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F##')*!A,@&,G!	D
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H%)%, / ,#%!(7!1J')*!F44,\$\$!	K
F33*&4)%&(#!(7!H,4%&(#!LMKNF/,:&4)#\$!G&%=!9&\$)O&*&%&,\$!F4%!	K
F4)5, / &4!P:,,5(/ !)#5!P:,,5(/ !(7!H3,,4=!	L
E:(=&O&%,5!.(#5'4%!)#5!9,7&#&%&(#\$!</td><td>L</td></tr><tr><td><&*,!"C!H,2')*!Q):)\$\$/,#\\!</td><td>R</td></tr><tr><td>6 (#8<&\%*,!"C! S &\$4(#5 '4\\!</td><td>T</td></tr><tr><td>E: (=&0&%, 5!A, *)%&(#\$=&3\$!)</td><td>;D</td></tr><tr><td>9,7&#&&&(#\$!(7!U,0!<,:/\$!)#5!V=,:!.(#&&5,:)&&(#\$!)</td><td>;D</td></tr><tr><td>. $(\#7\&5, \#\%)*\&\%0-!E:\&@)40-!)\#5!A,*)\%, 5!A, 3(:\%\&\#>!A, \\$3(\#\%\&O\&*\&\%\&,\\$!)$</td><td>;L</td></tr><tr><td>E:&@)40!)#5!.~(#7&5,#%&)*&%OW!X#5,:\$%)#5&#>!%=,!9&77,:,#4,\$!</td><td>;L</td></tr><tr><td>A,J',\$\\$!7(:!.(#7&5,#\&)*&\0!</td><td>;R</td></tr><tr><td>$A,\\$3(\#\\$\&0^*,!1/3^*(0,,\\$!))$</td><td>; Y</td></tr><tr><td>. (#7&5,#%&)*!A,\$(':4,\$!</td><td>; T</td></tr><tr><td><)Z,![)4Z!%=,!6&>=%!)#5!V%=,:!E'0*&4!FG):,#,\$\$!1@,#\$!</td><td>;T</td></tr></tbody></table>	

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P(:/)*!.(/3*)&#%\$-!9&\$/&\$\$)*\$!)#5!F33,)*\$!(7!9&\$/&\$\$)*\$!</td><td>ID</td></tr><tr><td><math display="block">P(:/\)^*!\ .\ (\ /\ 3^*)\&\#\%!H\&>\#,5!00!\ .\ \&@\&^!A\&>=\%\\$!B!<\&\%^*,!"C!\ .\ (\ (:5\&\#)\%(:!)</math></td><td>II</td></tr><tr><td>A,J',\$%!7(:!.(#7&5,#%&)*&%O!(:!6(!P':%=,:!F4%&(#!))*</td><td>II</td></tr><tr><td>A.J'.\$\\$!7(:!(#7\\5.#\\)*\\0!(:!6(!P':\=.:!F4\\(#!7(:!)*\\7(:#\)!H.28</td><td></td></tr></tbody></table>	

:9-&'&+&'7946!; 46+\$-/!87<<+9'&=!''>?\$%&4&'79-/!49@!A7&'%\$!7#!A79B C'-%D'<'94&'79!

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- $\frac{! \text{ "}\text{M}+8+6. \text{ }/\text{"}8\text{/\&\#,N}! \text{ }. \text{ }(\#5\text{'}4\%!\%=) \text{ } \%! \text{ }(44\text{'}:\$!\&\#!\%=,!4(\#\%,2\%!(7!. (**,>,!, / 3*(0 / ,\#\%!(:!,5\text{'}4)) \text{ }\&(\#!,5:) / \$!(:!)4\%\&\&\&\&,\$-!\&\#4*'5\&\#>-!0'\%!\#(\%!*\& / \&\%,5!\%(-!V44\&5,\#\%)*!\$\%'50!)0:()5!(:!\&\#\%,:\#\$=\&3!3:(>:) / \$b! }$
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5&\$)O&*&&Ob!<=,!..(**,>,!&\$!4(/ / &%%,5!%(!3:(@&5&#>!&@&5')*\$!G&%=!5&\$)O&*&&&,\$!,J')*!)44,\$\$!%(!%=,!..(**,>,?\$!3:(>:) / \$!)#5!)4&@&&&,\$b!!

<u>! "#\$%&' (&) %*+, \$& -,., // 0 % 1 #&</u>

`<&*,!"C!H,2')*!Q):)\$\$ / ,#\a!&\\$!)!\$'0\$,\!(7!E:(=&O&\,5!.(#5'4\b!X#5,:!9,3):\\/,#\!(7!15'4)\&(#!:,>'*)\&(#\\$!],++!IK!.bPbAb-!E):\!;\MR^!&\\$',5!&\#!S)0!

; ')%+6<=6>+?5&%E,,&5%)6

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- g A,)\$(#) 0^* ,!3,:\$(#!/,)#\$!)!:,)\$(#) 0^* ,!3,:\$(#!'#5,:!\$&/&*):!4&:4'/\$%)#4,\$!)#5!G&%=!\$&/&*):! &5,#%&%,\$!%(!%=,!4(/3*)&#)#\%b!
- g H'O\$%)#%\&)*!, / (%&(#)*!5&\$%:,\$\$! / ,)#\$!\$&>#&7&4)#%! / ,#%)*!\$'77,:&#>!(:!)#>'&\$=!%=)%! /)O!O'%! 5(,\$!#(%!#,4,\$\$):&*O!:,J'&:,! / ,5&4)*!(:!(%=,:!3:(7,\$\$&(#)*!%:,)% / ,#%!(:!4('#\$,*&#>b!

