| A1;B+/:;2%"6@"C6D2>"EF6/;5\$" O\$ * P\$0"E0" " | |
|---|--|
| Z1=FD:;B+"\$15"X`D;2\$.F+"?+5\$H6H%"G6D/:+" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$0"E0" " | """""") 6B+* . +/"&' &&" |
| G+/2;@,+5"?++/"<+B;+8+/" XF:+B;+/"<+:+\$/=>"9=\$5+*%" | 4=26. +/"&' &! " |
| " 9==+::;.DFF"-;:\$.;F;2%"9FF%" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$0"E0" | """""""""""""""""""""""""""""""""""""" |
| a6H1;26"41F;1+" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$0"E0" " | """""""""""""""""""""""""""""""""""""" |
| #+12\$F"K+\$F2>"E;/:2"9;5" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$0"E0" " | """""""""""""""""""""""""""""""""""""" |
| G+/2;@,+5"41F;1+"X5D=\$26/" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$Q"E0" | """""""""""""""""""""""""""""""""""""" |
| C%:2+*"6@'G\$/+"?/\$=2;=+"<+B;+8"0/\$;1;1H" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$*P\$0"E0" | """""""""""""""""""""""""""""""""""""" |
| G61=+P2"#\$PP;1H"0/\$;1;1H"" A1;B+/:;2%"6@'C6D2>"EF6/;5\$" O\$ * P\$Q"E0" | """""""") 6B+*.+/"&''(" |
| n | |

GEC"4D2:2\$15;1H"715;B;5D\$F"9=>;+B+*+12"98\$/5"3)6B+*.+/"&'!!70"G>;F5"\$15"E\$*;F%"C2D5;+:0" 06D;:"5+"F\$"?\$/2+"EF6/;5\$"#+12\$F"K+\$F2>"71:2;2D2+0"A1;B+/:;2%"6@"C6D2>"EF6/;5\$N""

GEC"4D2:2\$15;1H"0+\$*"9=>;+B+*+12"98\$/5"3)6B+*.+/"&'!'7";1"\$=]168F+5H+*+12"6@'2>+"86/]"

=615D=2+5". %"2>+"G611+=2"E\$*\$F;\$:c0;22F+"K\$B\$1\$"XB\$FD\$2;61"?/6d+=20"G>;F5"\$15"E\$*;F%"C2D5;+:0" 06D;:"5+"F\$"?\$/2+"EF6/;5\$"#+12\$F"K+\$F2>"Z1:2;2D2+0"A1;B+/:;2%"6@"C6D2>"EF6/;5\$N""

GEC"4D2:2\$15;1H"0+\$*"9=>;+B+*+12"98\$/5"3) 6B+*.+/"&' T7";1"\$=]168F+5H+*+12"6@'2>+"86/]" =615D=2+5".%"2>+"CD:2\$;1\$.;F;2%"Z1@/\$:2/D=2D/+"?/6d+=20"G>;F5"\$15"E\$*;F%"C2D5;+:0"06D;:"5+"F\$" ?\$/2+"EF6/;5\$"#+12\$F"K+\$F2>"Z1:2;2D2+0"A1;B+/:;2%"6@'C6D2>"EF6/;5\$N""

 $\begin{aligned} & \mathsf{GEC}^*4\mathsf{D2}{:}\,2\$15;1\mathsf{H}^*\mathsf{Z15};\mathsf{B}{:}5\mathsf{D}\$\mathsf{F}^*\mathsf{9}=>;+\mathsf{B}+*+12"98\$/5"3)\,\mathsf{6B}+*\,.\,+/"\&'\,\,'\,\mathsf{W70}^*\mathsf{G}>;\mathsf{F5}^*\$15"\mathsf{E}\$*\,;\mathsf{F\%}^*\mathsf{C2D5};+:0"\\ & \mathsf{06D};:\,"5+"\mathsf{F}\$"?\$/2+"\mathsf{EF6}/;5\$"\#+12\$\mathsf{F}^*\mathsf{K}+\$\mathsf{F2}>"\mathsf{Z1}:2;2\mathsf{D2}+0"\mathsf{A1};\mathsf{B}+/:\,;2\%"\mathsf{6}@'\mathsf{C6D2}>"\mathsf{EF6}/;5\$"" \end{aligned}$

н

$$\begin{split} & | D//D: 0^{\circ}ON0^{\circ} \# 68 + /\%0^{\circ} - N0^{\circ}) + : * \$10^{\circ}ON0^{\circ}G\$FF + d\$: 0^{\circ}ON \# N0^{\circ} J^{\circ}K + /1\$15 + h0^{\circ} \# N^{\circ}38' ! ' 7N^{\circ}N(\&\$\#' 3\%(E) \\ & , 0\%0' 0\% (P)?0\$' 0\#E\%3) + \$)\#(E' E\%(E)\&, -0, \$' --40\$' &\%' --4) > \%C \#$3#)\&1\% > \$\#()' (>)01 \#\%) . ' '' \% \#3) \\ & \%()'' \#(0' -)1\#' -01)3\#$C\%\#3)3\#\$]; 1H^{\circ}=>;F5/+1f: "* +12\$F''>+\$F2>": +/B;=+: ":D==+::@DF": +/;+:0" \\ & E \# KZ"PD. N") 6N''&(' R(7N 0\$ P\$0''E0, "A1;B+/::;2%"6@C6D2>"EF6/;5$0"G6FF+H+"6@I +>$B;6/$F"$15" \\ & G6**D1;2%"C=;+1=+:"06D;: "5+"F$"?$/2+"EF6/;5$"#+12$F"K+$F2>"Z1:2;2D2+0"<+:+$/=>"J" \\ & O/$;1;1H"G+12+/"@6/"G>;F5/+1f: "#+12$F"K+$F2>N" \end{split}$$

K65H+:0"CN0"E+//+;/\$0"aN0"_;F. +/2R

/ Y"3PPN"! R&&7N"O\$ * P\$0"E0, "A1;B+/:;2%"6@'C6!

