*B+(H!,,'())%3*%$&'S'&'!,*%)"*,!+S'$!*
: 4+Bd_4!82!8>4!; 7/-<=>! * 47/+894-8!/8!' +, -!. /O+!1233454!
       122+H<-/84!G45<--<-5!8>+215>!/HB/-L4H!<-84+94H</84!;7/-<=>!34B43=6!R/33!J@@Ka7+4=4-8!
       \# = <8! < !8 > 4!7 + 47/ + /8 < 2 - !2 : !H47/ +894 - 8/3!/ = -4 = -94 - 8!H2L194 - 8-6!J@?@a7 + 4 = 4 - 8!
       T-!L>/+54!2:1:7/-\Leftrightarrow>!73/L494-86!:1994+!J@?@a7+4=4-8!
               N7H/84!L/3G+/8<2-=!/-H!+4=23B4!84L>-4/3! \iff 14=!O4>!8>4!84=8!
               . 448!O&>!C+25+/9!#==<8/-8!82!17H/84!73/L494-8!7/54!2-!:7/-<>!*47/+894-8!
               O4G=&4!/-H!+4B<=4!/77+27+</84!434L8+2-4!:2+9=!
               . 448!O&>!*4/-f=!q:: 4!82!H<=LI==!73/L494-8!17H/84=!/-H!7/+84<7/84!<-!,4/+3,!
               O4G<-/+=!:2+!<-L29<-5!=81H4-8=!
               ) 4B<4O!=81H4-8=f!3/-51/54!G/LE5+21-H!S14=8<2--/<+4=!
               \&39/3!=81H4-8=!82!+4S14=8!4==/,=!2+!92H<,:!73/L494-8!/-H!+4=72-H!82!
               73/L494-8a+43/84H!4a9/3=!
               &B/31/84!4==/,=!+4$14=84H!:2+!8>2=4!73/L<-5!<-!/HB/-L4H!34B43=!
               1297&4!+4=138=!/-H!7+47/+4!=7+4/H=>448!:2+!) 45<=8+/+f=!q::4.4!/-H!H2L194-8=!
               :2+!#1/H494!R/↔!
               T-84+B<4O!=81 H4-8=!82!H484+9<-4!/HB/-L4H!73/L494-8!
               ) 4=23B4!=L>4H13<-5!/-H!4-+23394-8!<==14=!
```

```
; | 74+B<4!; 7/-<>!%/-5| /54!Q4/L><-5!#==<8/-8=!ZR/33!J@@Ka7+4=4-8\!
            : 434L8I3/-51/54IQ#=!HI+<-5!, 4/+3, IQ#!C+4a&9732, 94-8Id 2+E=>27!
            .4-82+!; 7/-\Leftrightarrow>!Q#=!HI+<-5!O44E3, !<-H-B-HI/3!2+!5+2I7!9448<-5=!
           #==<=8!O&>!8>4!L+4/8<2-!/-H!4H&<-5!2:!34==2-!73/-=!/-H!/L8&B&<4=!
            12-HIL8!34==2-!2G=4+B/8<2-=!/-H!4B/3I/8<2-=!
    122+H<-/84!8>4!O44E3,!; 7/-<=>!3/-51/54!8/G34!
   ) 4=72-=G34!:2+!84[8G22E!/H278-2-=!/-H!2+H4+=!:2+!; C#A!@@?6!@@J6!?@@6!?@?6!/-H!?@J!
   g+4-8!-40!=8+1L82+=!82!8>4!; 7/=2!*47/+894-8!
Q8>4+!; 4+B<4.4!82!' +, -!. /O+!1233454!
   \%/-51/54!Q182+!\%/\Leftarrow 2-!ZJ@?ca7+4=4-8\!
   R/L138,!. 4-82+6!J@?Ka7+4=4-8!
    ^ I 9/-!; I G`4L8=! * 47/+894-8/3!) 4B<4O4+6!J@?ca7+4=4-8!