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K''(4;')%+6<=6F&)'(86G'''%+(7+6))

 $9) \&\# > !@\&(*,\#4,!) \$!5, 7\&\#, 5!\&\#! \&= ,! < \&\%*, !"C!9) \&\# > !+ \&(*,\#4,! \underline{5,7\&\#\&\&\&(\#!)}) O(@,! \&=) \&!5\&5! \#(\&!:,3(:\%,5*0!)) \otimes (\#1,\#2) \otimes (\#1,\#2)$

8.39": "#%7&; %\$,#"31/9"</&&

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I''I'C')+-6*+\%\&)'''(, I'\\$, 6C06. +/, "(, 6'(6E5)I"/')06

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- $g \frac{O/++\%06\&(-6\&7)'A+\%068'A+(N!)}{(++\%068'A+(N!))} . (\#\$,\#\%!4)\#\#(\%!0,!(0\%)\&\#,5!\%=:('>=!\%=,!'\$,!(7!7(:4,-!4(,:4\&(\#-!\%=:,)\%\$-!\&\#\%\&/\&5)\%\&(\#!(:!3:,\$\$':\&\#>-!(:!00!\%)Z\&\#>!)5@)\#\%)>,!(7!\%=,!\&\#4)3)4\&\%\%\&(\#!(7!)\#(\%=,:!\&\#5\&@\&5')*b!$

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 $<=,!H\%)\%,!(?!.)*\&7(:\#\&)!4(\#\&5,:\$!\$,2')*!\&\#\%,:4(':\$,!G\&M=!)!/\&\#(:!])!3,:\$(\#!'\#5,:!M=,!)>,!(?!;T^!\%(!O,!'\#*)G7'*b!F!3,:\$(\#!G=(!,\#>)>,\$!\&\#!'\#*)G7'*!\$,2')*!\&\#\%,:4(':\$,!G\&M=!)!/\&\#(:!5(,\$!\$(!G\&M=('M!D**))*!B',\#\%,:4(':\$,\#\%!)$!5,7&\#,5!O0!\%=,!.(**,>,?\$!H,2')*!)#5!"\#\,:3,:$(\#)*!S &$4(\#5'4\%!E(*&40b!!)*|B',2'\%!B'$

O''/7 + 6

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`E:&@) 40a! > , #, :)**0! / ,)#\$!%=)%!(: /)%&(#!:,*)%,5!%(!)!:,3(:%!(7!E:(=&O&%,5!. (#5'4%!G&**!(#*0!0,!%=):,5!G&%=!&@&5')*\$!G=(!`#,,5!%(!Z#(Ga!&#!(:5,:!%(!)\$\$&\$%!&#!%=,!)\$\$,\$\$ / ,#%-!&#@,\$%&>)%&(#-!(:!:,\$(*'%&(#!(7!%=,!:,3(:%)!d=&*,!#(%!0('#5!00!4(#7&5,#%&)*&%0-!%=,\$,!&@&5')*\$!G&**!0,!5&\$4:,,%!)#5!

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 $,77,4\%!(7!\%=,!)^{**},>,5!=):)\$$/,\#\%!)\#5!3:,@,\#\%!\&\%\$!:,4'::,\#4,!\%=)\%!5(!\#(\%!\&\#@(*@,!7(:/)*!5\&\$4\&3*\&\#):0!)$ $)4\%\&(\#!)>)\&\#\%!)!:,\$3(\#5,\#\%!(:!:,@,)^*\&\#>!\%=,!\&5,\#\%\&\%0!(7!\%=,!4(/3*)\&\#)\#\%!$

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 $\begin{array}{l} \text{Hh}_{\text{N}},!*)\text{G!}:, \text{J}^{\text{L}}:,\$!3:(7,\$\&(\#)^{\text{L}}!4('\#\$,*(:\$!\%(!:,3(:\$\%!)\&^{\text{L}}!\&^{\text{L}}!6!).3) \% ,\#! \&\$!*\&Z,*0!\%(!,\#>)>,!\&\#! \\ 4(\#5'4\%!\%=)\%!\text{G}('*5!:,\$'*\%!\&\#!\$,:\&('\$!=):/!\%(!\%=,!3)\% ,\#\%!(:!(\%=,:\$i!]\&\&^!\&^{\text{L}}!\%=,:,!\&\$!:,)\$(\#)0^{*},!4)'\$,! \\ \%(!\$'\$3,4\%!\%=)\%!.)^{\text{L}}:,\$'(!\%',\$',\$') \%(!\%!,\$',\$') \%(\#\$!=)@,!0,,\#!\%:\&>>,:,5b!.S)\#5)\%(:0!.3(:\$!3,:\%)\&\#\&\#>!\%(!)0'\$,!)\#5!\#,>^*,4\%!\$=('*5!0,!/)5,!3':\$')\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!))) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!))) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!\%=,!.(**,>,?\$!E(*\&40!.(@,:\#\&+>!)) &\#\%(!)$

E((5&%*+\$''/)'(86*+,\$''(,'C'%')'+,6)