#68+/%0"-N0"0;15:+%0"#N0"J"b6:+P>0"<N"3&'!M7N"J-+\$%>')<NDD])\$#3,-03)'(>).%(>%(E3P)L\$'&A#()?&1++-) ^#'>%(#33)!33#33''#(0)WHIXU

!'" #\$%"&'&(" #68+/%0"-N0"3&'!(7N"?, &!)9)b%>3)'(>)J''' %#3)3430#'')+.)&'\$#)2\$'&0%&#)\$#C#\)30, >4) T, '\$0#\$)Nc)S! 2\$%)`)*, (#)WHI9Y)\$#2+\$0)J]WHIFUWHI98"0\$* P\$0"E0,"A1;B+/:;2%"6@'C6D2>" EF6/;5\$0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6* *D1;2%"C=;+1=+:0"G>;F5"\$15"E\$*;F%"C2D5;+:N

#68+/%0"-N"3&' ! (7N"?, &!).+\$)b%>3)' (>)J' '' %#3)3430#'')+.)&' \$#)2\$' &0%&#)\$#C#\)30, >4) T, '\$0#\$)WW)\$*' (, '\$4)`); '\$&1)WHI9Y)\$#2+\$0)J])WHIFUWHI98'0\$ * P\$0"E0,"A1;B+/:;2%"6@'C6D2>" EF6/;5\$0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6 * *D1;2%"C=;+1=+:0"G>;F5"\$15"E\$ * ;F%"C2D5;+:N

 $\#68 + /\%0" - N0"G\$FF + d\$:0"0N0" \land \$1H0" \land N0"ID//D:0"0N0"_;:>+0"bN0"K + /1\$15 + h0" \# N0"J"EF\%110"aN"3&' ! L7N""9$

#68+/%0"-N"3&' ! L7N"?, &!).+\$)b%>3)' (>)J' '' %#3)3430#'')+.)&' \$#)2\$' &0%&#)\$#C#\)30, >4) T, '\$0#\$)NW)S*' (, '\$4)`); '\$&1)WHIFY)\$#2+\$0)J])WHIWUWHIF8"0\$* P\$0"E0,"A1;B+/:;2%"6@"C6D2>" EF6/;5\$0"G6FF+H+"6@I+>\$B;6/\$F"\$15"G6* *D1;2%"C=;+1=+:0"G>;F5"\$15"E\$*;F%"C2D5;+:N

н

#68+/%0"-N"J"0\$2\$/2=>+@@{^D+:1+F0") N"3&' ! &78)?430#'')+.)&' \$#)2\$' &0%&#)\$#C%#\).%('-)\$#2+\$0)WHI1U WHIW8)0\$ * P\$0"E0,"A1;B+/:;2%"6@'C6D2>"EF6/;5\$0"

- #68+/%Q"-NQ") +: * \$1Q"ONQ"J"?\$H\$1Q"ON9N"3&' ' T7N"?, '' '' \$4)\$#2+\$0)+.)01#)3, \$C#4)\$#32+(3#3).+\$)01#) >' 0%(E)C%+-#(&#)' (>)M, --4%(E)3&1++-UM' 3#>)&, \$\$%&, -, '' P)R1#)K' \(): #(0#\$)D\$%' '\$4) D\$#C#(0%+()D\$+E\$' '' 8"

#68+/‰"

!₩" #\$%"&'&(" $\begin{aligned} ?/\$=2;=+"&<+B;+8"3C4G?<7"0>+"PD/P6:+"6d'2>;:"P/6d+=2";:"26"P/6B;5+"\$1\$F\%:::"6d'C\%:2+*"6d'G\$/+"\\ ?/\$=2;=+"&<+B;+8"3C4G?<7"5\$2\$"d6/"CD==+::"("a;5:"J"E\$*;F;+:"\$H+1=\%"\$15"2>+;/"dD15+/:N"0>;:"\\ C4G?<"P/6d+=2"8;FF">+FP";5+12;d%"2/+15:"$15"6PP6/2D1;2;+:"d6/"P/\$=2;=+";*P/6B+*+12";1":\%:2+*"6d" = \$/+"B\$FD+:"$15"P/;1=;PF+:"d6/"2>;:"$H+1=\%"9:"P$/2"6d'2>;:0"$"5$2$"=6FF+=2;61"$15"5$2$":26/$H+"\\ P/6=+::"8;FF".+"5+B+F6P+5"8>;=>"8;FF"$FF68"=6*P$/;:61"6d'5$2$"2/+15:"6B+/"2;*+N""9*6D12,"\\ mL'0'' 'N" \end{aligned}$

G>;F5"\$15"E\$*;F%"C2D5;+:0"G6FF+H+"6@"

I + sB;6/sF"s15"G6 * D1;2%"C=;+1=+:0"A1;B+/:;2%"6@"C6D2>"EF6/;5sN"C2\$2+"6@"#\$::\$=>D:+22:"C4G?<" & ILR&'!(N"O>+"H6\$F"6@'2>+"P/6d+=2";:"26"P/6B;5+"@6FF68RDP"2/\$;1;1H0"5\$2\$"\$1\$F%:;:0"=61:DF2\$2;610" \$15"2+=>1;=\$F"\$::::2\$1=+"61"2>+";7(")84T210R-4(0)P-10(7)2NO.243(7)C10(F)-6(2\$)24(2;)-6(6)12(1)10(0)