    ; 4+B4H!2-!=4/+L>!L299&844=!:2+!8>4!:2332O<-50!
            * <+4L82+!2:! * /8/!; L<4-L46!J@J?!
            * <+4L82+!2:!#LL4==!: 4+B<_4=6!J@?]!
           ; 7/-<=>! * 47/+894-8!
                   Q4-I+4a8+/LE!72=&<2-6!J@?JaJ@?]!
                   Q - 4a, 4/+! < -84+ < 9!72 = & < 2-6! J@?c!
                   h<-8<-5!#==<8/-8!C+2:4==2+!72=&<2-=6!J@J@!
           R+4-L>! * 47/+894-8!7L2-8<- I <-5!-2-a84-I+4!8+/LE!72=8<2-\6!J@?J!
           T8/3</-! * 47/+894-8!72-4a, 4/+!<-84+<9!34L81+4+!72=&<2-\6!J@@D!
   ; 4+B4!/=!:/LI38,!949G4+!2:!8>4!#LL4==-G38,!%4/747==>>+1*147+4+2000444022+BDGF47767;1f1. if() Tj EMC/LB10134/
   #LL4==!; 4+B<_4=! * <+4L82+\6!J@?c!82!7+4=4-8!
           #884-H!9448<-5=!82!<97+2B4!/LL4==G38.!2-!L/971=!
           C+47/+4!/-H!4H&!H2LI 94-8=!O&>!8>4!1299&88446!<-L3I H<-5!/LL4==G&8,!723L<4=!
   \# = 4 + 9!34 + 9!34 + 9!34 = 8!
```

Q+/-=3/8<2-=0!

\$() H! +!) \$! \*B+!,!) &%&'(), \( \bar{\pi} \&\%3V, \( \bar{\pi} \\ \bar{\pi} \) " \*R(+V, - (B, \*

) <80; 4</\*<42\*' 481?4<80; 4</\*\$; 4\text{W1?14917\text{N\*}}

PQ>4!&::4L8\(\text{4}\) | 13! #\(\dagger \) | 13/==+229U(!\(\dagger \) 2+E=>27!7+4=4-84H!/8! 13|\(\dagger \) | 13/=+229U(!\(\dagger \) 2+E=>27!7+4=4-84H!/8! 13|\(\dagger \) | 13/=+24-18\(\dagger \) | 13/=+229U(!\(\dagger \) 2+E=>27!7+4=4-84H!/8! 13|\(\dagger \) | 13/=+2325 | 13/=+229U(!\(\dagger \) 2+E=>27!7+4=4-84H!/8! 13|\(\dagger \) | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+2325 | 13/=+23

P' 4, 2-H!#LL4==-G-3-8, 0!N--B4+=/3! \* 4=-5-!:2+!%4/+-<-5!<-!8>4!N--B4+=-8, !13/==+229U(! cl 2+E=>27!7+4=4-84H!/8!13|84!T-84+-/8-2-/3!T-=8-8|84!12-:4+4-L4(!m/-1/+, 6!J@?K(!

 $P\%/=!4=8+1\ L81+/=!H4!2G`482aB4+G2!, !43!92H432!H4!L297484\_cj-0!32=!4:4L82=!:/L348/H2+4=!H4!\\ 3/!/HS1&=d\_cj-!H4!1-/!4=8+1\ L81+/!3<-5kl=84_/!/!28+/U(!C+49<2!1+\\ &=82G/3!H4!h-33/3j-!\\ L2-:4+4-L4!/8!3/!N-&4+=H/H!H4!h/33/H23H(!h/33/H23H6!; 7/<-(!m13, !?Y6!J@@D(!$ 

### C?D4\*E < F?\*\$; //151N\*

PC44+!%/-51/54!Q182+!Q+/<-<-5U(!C+4=4-84H!2-4a>21+!8+/<-<-5!:2+!3/-51/54!8182+=(!;7+<-56!J@JJ(!