 $F^{**}!=\&>=,:!,5'4) \% (\#!\&\#\%\%' \% (\#\$!\%=)\%!:,4,\&@,!7,5,:)*!7'\#5\&\#>-!\&\#4*'5\&\#>!\%=,!.(**,>,-!):,!(0*\&>)\%,5!\%(!\&\$$',!3'0*\&4*0!)\#!F\#\#')*!H,4':\&\%0!A,3(:\%!]^FHAa^!G=\&4=!\&5,\#\&7\&,\$!\=,!\#'/0,:!(7!3):\&4'*):!:,3(:\%,5!4:\&/,\$!(\#!4)/3'\$!(:!4)/3'\$!3:(3,:\%0-!(:!)5c)4,\#\\\(!4)/3'\$b!<=,!FHA!5(,\$!\#(\%!\#4*'5,!\&5,\#\\&70\&\#>!\&\#7(:/)\&(\#!)0('\%!\=,!4(/3*)\&\#)\\\(!:,\$3(\#5,\#\\)!$

!/'#+6Q''86

 $F^{**!} = \&>=, :!, 5'4) \% (\#! \&\#\% \% \% (\#! \% =) \%! =) @, !4) / 3' \$! 3(*\&4, !7(:4, \$! (:!\$, 4':\&\% 0!5, 3): \% / , \#\% \$! / '\$\%! /) \&\#\% \& \#!) !5) \&*0!4: \& / ,!*(>!\% =) \%! \&\#4*'5, \$! , \#\% \& , \$!7(:!) **!4: \& / , \$!\% =) \%! (44':!G \& \% = \& \#! 0 (\% =! \% =, !.*, :0!$

 $\begin{array}{l} (7!E:(=\&O\&\%,5!..(\#5'4\%!<=\&\$!\&\$!\%=,!0,\$\%!(3\%\&(\#!\%(!,\#\$':,!3:,\$,:@)\%\&(\#!(7!,@\&5,\#4,!)\#5!\%(!0,>\&\#!)!) \\ \&/,*0!4:\&/\&\#)*!\&\#@,\$\%>)\%\&@,!)\#5!:,/,5\&)*!:,\$3(\#\$,b!E(*\&4,!=)@,!'\#\&J',!*,>)*!)'\%=(:\&\%O-!\&\#4*'5\&\#>!) \\ \&=,!3(G,:!\%(!\$,Z!)\#5!,2,4'\%,!\$,):4=!G)::)\#\%-!4(**,4\%!7(:,\#8\&4!,@\&5,\#4,-!/)Z,!)::,\$\%-!)\#5!)\$\&\$\%! \\ \&\#!\$,,Z\&\#>!,/,:>,\#40!3:(\%,4\%\&@,!(:5,:\$b!''7!:,J',\$\%,5-!\%=,!.(**,>,!G&**!=,*3!)\#0!V44\&5,\#)*! \\ 4(//'\#\&\%O!/,/O,:!>,\%!\%(!)!\$)7,!3*)4,!)\#5!G\&**!3:(@\&5,!\%:)\#$3(:\%)\&(\#!\(!\m*=,!=(\$3\&\%)*-!4((:5\&\#)\&(\#!)G\&*=!*)G!,\#7(:4,/,\#\%-!)\#5!&\#7(:/)\&(\#!)O('\%!(\#8!)\#5!(7784)/3'\$!:,\$(':4,\$!)\#5!(3\&(\#\$!,7(:!:,\$)(*'\&(\#b!))) \\ \vdots,\$(*'\&(\#b!) \end{array}$

QE. F6RQ'', 6E(8+%+,6."%'7+6F+\$&/)#+()S6

 $F@)\&^*)O^*,!\%(!:,\$3(\#5!\%(!)\#0!:,3(:\%\$!(7!4:\&/,!(:!@\&(*,\#4,-!\&\#4*'5\&\#>!E:(=\&O\&\%,5!.(\#5'4\%!)P(:!1/,:>,\#4\&,\$\%!\);;!$

P(:!4(#4,:#&#>!\$&\')\\&(#\\$-!4)**!5\&\\$3)\\d=!)\\!]TYY^!FHU\8nFE9!r]TYY^\8DYL\8LDYI\s\!

$QE \cdot F(K'')I + \&, bF'A', '''(6)$

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F@)&*)O*,!%(!:,\$3(#5!%(!)#0!:,3(:%\$!(7!4:&/,!(:!@&(*,#4,-!*'5&#>!E:(=&O&%,5!.(#5'4%b!! IILI!6(:%=!H)#!P,:#)#5(!A()5!n(\$!F#>,*,\$-!.F!\MMRL! P:(#%!5,\$Z!3=(#,!#'/O,:\||IDI^!IKK8LYM;!

! 'A'\\(6 * '8I), 6T6; ')\(\)+6<=6399'7+6

 $Q)\#5^*,\$!4(/3^*)\&\#\$!(7!E:(=\&0\&\%,5!.(\#5'4\%!)>)\&\#\$\%!)\#0!\&\#5\&@\&5')^*i!G(:Z\$!G\&\%=!(\%=,:!(77\&4,\$!(\#84)/3'\$!)\$!)33:(3:\&)\%,!\%(!3:(@\&5,!\$'33(:\&@,!\&\#\%,:\&/!/,)\$':,\$-!G=\&4=!/)0!\&\#4*'5,!4=)\#>,\$!\&\#!=('$\&\#>-!)4)5,/&4!7^*,2\&0\&*\&\%0-!)\#5!\#(84(\#\%)4\%!5\&:,4\&@,\$-!)/(\#>!(\%=,:!/,)\$':,\$b!!F_.!A((/!;;;!$

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GGGb(20b,5'N(77&4,\$8\$,:@&4,\$N4)/3'\$8\$)7,%0!