26"P/6B;5+"\$1\$F%: ;:"6@'C%:2+*"6@'G\$/+"?/\$=2;=+"<+B;+8"3C4G?<7"5\$2\$"@6/"CD==+::"("a;5:"J"E\$*;F;+:"\$H+1=%"\$15"2>+;/"@D15+/:N"

5+B+F6P*+12"\$15"P/+P\$/\$2;610"P/+:+12\$2;61"5+B+F6P*+12"\$15"P/+P\$/\$2;610"\$15"/+:+\$/=>"
\$1D:=/;P2"5+B+F6P+12"\$15"P/+P\$/\$2;611"9*6D12,""

""G>;F5"\$15"E\$ * ;F%"C2D5;+:0"06D;:"5+"F\$"

 $\begin{aligned} & (55) & \# + 12 F'' K + F^{2} = 71 : 2; 2D^{2} + (A^{1}; B^{1} + 1; 2) & G^{0} C 6D^{2} = F^{6}; 5S^{1}) & (55) & F^{1} XB FD^{2}; 6^{1} = 5 : +^{1} Z^{1} & O^{1} + F^{1} C^{1} + F^{1} C^{1} & O^{1} & O^{1} + F^{1} C^{1} & O^{1} & O^{1} + F^{1} C^{1} & O^{1} & O^{1$

 $\begin{aligned} &3C4G? < 7"e6/"2> + "42288$"G>;F5/+1n: "G66/5;1$2+5"9==+::"J"<+e_+//$F"26"C+/B;=+:N"0>+"C4G?<"8;FF":DPP6/2"2>+"*$15$2+"6e"G66/5;1$2+5"9==+::"26"./;1H"*+12$F">+$F2>"$15"5+B+F6P*+12$F":FF1=15":PF6P2:2"*15"5+B+F6P*+12$F":SH+1=;+:"26H+2>+/";1"2>+"P/6B;::61"6e"=$:+"/+:6FD2:61"$15"/+e+//$F":+/B;=+:"2>/6DH>"$"e6=D:"61"=6**D1;2%R.$:+50";15;B;5D$F;h+5"$15"=DF2D/$FF%"=6*P+2+12"=$/+"e6/"=>;F5/+1"$15"e$*;F;+:N"0>;:"2/$;1;1H"8;FF6==D/"6B+/"2>+"=6D/:+"6e"61+"%+$/"$15"8;FF".+"=615D=2+5";1"e;B+"P>$:+:N"0>;:"P/6P6:$F"6D2F;1+:"2>+"e;B+"P>$:+:"$15"P/6B;5+:"$"P/6d+=2+5"2;*+2$.F+N"9*6D12,"mWSQU'T"$

"G>;F5"\$15"E\$ * ;F%"C2D5;+:0"06D;:"5+"F\$"?\$/2+"

N"G>;F5"\$15"E\$*;F%"C2D5;+:0"06D;:"5+"F\$"

?\$/2+"EF6/;5\$"#+12\$F"K+\$F2>"71:2;2D2+Q"A1

/+:+\$/=>"\$::;:2\$12:"\$15":2D5+12:N"9 * 6D12,"m! &0' ' ' N"

G>;F5"\$15"E\$*;F%"C2D5;+:0"G6FF+H+"6@"I+>\$B;6/\$F"\$15"

 $\begin{array}{l} G6 ^{*} & D1; 2\% ^{\circ}C=; +1=+: (!^{\circ}A1; B+/:; 2\% ^{\circ}G ^{\circ}C6D2> ^{\circ}EF6/; 5\$ N^{\circ}9/; h61\$ ^{\circ}C\% : 2+ ^{*} ^{\circ}G ^{\circ}G\$/+ ^{\circ}?/\$=2; =+ ^{\circ}<+B; +8 ^{\circ} \\ 3C4G? < 7N ^{\circ}O> + ^{\circ}PD/P6: + ^{\circ}G ^{\circ}2>; : 'W ^{\circ}\% +\$/ ^{\circ}=612/\$=2 ^{\circ}P/6d+=2 ^{\circ}; : ^{\circ}26 ^{\circ}P/6B; 5+ ^{\circ}\$1\$ F\% : ; : ^{\circ}G ^{\circ}: 2\$ 2+8; 5+ ^{\circ}C\% : 2+ ^{*} ^{\circ} \\ \end{array}$

+* PF6%++:"@6/"Z<I "=612;1D;1H"+5D=\$2;61"=+/2;@;=\$2;61\\#\$;12\$;1+5";1@6/*\$2;61\\$.6D2"Z<I"

 $\mathsf{P}/626 = 6\mathsf{F}^*(15^{"}; 1B + :2; H$2 + "8 > +2 > + /"2 > +"6/H$1; h$2; 61$ \mathsf{F}^*: :+:: * +12^{"}\mathsf{P}/626 = 6\mathsf{F}^*= $1^{"}5; :2; 1HD; :>". +28 + +1" \\ 6/H$1; h$2; 61: "8; 2 > "B$/%; 1H" = P=; 2; +: "@6/" = DF2D/$\mathsf{F}" = 6 * \mathsf{P}+2 + 1 = +N"$

 $\label{eq:K} K_{;:} P $1;="C+/B_{;=+:}"G6D1=;F"?/6d+=20"G>;F5"$15"E$*;F%"C2D5;+:0"G6FF+H+" 6@"I +>$B;6/$F"$15"G6**D1;2%"C=;+1=+:0"06D;:"5+"F$"?$/2+"EF6/;5$"#+12$F"K+$F2>"Z1:2;2D2+0" A1;B+/:;2%"6@'C6D2>"EF6/;5N

06D::"5+"F\$"?\$/2+"EF6/:5\$"#+12\$F"