PQ>4!C+<-L<734=!2:!N \* %U(!C+2B4H4H!/-!>2I+a32-5!N \* %!8+/<-<-5!82!=8IH4-8!L2-=I38/-8=!:2+!8>4!Q4/L><-5!/-H!%4/+-<-5!T-=8&I84(!; 7+<-56!J@?K(!

PQ4L>!Q/3E!2-!N \* %U(!C+4=4-84H!/8!/!:/L138,!7/-43!82!=>/+4!<-:2+9/8<2-!2-!49732,<-5! N \* %!<-!84/L><-5(!; 7+<-56!J@?K(!

 $PA284=1:+29!8>4!R<43H0!C1>/8!TfB4!%4/+-4H!/G218!N*%U(!C+4=4-84H!/-H!:/L<36/84H!G+4/E218!5+217!/8!/!Q+<31233454!N-&4+=/3!*4=<5-!:2+!%4/+-<-5!ZN*%\!O2+E=>27!2+5/-$\dH!G,!8>4!C+2B2=8f=!g::\d4(!;7+<-56!J@?b(!))$ 

P; 294!MI + H-4!:2+!%/-5I/54!QI82+=U(!C+4=4-84H!/-H!>43H!n!/-H!#!=4==<2-!/8! %/-5I/54!QI82+=!Q+/<-<-5!O&>!#L/H494!) 4=2I+L4!; 74L</3=8!/-H!C+2:4==<2-/3! \*4B432794-8!1>/<+(!; 7+<-56!J@?](!

PgB4+L29<-5!8>4!T-:3I4-L4!2:!8>4!%?!<-!8>4!R2+4<5-!%/-5I/54!13/==+229(U!C+4=4-84H!/8! Q+\alpha1233454!O2+E=>27!\bigZP#!\%/-5I/54!13/==!:2+!\%/-5I/54!Q4/L>4+=(U\!R/336!J\@?\@(!

#### #\$\*" <007: E 1781?N\*

P&3!92H432!H4!L29748d<j-U(!C+4=4-84H!/8!8O2aO44E!O2+E=>27!2-!84L>-2325,!/-H!L1381+4!ZP&3! 1=2!H4!3/!84L-23251/!,!3/!L1381+/!4-!43!/13/!H4!434(U\!; /3/9/-L/6!; 7/<-(!m13,6!J@?J(!

#### @1; ?518; F4\*#4001?708DN\*

P&3!I=2!H4!9/84+</34=!74H/5j 5d2=!4-!43!/I3/!H4!434U(!C+4=4-84H!82!5+/HI/84!=8IH4-8=!2:!; 7/-<>! /7734H!3-5I <=8d=(!cl/=><-582-6!\* (1(!.../,6!J@@](!

B+(H!,,'()%3\*%HH'3'%&'(),\*

#94+\(\dample-!121-\(\delta\!2-!8\)>4!\(Q4/L)<-5!2:!\(R2+4\)-51/54=!\(\text{#1QR}\)\!

. 2H4+-!\(\dample-51/54!\)#==2L\(\dample\!8\)2-!\(\text{?}.\) \%\\!

#94+\(\dample-!\)#==2L\(\dample\!8\)2-!:2+!\(\dample\!73\)4H!\(\dample\!8\)-51\(\dample\!8\)!; 2L\(\dample\!8\),!2:!\(\dample\!94+\(\dample\!73\); \(\dample\!8\)!

## 3%) @#%@!,\*

&-53=>0!-/8-84!L297484-L4! ; 7/-=>0!-4/+a-/8-84!L297484-L4! R+4-L>0!<-84+94H</84!7+2:4-4-L,! C2+81514=40!+4/H<-5!E-2034H54! T8/3</-0!+4/H<-5!E-2034H54!

# ! AB! +'! ) \$! \*%C+(%" \*

; 4B<3346!; 7/<-!Z=81 H,!/G+2/H6!?DDi aDK\!

. /H+I9Td() $T1_01Tf()$  $T1_01Tf$