 $IDI^{1}DL_{8DL}; [1], / .:>, #40!*\&#,^!(:!5\&)*!L!7:(/!)#0!4)/3'$!3=(#,!)$

@5#&(6*+, "5/7+, 6

$$\begin{split} &F@)\&^*)0^*,! \ (\#!\ G_{,,}Z5)0\$!\ 5':\&\#>!:,>'*):! \ (77\&4,!=(':\$!\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$\$!:,*)\ \&,5!\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$\$!:,*)\ \&,5!\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$\$!:,*)\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$\$!:,*)\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$!:,*)\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$!:,*)\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$!:,*)\ \&(!:,4,\&@,!\ 4(\ /\ 3*)\&\#\$!:,*)\ \&(!:,4,\&,!)\ \&(!$$

GGGb(20b,5'N(77&4,\$8\$,:@&4,\$N='/)#8:,\$(':4,\$!

1IDI^!DL\8DR:I!

<u>F+&(6"96>)5-+(),6399'7+1F+&(6"(6F5)06</u>

$$\begin{split} &F@)\&^*)O^*,!(\#!G,,Z5)O\$!5':\&\#>!:,>'*):!(77\&4,!=(':\$b!F44,\$\$!\%(!9,)\#!(\#!9'\%0!DK!=(':\$!)!\\ &5)O!O0!4)^*\&\#>!.)/3'\$!H)7,\%0!)\%!JIDI^!DL\&DL\&DL\b!.)\#!)\$\&\&\%!G\&\%=!:,)\$(\#)O^*,!\\ &)44(//(5)\&(\#\$!7(:!=('$\&\#>-!)4)5,/&4!7*,2&O&*&MO-!)\#5!6(!.(\#\%)4\%!n,\%,:\$b!<=,!9,)\#!(7!H\%'5,\#\$!G&**!7(:G):5!)#0!:,3(:\\$!\&\#@(*@\&\#>!3(\\,\#\\&)*!E:(=\&O&\,5!.(\#5'4\%!\%(!\%=,!.\&@\&*!A\&)=\\$!)\#5!<&\%*,!"C!V77\&4,b!$$

[,:Z'\$!Q)**!

]IDI^!DL\8DRR;!

K131@03+/&; %<3.#"1F&

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]D; I^!T\K8; MMM! GGGb,, (4b>(@!

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 $<=,! [':,) '! 7 (:! E:\&@) \%,! E(\$\%,4(\#5):0!15'4) \%\&(\#!)44,3 \%\$!)^{**!} \%03,\$! (7!4(/3*)\&\#\%\$!:,*)\%,5! \%(!\%*,>,!) \#5! / 00!:,7,:!) \#0! 4(/3*)\&\#\%!:,4,&@,\$! \&\#4*'5\&\#>! 4(/3*)\&\#\%\$!:,*)\%,5! \%(!\&\#\$\%\&\%'\%\&(\#)^*! 3(*\&4\&,\$!(:!3:(4,5':,\$-!(:!0(\%=-!\%(!\%=,!.(**,>,-!)\#!)44:,5\&\%\&\#>!)>,\#40-!(:!) \#(\%=,:!)33:(3:\&)\%,!,\#\&\%0!7(:!:,\$(*'\%\&(\#b!!))$

[':,)'!7(:!E:&@)\\,!E(\$\\\$,4(\(\pi\)):0!15'4)\\\(\pi\)(\(\pi\)!

DLIL!.)3&\(*!V)Z\\$!9:\&@,-!H'\&\,!KMM!!

H)4:) / ,#\(-! . F!\LTII!

]\;R^!KI;8R\DK!! GGGb033,b4)b>(@!

A#9%.&; %<3.#"1F&B31/"7%.,#"31/&

; '#+%'(+,,6&(-6Q"7&)'"(6"96<(7'-+()6

 $\begin{array}{l} . \ (\ /\ 3^*) \&\#) \#\%! \) \#5! \&=\&:583) : \&0! G\&\%\#, \$\$, \$!) : ,! \ ,\#4(':)>, 5! \&(!:,3(:)!E:(=\&O\&\%,5!.(\#5'4\%!)\$!\$((\#!)\$!) : 3(\$\&O^*,!\&\#!(:5,:!\&(!/)2\&/\&e,!\&=,!.(**,>,?\$!)O\&^*\&\&O!\&(!:,\$3(\#5!3:(/3\%^0!)\#5!,77,4\&@,^Ob!<=,!.(**,>,!5(,\$!\#(\%!-!=(G,@,:-!*\&/\&\%!)=,!\&\&/,!7:)/,!7(:!:,3(:\&\#>b!"7!\&=,!:,\$3(\#5,\#\%!\&\$!\#(\%!)!/,/O,:!(7!\&=,!V44\&5,\#\%)*!4(//'\#\&\%O-!\&=,!.(**,>,!G&**|\$\&\%*!\$,Z!\&(!),Z,!\$\&,3\$!\&(!,\#5!\&=,!=):)\$\$/,\#\%:13:,@,\#\%!\&\$!:,4'::,\#4,-!)\#5!)55:,\$\$!\&\%!,77,4\&\$-!O'\&!\&\%!)O\&^*\&\&O!\&(!\&)Z,!5\&$4&3*&\#):0!)4\&(\#!)>)\&\#\$\%!\&\$!:,4'::,\#4,-!)\#5!)55:,\$\$!\&\%!,77,4\&\$-!O'\&!\&\%!)O\&^*\&\&\%!\&(!\&)Z,!5\&$4&3*&\#):0!)4\&(\#!)>)\&\#\$\%!\&\$!:,4'::,\#4,-!)(-1/4(':\$,-!O,!*\&/\&\%,5b!F\#\&\#4\&5,\#\%!5(,\$!\#(\%!=)@,!\&(!(44':!(\#!4)/3'\$)\&(!O,!:,3(:\%,5!)\&(!)=,!.(**,>,b!!))).$