 $\begin{array}{l} \mathsf{K} + \$f2 > $71:2;2D2 + 0"G6FF + H + "6@"I + > \$B;6/\$F"\$15"G6^* D1;2\%"C=; +1= + : 0"A1;B+/:;2\%"6@"C6D2 > "EF6/;5\$N" \\ \mathsf{K} ???e"3\mathsf{K} 6^* + $71:2/D=2;61"@6/"?\$/+12:"6@"?/+:=>66F"e6D1H:2+/:7"4D2=6^* +: "C2D5\%M"91"! SR*612>" \\ \mathsf{P} / 6d + = 2" + B\$FD\$2;1H"56:\$H + 0"2; *;1H0"\$15"\$=\$5+*;="6D2=6^* +: "6@"=>;F5/+1"8>6"P$/2;=;P$2+5";1"2>+" \\ \mathsf{K} ??e"\mathsf{P} / 6H/\$ * \mathsf{N}"ED15+5". \%"2>+"?+8"\mathsf{K} 6^* + "i;:;2;1H"G\$ * P$;H10"$"P/6d+=2"6@"2>+"?+8"G+12+/"61"2>+" \\ \mathsf{C} 2\$2+:"\$15"2>+"?+8"G>$/;2\$. F+"0/D:2: \mathsf{N}"<+#=+//+5\mathsf{N}" \end{array}$

&+--#E#)30, >#(03)>%.#\$)M4)#Z2#\$%#()+.)>%&&\$%' %('0%+()k?6:2+/"P/+:+12\$2;611g"&'&L"ACE" _/\$5D\$2+"<+:+\$/=>"C% * P6:;D*0"0\$ * P\$0"E0N""

- _/6B+:("KN0"I /%\$12RG6*:26=]("CN"J"#68+/%"-N"3&' &! ("C+P2+*.+/7N"; #(0'-)' (>)M#1' C%+\$'-)1#'-01) (##>3)+.)0\$' (3%0% ()' E#)4+, 01)#Z2#\$%#(&%(E)1+'' #-#33(#33)\$R!]B<Y)>, \$%(E): +C%>UI ="k?6:2+/" P/+:+12\$2;611N"0>+"TS^{2>}"\$11D\$F"9*+/;=\$1"G61H/+::"6@<+>\$.;F;2\$2;61"#+5;=;1+N""
- $\label{eq:started_s$
- #68+/%U"-N"3&'&'U"bDF%7N"/C#\$C%#\)+."?430#'')+.): '\$#)D\$'&0%&#)^#C%#\)S?/:D^YP)D\$+E\$'''5) &+'''', (%045)'(>)30'0#)2#\$32#&0%C#3)k?6:2+/"P/+:+12\$2;611N"O>+"&'&'"A1;B+/:;2%"6@'#\$/%F\$150" I \$F2;*6/+"O/\$;1;1H"Z1:2;2D2+:U"4/F\$1560"E0N"3G61@+/+1=+"=\$1=+FF+57N"
- $$\label{eq:starter} \begin{split} \# 68 + /\%'' \texttt{N}^3\texttt{G}>\$; /7"3\&' ! \texttt{T0}" \# \$/=> \texttt{N}'?430 \# '')+.)\&' \$\#) 2\$' \&0\%\#)\$\#C \# \backslash\texttt{S}?/: D^\texttt{P}D\$+\texttt{E}$' '' 5)\&+ '' '' , (\%45) \\ & `(>)30' 0\#) 2\#\$32 \#\&0\%C \#0''''\texttt{C} \$ P6:; D* "=615D=2+5"\$2"2>+"L&15"911D\$\texttt{F}"<+:+\$/=>"\$15"?6\texttt{F};=\%" \\ & \texttt{G61}@_{+}/+1=+"61"\texttt{G}>; \texttt{F50}"956\texttt{F}+:=+120"\$15"e6D1\texttt{H}"95D\texttt{F2}"\texttt{I}+>\$\texttt{B}; \texttt{6}/\$\texttt{F}"\texttt{K}+\$\texttt{F2}>0"0\$ * P\$0"\texttt{E0}" \end{split}$$
- #68+/%U"-N"J"K+/1\$15+h0"#N"3&' ! T0"#\$/=>7N"C%:2+*"6@'=\$/+"P/\$=2;=+"/+B;+8"3C4G?<7N"Z1N"-N" #68+/%"3G>\$;/70"?430#'')+.): ' \$#)D\$' &0%#)^#C%#\)\$?/: D^YP)D\$+E\$' '' 5)&+'' '', (%045)' (>)30' 0#) 2#\$32#&0%C#8)C%*P6:;D*"=615D=2+5"\$2"2>+"L&15"911D\$F"<+:+\$/=>"\$15"?6F;=%"G61@+/+1=+"61" G>;F50"956F+:=+120"\$15"e6D1H"95DF2"I+>\$B;6/\$F"K+\$F2>0"0\$*P\$0"E0N"

 $0$2$/2=>+@@R^D+:1+F0"$

#68+/%Q"-N"3&' !MQ"#\$/=>78)EF6/;5\$"K7??e"5\$2\$"/+:DF2:"J"@,15;1H:"Ee"&' ! (R&' !W,"I/\$=]+1"C=>66F" <+\$5;1+::"9::+::*+12"J"?\$/+12"71B6FB+*+12"CD/B+%N"71"#N"0;15:+%"3G>\$;/70)D\$#2' \$%(E) &1%>\$#().+\$)A%(>#\$E' \$0#(P)R1#)%' 2' &0)+.)<NDD])+()2' \$#(0)%(C+-C#'' #(0)' (>)3&1++-) \$#' >%(#338)

\$15"?6F;=%"G61@+/+1=+"@"0\$ * P\$@"E0N"""

- #68+/%0"-N0"?\$H\$10"0N9N0"e\$*P6F:]\$%\$0"CN0"J"_;F0"0N"3&'!!0"#\$/=>7N"Z*P/6B;1H"%6D2>"6D2=6*+:";1"\$" B;6F+1=+"P/+B+12;61"P/6H/\$*,"G6*.;1;1H"`D\$F;2\$2;B+"\$15"`D\$12;2\$2;B+"P+/:P+=2;B+:N"Z1"<N" I /;:=6+"3G>\$;/70":+''', (%04UM'3#>)2'\$0%&%2'0+\$4)\$#3#'\$&1)S:LD^YP):,-0,\$'--4)&+''2#0#(0) &+'''', (%04)M'3#>U'22\$+'&1#3N"C%*P6:;D*"=615D=2+5"\$2"2>+"G>;F5/+1f:"#+12\$F"K+\$F2>" <+:+\$/=>"\$15"?6F;=%"G61@+/+1=+0"0\$*P\$0"E0N"
- e\$* P6F:]\$%\$0"CN0"#68+/%0"-N0"J"-6FF\$/50")N"3&'!!0"#\$/=>7N"D\$+.%#3)+.)&1%>\$#()\%01)1%E1),0%%0'0%+() +.)?0'0#)N(2'0%#(0)D34&1%0\$%%)D\$+E\$'''8)?\$P+/"P/+:+12\$2;61)\$2"2>+"G>;F5/+1f:"#+12\$F"K+\$F2>" <+:+\$/=>"\$15"?6F;=%"G61@+/+1=+0"0\$* P\$0"E0N""
- C6DF6D1;\$:R9//;\$H\$0"-N0"#68+/%0"-N0"EDFF+/0"#N#N0"J"C26]+:0"ON"EN"3&'!'0")6B+*.+/7N""R1#) '22-%a'0%+()+.)01#)&1%>)>%a#&0#>)%(0#\$'&0%+()2\$+&#>, \$#3)+.)D:NR).+\$)&1%>\$#()>% E(+3#>) \%01)\$#'&0%C#)'00'&1''#(0)>%a+\$>#\$8)?6:2+/"P/+:+12\$2;61"\$2"2>+"9::6=;\$2;61"@6/"I+>\$B;6/" \$15"G6H1;2;B+"0>+/\$P%"39IG07"911D\$F"G61B+12;610"C\$1"E/\$1=;:=60"G9N"

K+/1\$15+h0"#N0") +: * \$10"ON0"#68+/%0"%

- # 6;1 + 0"GNON0"C26] +: 0"ON0"J" # 68 + /%0" N"3&' ' M0"9P/;F7N"! 33#33'' #(0)+.)(, \$0, \$' (&#)0\$' 23)+.)' EE\$#33%+ (5)>#2\$#33%+ (5)' (>)\$#E\$#33%+ ()2\$#3#(0#>)M4)&1%>\$#()%01)&+'' 2-#Z)1#' -01) $&+ (>%0%+ (38"?6:2+/"P/+:+12$2;61"$2"2>+"G>;F5"K+$F2>"?:%=>6F6H%"G61@+/+1=+0"_$;1+:B;FF+0"$ EON"
-) +: * \$10"ON0"K+/1\$15+h0"#N0"I D//D:0"ON0"#68+/%0"-N0"K65H+:0"CN0"J"?6/2+/0"9N"3&' ' M0"E+. /D\$/%7N" : \$+33U3%D#)&+'' 2' \$%2+()+.)3430#'')+.)&' \$#)-+E%2)'' +>#-38)?6:2+/"P/+:+12\$2;61"\$2"2>+"\$11D\$F" * ++2;1H"6@'9"C%:2+* "6@'G\$/+"@6/"G>;F5/+1f:"#+12\$F"K+\$F2>,"XVP\$15;1H"2>+"<+:+\$/=>"I \$:+0" O\$ * P\$0"EON"
- K\$/P+/0"#N"K+/1\$15+h0"#N0") +: * \$10"0N0"#68+/%0"-N0"J"Z:\$\$=:0"#N"3&' ' M0"E+. /D\$/%7N""
-) $D\$+0+\&+-)' 33\#33'' \#(0)' ('-43\%P)' ()' ('-43\%)+.)2\$+0+\&+-3)' 33\#33\%(E)\&, -0, \$'-)\&+'' 2\#0\#(\&\#)' 0) \\ '()+\&E' (\%0' 0\%+('-)-\#C\#-8)?6:2+/"P/+:+12\$2;61"\$2"2>+"$11D$F" * ++2;1H"6@'9"C\%:2+ * "6@'G$/+" @6/"G>;F5/+1f:"#+12$F"K+$F2>,"XVP$15;1H"2>+"<+:+$/=>"I $:+0"0$ * P$0"E0N"$
- E/;+5*\$10"0N0"#68+/%0"-N0"K+/1\$15+h0"#N0") +:*\$10"0N0"#\$%F6220"#N0"J"ID//D:0"0N"3&''M0" E+. /D\$/%7N"BZ'''%(%(E)01#)\$#3#'\$&1)3, 22+\$0%(E)&, -0, \$'-)&+'' 2#0#(&#)%()&1%>\$#(h3)'' #(0'-) 1#'-01P)g'0%(+8)?6:2+/"P/+:+12\$2;61"\$2"2>+"\$11D\$F"*++2;1H"6@'9"C%:2+*"6@'G\$/+"@6/" G>;F5/+1f:"#+12\$F"K+\$F2>,"XVP\$15;1H"2>+"<+:+\$/=>"I\$:+0"0\$*P\$0"E0N"

_/++1. \$D*@"?N"XN@"-+5/;=]@"<N"EN@"0;P;+1@"0N@"1/681@"XN"GN@"#68+/%@"-N@"0\$/5;+/;@"CN@"J"