E#(+,)069"/6E%7"I"%6"/63)I+/6F/586U,+6"/63)I+/6!"(-57)6G"%&)""(,6)

GGGb3,)4,(@,:@&(*,#4,b(:>!

DKNY! . (#7&5,#%&)*!=(\%\\#,\\W!]D; I^!RDR8II\I!(:!]RDR^!Y\I8IITL! V77&4,\\W!]D; I^!\LL8\M\M! +&5,(!3=(\#,\\W!]D; I^!YTL8DRTK!

*&\$+B6EC5, +B6&(-6<(7+,)6K&)'''(&\%K+)M''/H6R*E<KKS6

F!4(#7&5,#%&)*-!)#(#0 / ('\$!#)%&(#)*!\$,2')*!)\$\$)'*%!=(%*&#,b! GGGb:)&##b(:>!]TMM^!RLR8KRYI!

K&)'''(&%F''#+,)'76G'''%+(7+6@'')%'(+6

 $F@)\&^*)O^*,! \ DKNY! \ \%(! \$3,)Z! \ 4(\#7\&5,\#\&)^{**}O! \ G\&\&=! \)\#O(\#,! \ ,23,:\&,\#4\&\#>! \ 5(\ / \ ,\$\&4! \ @\&(^*,\#4,-! \ \$, Z\&\#>!: \ ,\$(':4,\$!(:!\&\#7(:\ / \)\&\&(\#-!(:!J',\$\&\&(\#\&\#>!'\#=,)^*\&=0!)\$3,4\&\$!(7!\&=,\&:!:,^*)\&(\#\$=\&3b! \ \underline{GGGb\&=,=(\%\&\#,b(:>! \]TMM^!Y\setminus \$YDII!}$

B31>"7%1#", \$\& 5 \%7"6, \$\&; \%/3+.6\%/\&

<)2&!@('4=,:\$!):,!)@)&*)O*,!)%!E:(c,4%!HFP1-!.) / 3'\$!H)7,%O-!1 / / (#\$!H%'5,#%! d,**#,\$\$!.,#%,:!
)#5!A,\$&5,#%&)*!15'4)%&(#!)#5!Q('\$&#>!H,:@&4,\$!%(!3:(@&5,!7:,,!%:)#\$3(:%)%&(#!%(!*(4)*! /,5&4)*!
4,#%,:\$b!<=,!H':@&@(:!F5@(4)%,!&\$!)*\$(!)@)&*)O*,!%(!)44(/ 3)#0!\$':@&@(:\$!%(!)44,\$\$!(7784) / 3'\$!
:,\$(':4,\$b!<=,!7(**(G&#>!%=:,,!(7784) / 3'\$! /,5&4)*!4,#%,:\$!):,!)**!5,\$&>#)%,5!OO! n(\$!F#>,*,\$!
.('#\O!)\$!H,2')*!F\$\$)'*%!A,\$3(#\$,!<,)/!]`HFA<a^!.,#%,:\$b! d=&*,!%=,!\$3,4&7&4!3:(4,\$\$!)#5!
:,\$(':4,\$!,)4=!HFA<!.,#%,:!G&**!3:(@&5,!)#!</pre>

> & (6Z&C/'+%6G&%+06P+-'7&%'+()+/6

'1"#", \$&K//%//0%1#&

 $\begin{array}{l} F7\%, : :: , 4 , \&@\&\#>!) :: , 3 (:\%! (7!E: (=\&O\&\%, 5! .. (\#5'4\%-!\%=,! .. \&@\&^!A\&>=\%\$! B! <\&\%^*,!"C! V77\&4 ,! G\&^**!>) \%=, :! \\ \&\#7 (: /) \&\& (\#!) O ('\%!\%=,!: , 3 (:\%, 5!4 (\#5'4\%!) \#5!: , \$3 (\#5!\%(!) \#0!\& / / , 5\&)\%, !=,) *\%=! (:!\$)7 , \%0!4 (\#4 ,:\#\$! :) \&\$, 5!00!\%=, !: , 3 (:\%b! <=,! .. \&@\&^!A\&>=\%\$! B! <\&\%^*, !"C! V77\&4 ,! G\&^**!) \$\$, \$\$!\%=, !4 (/3*) \&\#) \#\%?\$!\$)7 , \%0!) \#5! \\ G, **8 \end{array}$