- $\begin{array}{l} \texttt{C26} + : \texttt{0"ON'J''\#68 + /\%\texttt{U} \texttt{N"3&'}! \texttt{0"9P};\texttt{FN''D\$ + M-\#''} \texttt{3})\%()\texttt{\&'} \texttt{\%}(\texttt{E}). + \texttt{$)01\#)(\#\#\texttt{>3}+.)\texttt{>}\%. \texttt{\&}, \ \texttt{-0)}\texttt{\&1} \texttt{\&}\texttt{>} \texttt{\#}(\texttt{N}'') \texttt{\&}(\texttt{A}) \texttt{\&}(\texttt{A})$
- E;:>+/0"I NON0"C26]+:0"ON0"#68+/%0"-N0"#+5;1\$0"GN0"#=^86810"CN0"C>+PP\$/5RK\$1H+/0"CN0"I /%\$120"bNI N0"J" 5+?+/=h+F0"#NeN"3&' ' 0")6B+*.+/7N"!\$+'' ')'3)')3#(3+\$4)\$#%(.+\$&#'' #(0)0+)'' +0%C'0#) #(E'E#'' #(0)M4)&1%>\$#()\%01)',0%2''N"?6:2+/"P/+:+12\$2;61"\$2"2>+"!U2>"911D\$F"9::6=;\$2;61" @6/"2>+"95B\$1=+*+12"6@I+>\$B;6/"0>+/\$P%0")+8"4/F+\$1:0"09N"
- EDFF+/0"#N0"#68+/%0"-N0"J"C26]+:0"0N"3! TTU0"C+P2+*.+/7N"! ('-43%)+.)3#-#&0%C#)", 0%" N"?6:2+/" P/+:+12\$2;61"\$2"2>+"!U2>"911D\$F"EF6/;5\$"9::6=;\$2;61"@6/"I+>\$B;6/"91\$F%:;:0"C\$/\$:62\$0"EON"
- C26]+:("ON"J"#68+/%("-N"3! TTW("9P/;F7N"; +>#\$'0%(E)01#)01\$#31+->).+\$)\$#2+\$0)+.)2'%()M4)')&1%>)\%01) -#, A#''%)%()\$#''%3%+(N"?6:2+/"P/+:+12\$2;61"\$2"2>+"E;@>"EF6/;5\$"G61@+/+1=+"61"G>;F5"K+\$F2>" ?:%=>6F6H%("_\$;1+:B;FF+("EON"
- $\begin{aligned} \mathsf{C} &=>\$2h. +/\mathsf{H0}^{\circ}\mathsf{ON0}^{\circ} \# 68 +/\%0^{\circ} \mathsf{N0}^{\circ}\mathsf{J}^{\circ}\mathsf{C26}] +: 0^{\circ}\mathsf{ON}^{\circ}\mathsf{I} \ \mathsf{TTW0}^{\circ}\mathsf{P}/\mathsf{;}\mathsf{F7N}^{\circ}\mathsf{J}^{\circ} \ '' \ \%4)., \ (\&0\% + (\%(E)^{\circ} \ (>)^{\circ} > e, \ 30^{\circ} \ \#(0). + \cdots + \\%(E) \\ 0\$^{\circ}, \ '' \ '0\%)\mathsf{M}\$^{\circ} \ \%()\%(e, \ \$40^{\circ}\mathsf{C2} + /^{\circ}\mathsf{P}/+: +12\$2; 61^{\circ}\$2^{\circ}\mathsf{2} > +^{\circ}\mathsf{E}; @>^{\circ}\mathsf{E}\mathsf{F}6/; 5\$^{\circ}\mathsf{G}61@+/+1= +^{\circ}61^{\circ}\mathsf{G}>; \mathsf{F}5^{\circ}\mathsf{K} + \$\mathsf{F}2>^{\circ} \\ ?: \% &=>6\mathsf{F}6\mathsf{H}\%0^{\circ}_\$; 1+: \mathsf{B}; \mathsf{F}\mathsf{F}+0^{\circ}\mathsf{E}\mathsf{ON}^{\circ}\end{aligned}$
- I D=>+/0"0N0"\\$H1+/0"9N0"<D2h0"XNKN0"#68+/%0"-N0"J"C26]+:0"0N"3! TTW0"9P/;F7N"C#\$M'-)\$#E, -'0‰()+.) +C#\$'&0%C%045)%'2, -3%C#(#335)'(>)2'\$0%&%2'0‰()M4)&1%>\$#()\%01)!K<KN"?6:2

 $4:1+: @"?N_N@"-$i +/1+@"aNGN@"456 * @"-NON@"J"C26]+: @"ONEN"3! TT&@"#$%7N"! 33#33'' #(0)+.)$

- $\# 68 + /\%0" N"3\&' ! U0"bD1 + 7N"21B;2+5)_D+: 2"0+=2D/+/0"A1;B+/:;2%"6@"C6D2>"EF6/;5$"D15+/H/$5D$2+" = 6D/: +0" # +12$F"K+$F2>=0$8"$15"?6F;=%"I +>$B;6/$F"K+$F2>=$/+"#;16/0"L#1'C%+$'-) <#'-01&' $#)N33, #3).+$): 1%>$#(5"0$ * P$0"E0N""$
- # 68 + /%0" N"3&' ! U0" # \$/=>7N"BC' -, '0%(E)'' '&\$+)2\$' &0%�%(&+\$2+\$'0%(E)\$#3#' \$&1)'' #01+>38"21B;2+5) $_D+:2"0+=2D/+/0"A1;B+/::2\%"6@"C6D2>"EF6/:5\$"D15+/H/\$5D\$2+"=6D/:+0"C=>66F"6@"C6=:\$F"$ $\land 6/]0"?+\&\%'-)@+\$A); ' \&\$+)D\$' \&0\%\&\#5"0\$ * P\$0"E0N"""$
- #68+/%0"-N"3&' ! M0"#\$/=>7N"BC' -, '0%(E)'' '&\$+)2\$' &0%�%(&+\$2+\$'0%(E)\$#3#' \$&1)'' #01+>38"Z1B;2+5) _D+:2"0+=2D/+/0"A1;B+/:;2%"6@'C6D2>"EF6/;5\$"D15+/H/\$5D\$2+"=6D/:+0"C=>66F"6@'C6=;\$F" \6/]0"?+&% -)@+\$A); '&\$+)D\$' &0%"O\$ * P\$0"EON""