 $g \quad 5,\%,:/\&\#,!)>,!(7!\%=,!4(/3*)\&\#)\#\%i!)\#5!\&7!\%=,!4(/3*)\&\#)\#\%!\&\$!)!/\&\#(:!(:!G)\$!)!/\&\#(:!)\%!\%=,! \\ \%\&/,!(7!\%=,!)**,>,5! E:(=\&O\&\%,5!.(\#5'4\%-!/)Z,!\%=,!)33:(3:\&)\%,!\#(\%\&7\&4)\&\&(\#\$!\%(!\$\%)\%,!)>,\#4\&,\$b!!$

 $F\#0!H'33(:\&\&@,!S,)\$':,\$!3'\&!\&\#!3*)4,!G\&^*!0,!Z,3\%!3:\&@)\%,-!,24,3\%!\%(!\%=,!,2\%,\#\%!\%=)\%!5(\&\#>!\$(!\&/3)\&:\$!\%=,!)O\&^*\&\%0!(7!\%=,!\&\#\%\&\%'\%\&(\#!\%(!3:(@\&5,!\%=,!\$'33(:\&\&@,!/,)\$':,\$b!P(:!,2)/3*,-!\%(!,77,4\%')\%,!)!=('$\&\#>!4=)\#>,-!$\%)77!\%!A,$&5,#\&\)*!15'4\%&(#!\)#5!Q('$&\pi>!H,:@&4,$!G&^**!O,!&\pi7(:/,5!(7!\pi=,!\pi,5!\)(!)$\$&\pi\\[G\&**!G\=!)!=('$&\pi>!+).$\$!5\&:,4\%,5!OO!\pi=,!.&\pi&\pi\\[A\&>=\pi$!B!<&\pi*,'!'C!.((:5\&\pi)\)(:!O'\M!G**!\pi(\pi).$\$

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 $10, \#! \& 7! \& -,! \)^{**}, >) \& (\#\$! (7!)! 7(:/)^{*}! 4(/3^{*}) \& \#\$! 7)^{**}! G \& -\& \#! \& -,! 5, 7 \& \#\& \& (\#! (7! < & \& *,! "C! H, 2')^{*}! \\ Q):) \$\$/, \#\$-! \& -,!$

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)4\\(\(\pm\) \(\cdots \) \(

- g <=,!.(/3*)&#)#%?\$!:,J',\$%!#(%!%(!3:(4,,5!G&%=!&#&%&)%&(#!(7!)!4(/3*)&#%i!!
- $g = \langle -, | . (/3^*) \& \#) \# \% \% : ,) \$ (\#) 0^*, | \$) 7, \# 0! 4 (\#4, :\#\$!:, >) : 5 \& \# > ! \& \# \& \& \& \& (\#!(7!)!. (/3^*) \& \# \% !!!!$
- g <= ,! : & Z! % =) %!) 55 & % (#) %!) 4 % \$! (7! E: (= & O & %, 5! . (# 5 '4 %! G ('*5! (44':! & 7!)! . (/3*) & # %! & \$! # (%! & # & %, 5!!!!) 4 % \$! %) % , 5 i!!!

- $g <=,! \$4(3,! (7! \%=,!)^{**},>,5! 5\&\$4:\& / \&\#) \%\& (\#-! \&\#4^* '5\&\#>! \&\#7(:/) \%\& (\#! \$'>>,\$ \%\&\#>!)! 3) \%,:\#-! \\ (\#>(\&\#>! \$,2! 5\&\$4:\& / \&\#) \%\& (\#-! (:! \$,2! 5\&\$4:\& / \&\#) \%\& (\#!)^{**},>,5! \% (!=)@,! \& / 3) 4\%,5! / '*%3^*,! \\ \&\#5\&@\&5')^*\$i!!$
- $g <=,!)@) \&^*) O\&^*\& \& O! (7! , @\&5, \#4,! \& (!) $$\& \& (!) ! 9 , 4\& \& (\#8 /)Z , :! \& \#! 5 , \& , : / \& \#\& \# >! G = , :! $, 2! 5 \& $4 : \& / \& \#) \& (\#! (44'::,5i!)$

; %G + %/#/& > 3.&B31 > "7%1#" # 5! > (10.22)0.2(2(&@))TJET(@&)22(1) - 030.2(&)R(>(10..2(/))) + (2...2(A))R(A) > (2...2(A))

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 $\begin{array}{l} (:!\ 3:(4,,5!\ \%(!\)\#!\ \&\#@\,,\$\%\&>)\&\&(\#!\ (@\,,:!\ \%=,!\ (Oc\,,4\%\&(\#!\ (7!\ .\ (\ /\ 3*)\&\#)\#\%-!\ \%=,!\ .\ (**\,,>\,,!\ /\)0!\ 4(\#\&5\,,:!\ G=\,,\%=\,,:!)\#0!(7!\%=\,,!7(**(G\&\#>!)33*0\%!) \end{array}$