0\$*P\$0"[3TK(:)20(+)]TJET"

L!" #\$%"&'&("

 $K + F_{2} = 15 KD * 1C + B = 13X4 KKC70 I 6:2610 \# 9N$

п

__/\$5D\$2+"G6D/:+0"GF;1;=\$F"

<+>\$.;F;2\$2;61"\$15"#+12\$F"K+\$F2>"G6D1:+F;1H"J"#\$//;\$H+"\$15"E\$*;F%"0>+/\$P%0"G>;F5"\$15"E\$*;F%" C2D5;+:0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6**D1;2%"C=;+1=+:0"A1;B+/:;2%"6@'C6D2>"EF6/;5\$N" C=;+1=+:@"A1;B+/:;2%"6@"C6D2>"EF6/;5\$N"

_/\$5D\$2+"G6D/:+0"G>;f5"\$15"

 $956F+:=+12"I +>\$B;6/\$F"K+\$F2>"P/6H/$*0"G>;F5"\$15"E\$*;F\%"C2D5;+:0"G6FF+H+"6@'I +>\$B;6/\$F"\$15" G6**D1;2%"C=;+1=:0"A1;B+/:;2%"6@'C6D2>"EF6/;5$N"3_/6B+:7"$

"A15+/H/\$5D\$2+"G6D/:+0"C=>66F"

6@'C6=;\$F"\6/]0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6* *D1;2%"C=;+1=+:0"A1;B+/:;2%"6@'C6D2>"EF6/;5\$N"

 $A15 + /H/\$5D\$2 + "G6D/: + 0"C = > 66f"6@"C6 = ;\$F" \land 6/] 0" G6FF + H + "6@"I + > \$B;6/\$F"\$15"G6 * * D1;2%"C = ; + 1 = + : 0"A1;B + /: ;2%"6@"C6D2 > "EF6/;5\$N"$

A15+/H/\$5D\$2+"G6D/:+@"

 $C => 66F"6@"C6 =; F" \land 6/] @"G6FF + H + "6@"I +> B; 6/F" + 15"G6 * * D1; 2%"C =; +1 = +: @"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6@"C6D2 > "EF6/; 55W" + 15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:; 2%"6"C6D2 > "EF6/; 55W" + 15"C6, A1; B + 15"C6,$

A15+/H/\$5D\$2+"G6D/:+0"

 $C => 66F"6@"C6 =; F" \land 6/] @"G6FF + H + "6@"I +> B; 6/$F"$15"G6 * * D1; 2%"C =; +1 = +: 0"A1; B + /:: ; 2%"6@"C6D2 > "EF6/; 5N

/\$5D\$2+"G6D/:+0"

$$\label{eq:cessf} \begin{split} \mathsf{C} = > 66\mathsf{F}^* 6@\mathsf{C} 6 = ; \$\mathsf{F}^* \setminus 6/] \mathbb{Q}^* \mathsf{G} 6\mathsf{F} + \mathsf{H} + "6@\mathsf{I} + > \$\mathsf{B}; 6/\$\mathsf{F}^* \$15"\mathsf{G} 6 * * \mathsf{D}1; 2\%"\mathsf{C} = ; +1 = +: \mathbb{Q}^* \mathsf{A}1; \mathsf{B} + /: ; 2\%" 6@\mathsf{C} 6\mathsf{D}2 > " \mathsf{EF}6/; 5\$\mathsf{N} \end{split}$$

"A15+/H/\$5D\$2+"G6D/:+0"C=>66F"6@"

C6=;\$F"\ 6/]0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6* *D1;2%"C=;+1=+:0"A1;B+/:;2%"6@'C6D2>"EF6/;5\$N

"__/\$5D\$2+"G6D/:+0"9PPF;+5"1+>\$B;6/"

91\$F%:;:0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6* *D1;2%"C=;+1=+:0"A1;B+/:;2%"6@"C6D2>"EF6/;5\$N

"_/\$5D\$2+"G6D/:+0"9PPF;+5"

 $\mathsf{I} +>\$\mathsf{B};6/"91\$\mathsf{F}\%::: @"G6ff+H+"6@"I+>\$\mathsf{B};6/\$\mathsf{F}"\$15"G6**D1;2\%"C=;+1=+: @"A1;B+/:::2\%"6@"C6D2>"EF6/;5\$".$

"A15+/H/\$5D\$2+"G6D/:+@C=>66F"

6@'C6=;\$f"\6/]0"G6FF+H+"6@'I+>\$B;6/\$F"\$15"G6**D1;2%"C=;+1=+:0"

- " 95B\$1=+5"?:%=>6+5D=\$2;61\$F"712+/B+12;61:0"CP/;1H"!TTS"
- " 95B\$1=+5"?:%=>6+5D=\$2;61\$F"712+/B+12;61:@CP/;1H"! TTU""
- " 95B\$1=+5"?:%=>6+5D=\$2;61\$F"712+/B+12;61:@CP/;1H"! TTM"
- .