- g <=,:,!):,! / *%&3*,!(:!3:&(:!:,3(:%\$!(7!\$,2')*! / &\$4(#5'4%!)>)&#\$%!A,\$3(#5,#%b!)
- g A, 3(#5, #%!: , 3(:%, 5*0!'\$, 5!)!G,)3(#-!3=0\$&4)*!: ,\$%:)&#%\$-!(:!, #>)>, 5!&#!O)%%, :0b!
- A, 3(#5, #%!&\$!)!7)4'*%0!(:!\$%)77!/,/0,:!G&%=!(@,:&&>=%!(7!\$%'5, #%\$b!)
- $g <= : , |\&\$!| (G, :|\&/0)*) #4, |O, \%G, \#! . (/3*) \&#) #\%!) #5!A, $3(#5, #\lb!)$
- g . (/ 3*)&#)#\! 0, *&, @, \$! \=)\\! \\=,! . (/ 3*)&#)#\! G&**! 0,!*,\$\$! \$)7,!&7! . (/ 3*)&#)#\\?\$!#) / ,!&\$! 5&\$4*(\$,5!(:!)#!&#@,\$\\&>)\&(#!&\$!4(#5'4\\,5b!
- g <=,!.(**,>,!&\$!)O*,!%(!4(#5'4%!)!%=(:('>=!&#@,\$%&>)%&(#!)#5!(O%)&#!:,*,@)#%!,@&5,#4,!&#!%=,!)O\$,#4,!(7!.(/3*)&#)#%?\$!4((3,:)%&(#b!

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Q)#50((Z-!%=,!..(**,>,!G&**!=)@,!%=,!:&>=%-!G&%=&#!&%\$!\$(*,!5&\$4:,%&(#-!%(!4(#\$(*&5)%,!%=(\$,!(%=,:!)**,>))&(#\$!G&%=&#!(#,!&#@,\$%&>))&(#!)#5N(:!=,):&#>b!!)

<()+/&7)'''(6M')I6Z''+A&(7+6.'''7+-5/+,6U(-+/6!'')+7)'A+6J&/8&'('(86E8/++#+(),!)''+6J''+16J''-

>)&(-&/-6"96LA'-+(7+6)

 $<=,!\$\%)\#5):5!7(:!5,\%,:/\&\#\&\#>!G=,\%=,:!\%=,!:,\$3(\#5,\#\%!\&\$!:,\$3(\#\$\&0^*,!7(:!)!3(*\&40!@\&(*)\%\&(\#!\&\$!\%=,!3:,3(\#5,:)\#4,!(7!\%=,!,@\&5,\#4,!\$\%)\#5):5-!\&b,b-!G=,\%=,:!\&\%!\&\$!/(:,!*\&Z,*0!\%=)\#!\#(\%!\%=)\%!)!@\&(*)\%\&(\#!(7!,...,\$,13(*\&40!(44'::,5b!$

K''6!''(9%'7)6''96<()+/+,)6''/6J'&,6

P"-'9'7&)'"(6"96./"7+,,+,6

!

*+ 5+, 0.69''/6F+%&0.6&(-6L?)+(,'''(,6''96;'#+6)

<=,!. &@&*!A&>=\\$!B!<&*,!"C!. ((:5&#)\\(:!/)0!,2\\,\#5!)\#0!5,)5\\\&\#,\$!G\\\=&\#!\\=&\\$!E(\\&40-!7(:!>((5!))) 4) $^{,+}$ = $(G#!)#5!5(4' / ,#\,5b!)_{((5!.)}^{,+}$ = $((5!.))^{,+}$ = . ((:5&#)%(:!&#!%=,&:!\$(*,!5&\$4:,%&(#!)#5! /)0!*'5, %!%=,!'#)@)&*)0&*&%0!(7!)!G&%#,\$\$-!3):%0-!(:!&#!%=,&:!\$(*,!5&\$4:,%&(#!)#5! /)0!*'5, %!%=,!'#)@)&*)0&*&%0!(7!)!G&%#,\$\$-!3):%0-!(:!&#!%=,&:!\$(*,!5&\$4:,%&(#!)#5! /)0!*'5, %!%=,!'#)@)&*)0&*&%0!(7!)!G&%#,\$\$-!3):%0-!(:!&#!%=,&:!\$(*,!5&\$4:,%&(#!)#5! /)0!*'5, %!%=,!'#)@)&*)0&*&%0!(7!)!G&%#,\$\$-!3):%0-!(:!,%)(**&%0!(7!)!G&%#,\$\$-!3):%0-!(:!&%0!(#1,%)(#1,)5@&\$(:!O,4)'\$,!(7!5,)%=-!&**#,\$\$-!(:!(%=,:!,24'\$)O*,!4&:4'/\$%)#4,\$i!4(#4'::,#%!*)G!.#7(:4,/,#%! $G^{**}!\#(\$!0,!5,*)0,5!\$(!\$4=,5'*,!\$=,!3:(4,,5\&\#>\$!)\$!\$=,!4(\#@,\#\&,\#4,!(7!\$=,!)5@\&\$(:b!<=,!3):\&\&,\$!G\&^{**}!$ $0, !#(\%7 \& , 5 \& #!G: \& \% \& \# > !(7!) #0!, 2 \%, #$ \& (#-!)=, !:,)$(#$!7(: !& \%-!) #5!3:(c, 4 \%, 5 !#, G! \ \& /, * \& #, $ b! <=, !. (**, >, !$ G&**!#(\!'\#:,)\\$(\#)O*O!5,\#O!)!\\$\\'5,\#\!3):\\O?\\$!:,\J',\\$\!7(:!)\#!,2\\,\#\\$\(\#!\(7!)!5,)5\\\&\\,!:,*)\\,5!\\(!)! 4(/3*)&#\!5':\&#>!3,:\&(5\\$!(7!,2)/\&#)\\&(#\\$!(:!\\$4=((*!4*(\\$':,\\$b! &#!%=&\$!3(*&40!7(:!>((5!4)'\$,b!F#!,2%,#\$&(#!/)0!0,!:,J'&:,5!7(:!>((5!4)'\$,!%(!,#\$':,-!7(:!,2)/3*,-! $h=, \frac{1}{2} + \frac{1}{3} +$ (#!)44(#!)(7!%=,!#)(0)&*)0&*&%0!(7!%=,!3):&&,\$!(:!G&%#,\$\$,\$i!(:!7(:!(%=,:!*,>&%&/)%,!:,)\$(#\$-!\$'4=!)\$!&#@, &&&) &&&#. &#G: $,2\%, \#\%!(7!\%=,!)^{**},>,5! / \&\$4(\#5'4\%)!!$

<u>. &,)6>+?5&%@',)"/0</u>6

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K''(4E-A+/, &/'&%./''7+, 1./+, 5#\$)'''(6''%K''(4*+, \$''(, 'C%')06)

<=, 1840, 1940,

U, +6"96./'A"+8+-6*+7"/-,6

 $<=,! . (**,>,! G\&**! \#(\%!:,J'\&:,-!)**(G-!:,*0!'3(\#-!(:!(\%=,:G\&\$,!'\$,!J',\$\&\&(\#\$!(:!,@\&5,\#4,!\%=)\%!)!)!)! \\ 4(\#\$\&\&'\%,-!(:!\$,,Z!5\&\$4*(\$':,!(7-!\&\#7(:/)\&\#(\#!3:(\%,4\%,5!'\#5,:!)!*,>)**0!:,4(>\#\&e,5!3:\&@\&*,>,-!'\#*,\$\$!)! \\ *=,!3,:\$(\#!=(*5\&\#>!\$'4=!3:\&@\&*,>,!=)\$!G)\&@,5!\%=,!3:\&@\&*,>,b!!$

$\frac{1}{1}\frac{(7/1)6E7}{(6)}$

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 $\begin{array}{l} d=\#! \)! \ 9 \ \& 4 \& 3 \% \#) : 0! \ A, \$ (*'\% (\#! \ 0, > \& \# \$! \ '\#5, :!\% = \& \$! \ E (*\& 40-!\% = ,! \ . (**, > ,! \ G \& **! \# (\%)\% ,! \% = ,! \$\% ' 5, \# \%! \\ :, \$ 3 (\#5, \#\% ?\$!\% :) \#\$4 : \& 3 \%! \ G \& \# =! \ F 5 / \& \# \& \$\% :) \& \& @, ! S) \% ,: ! E, \#5 \& \# > ba! <= ,! \# (\%) \% \& (\#! \ G \& **! \ 0, !: , / (@, 5!) \% ,: ! \\ \% = ,! \ _: \& , @) \# 4 ,! \ E : (4, \$\$! \& \$! 4 (/3*, \%, 5!' \# *, \$\$! \% = ,! :, \$ 3 (\#5, \#\%! \& \$!) *\$ (!) !: , \$ 3 (\#5, \#\%! \& \#! (\% = ,:! (\# > (\& \# > ! \& \# @, \$\% \& >) \% \& (\#\$! (:!3: (4, \$\$, \$!7 (:!G = \& 4 = !\% = ,! \# (\%) \% \& (\#! \& \$!) *\$ (!) 33 * \& 4) 0*, b! \\ \end{array}$

 $2')I - \frac{1}{2}M\&\%''/6*+ \frac{1}{2}(\&)'''(6J+9''/+6!''\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\$\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\#\%\&'()6*+ \frac{1}{2}(\%5)'''(6J+9''/+6!'')\%$

* ??\$9@'>!*)!C'-%'?6'94D=!G\$-76+&'79!7#!4!SD'\$(49%\$!7#!3'&6\$!: I!L\$>+46! T4D4--<\$9&!!

 $\begin{array}{l} F33,\#5\&2! \ F! \ ('\mbox{\ensuremath{$\%$}}\#,\$! \mbox{\ensuremath{$\%$}}=,! \ 5\&\$4\&3\%\#) : 0! : ,\$(*'\mbox{\ensuremath{$\%$}} (\#! \ 3: (4,5':,\$! \mbox{\ensuremath{$\%$}}=,! \ . \ (**,>,! \ 7(**(G\$! \&\#! : ,\$(*@\&\#>!)**,>) \mbox{\ensuremath{$\%$}} (\#! \mbox{\ensuremath{$\%$}}=,! \ . \ (**,>,! \mbox{\ensuremath{$\%$}}=,! \mbox{\ensuremath{$\%$}}=,! \mbox{\ensuremath{$\%$}}=,! \mbox{\ensuremath{$\%$}}=,! \mbox{\ensuremath{$\%$}}=,! \mbox{\ensuremath{$\%$

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- g 123^*)&#!\%=)\%!\%=,!\%\'5,\#\%!=)\\$!\)!:\&>=\%!\%(!)\#!\)5\@\&\\$(:!(7!\%=,\&:!4=(\&4,!5':\&#>!\%=,!3:(4,\\$\\$!)\#5!\3:(\@\&5,!)!\&\\$\\!(7!..(**,>,!, /3*(0,,\\$!*:)\&#,5!)\\$!\)5\@\&\\$(:\\$!'3(\#!:,\J',\\$\\b)!\\$
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- g 9, %, : / &#) %& (#\$!7(:!,)4=!)**,>) %& (#-!G&%=!%=,!:) %& (#)*,i!!
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- g <=,!3:(4,5':,\$!7(:!)#!)33,)*b!!

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