ш

н

A15+/H/\$5D\$2+,"

- " C6=;\$F"C=;+1=+"K616/:0"E\$FF"! TTT"
- " C6=;\$F"C=;+1=+"K616/:0"E\$FF"! TTS"
- " C6=;\$F"C=;+1=+"K616/:0"E\$FF"! TTU"
- " C6=;\$F"C=;+1=+"K616/:0"E\$FF"! TTM""
- " C6=;\$F"C=;+1=+"K616/:0"E\$FF"! TTW"

-+P\$/2*+12\$F"9=\$5+*;="0;\$;:610"CP+=;\$F"9::::2\$12"26"2>+"G>\$;/""

#\$F*;0"#\$/]]D"3&'&L7N"J,004)b:)&-,30#\$%(E)%'2,0'0%+().+\$)''%3%(E)(+0)'0)\$'(>+'')>'0'8) A1;B+/:;2%"6@'C6D2>"EF6/;5\$0"G6FF+H+"6@'?D.F;="K+\$F2>"3?>-";1"?D.F;="K+\$F2>70"4D2:;5+" G>\$;/N"

K\$1F+%0"9

__6/. %0"G;\$/\$"3&' &! 7\"

I ;:: /\$ * 0"b+/+ * %"3&' ' U7N"D#\$3+(' -)\$#&+\$>)' (>)' 33#33'' #(0P)! \$' M%)%)M#00#\$)-#' \$(0)%()' ()! \$' M%) 3+&##04)\$' 01#\$)01' ()%()')&-' 33\$++'' &"A1;B+/:;2%"6@"C6D2>"EF6/;5\$0"G6FF+H+"6@'9/2: "\$15" C=;+1=+:"K616/: "G6FF+H+0"G6 * *;22++"#+*.+/N"

ш

- 0\$%F6/0"G6/21+%"3&' ' W7N"! 33#33'' #(0)+.)(, \$0, \$' (&#)0\$' 23)+.)' EE\$#33‰ (5)>#2\$#33‰ (5)' (>) ' EE\$#33‰ ()‰()&1%>\$#()\%01)&+'' 2-#Z)1#' -01)&+(>%0‰ (3N"A1;B+/:;2%"6@C6D2>"EF6/;5\$0" G6FF+H+"6@9/2:"\$15"C=;+1=+:0"K616/:"G6FF+H+0"G6 * *;22++"#+*.+/N"
- a;Ff;\$10"915/+\$"3&' 'W7N"!)(#\)-++A)'0)!,0%''P): ',3#35)0\$#'0''#(05)'(>)1+2#).+\$)01#).,0,\$#8" A1;B+/:;2%"6@'C6D2>"EF6/;5\$0"G6FF+H+"6@'9/2:"\$15"C=;+1=+:0"K616/:"G6FF+H+0"G6**;22++" #+*.+/N"
- $$\begin{split} C=>D^* $] + \label{eq:Constraint} C=>D^* $] + \label{Constraint} (C=>D^* $] + \label{Const$$
- $\label{eq:constraint} $$ + /$: 0"IF$] + N"A1;B+/:;2%"6@'C6D2>"EF6/;5$0"G6FF+H+"6@__/$5D$2+"C2D5;+:"3#NCN";1"G>;F5"J" 956F+:=+12"I+>$B;6/$F"K+$F2>70"E$=DF2%"95B;:6/N"$
- I +/1:2+;10"b\$*;+"3&'&L7N :, \$\$#(0), (%C#\$3'-)3, %&%>#)2\$#C#(0%+()2\$+E\$'''3)%()1%E1)3&1++-)3#00%(E3) %()01#)a(%0#>)?0'0#3P)!)\$#C%#\)'(>)\$#&+'''#(>'0%+(38"A1;B+/:;2%"6@'C6D2>"EF6/;5\$0" G6FF+H+"6@'_/\$5D\$2+"C2D5;+:"3#NCN";1"G>;F5"J"956F+:=+12"I+>\$B;6/\$F"K+\$F2>70"&¹⁵"E\$=DF2%"

e, C#(%#)e, 30%"A1;B+/:;2%"6@'C6D2>"EF6/;5\$0"G6FF+H+"6@'__/\$5D\$2+"C2D5;+:"3#NCN";1"G>;F5"J"

(!"

| 9/2;=f+"<+B;+8+/": 1%>\$#()' (>)]+, 01)?#\$C%#3)^#C%#\" | """""""""""""""""""""""""""""""""""""" | ! U" |
|--|--|------|
| 9/2;=f+"<+B;+8+/": 1%>\$#()' (>)]+, 01)?#\$C%)^#C%#\" | "CD* * +/"&' | ! U" |
| 0+V2. 66]"<+B;+8+/"C\$H+"?D. f;=\$2;61:"3KD* \$1"I+>\$B;6/7" | """""CP/;1H"&' | ! U" |

| GEC"C+\$/=>"G6* *;22++"#+*.+/" <+>\$.;F;2\$2;61"J"#+12\$F"K+\$F2>"G6D1:+F;1H" " | &'!W" |
|---|-------|
| GEC"E;+F5"XVP+/;+1=+"\ 6/]H/6DP"" E\$=DF2%"#+*.+/" | &'!M" |

н

 $\label{eq:approx_start} ?/\$=2;=+"<+B;+8"3C4G?<7"2/\$;1;1H"\$15"\$1\$F\%:::"8;2>"a+FF%"X1HF;:>"J"b\$=]"C;*61:0"=6**D1;2%" P\$/21+/N"0+=>1;=\$F"9::::2\$1=+"=6FF\$.6/$2;B+"309G7"\$15"\#$::$=>D:+22:"XV+=D2;B+"4@@;=+"6@'K+$F2>" \$15"KD*$1"C+/B;=+:"3X4KKC70"I6:2610"#9N"$

G>\$;/"6@"=6* *;22++"8>;=>"6B+/:++:"*\$22+/:"