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)(!.6+!

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A@%34./!01!.6+!G(*),0(>+(.!

B+50,.!H0#!I9I!

J!K4@),+!F+(+(?+L!789M!

$NFOH!ABP$GB!'HNQGB$NRS!

A@44!789M!

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0,!,+V3-+!)-!?0(+!)(!@%%0,?@(%+!T).6!.6+!,+4+*@(.!(@.)0(@4!%05/,)E6.!4+E)-4@.)0(#!

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N : **C M**

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E C : **C :** W+--)%@!2)44!!
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D D /A : D+%+>=+,!9I·6&!789M!

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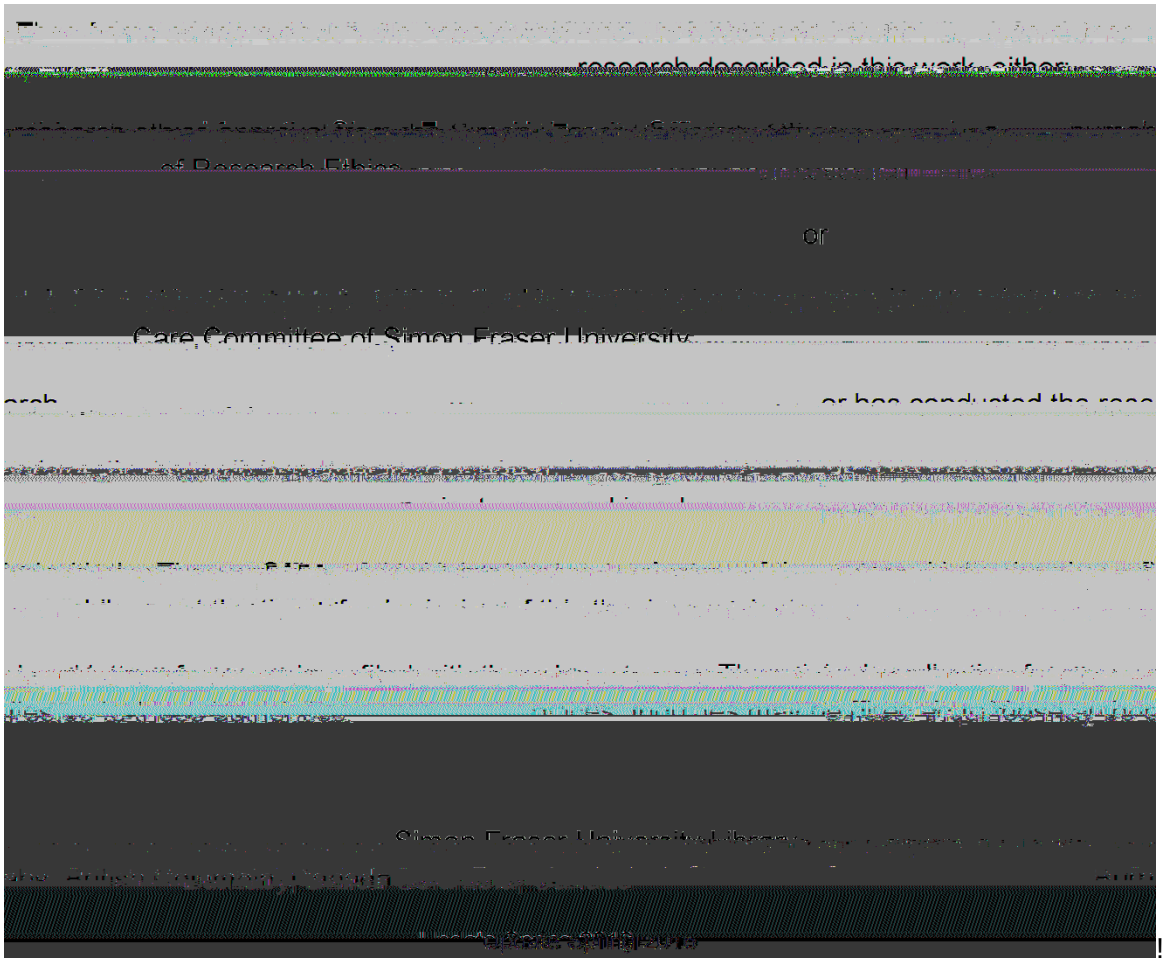

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(34.6!%0>>3(.)+-!.,@?).)0(@4!.+,,).0,/#!###r

A)E3,+!7#7# k/50.6+-+-!@=03.!.6+!?),+%.)0(@4)./!01!5,+1+,+(%+-!10,!.6+!103,!@..,)=3.+-!
3-+?!)(!.6+!DKG#!###9q

A)E3,+!p#9# $@.)-1@%.)0(!%3,*+-!?+.+,>)(+?!1,0>!.6+!"+.@!5@,@>+.+,!+-.)>@.+-!01!.6+!
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A)E3,+!p#7# D)11+,+(%+!)(!5,+1+,+(%+-!10,!.,@*+4!.)>+!@(?!4@/+,-!01!-5@T(!0(!=03E6!
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U(0T4+?E+#!i0T!U(0T4+?E+!)-!@!-+41V,@(U)(E!=+.T++(!9V7!0(!@!-%@4+!01!9V
r&!>0?+,@.+!)-!@!-+41V,@(U)(E!01!pVs&!@(?!6)E6!)-!@!,@(U)(E!01!IVr#!#########7M

A)E3,+!p#p# $+(-).)*)./!01!?)11+,+(%+-!)(!5,+1+,+(%+!10,!.,@*+4!.)>+!.0!-5@T(!@,+@!
=@-+?!0(!60T!@E+!01!,+-50(?+(.-!)-!E,035+?#!A)E3,+!Z@[!)-!.6+!0,)E)(@4!
@E+!E,035)(E&!@(?!1)E3,+-!Z=[!.6,03E6!Z1[!@,+!.6+!5,+1+,+(%+-!=@-+?!0(!
.6+!-+(-).)*)./!@(@4/-)-!@E+!E,035)(?-#!###þ8

A)E3,+!p#q# $+(-).)*)./!01!?)11+,+(%+-!)(!5,+1+,+(%+-!10,!4@/+,-!01!-5@T(!0(!=03E6!
=@-+?!0(!60T!@E+!01!,+-50(?+(.-!)-!E,035+?#!A)E3,+!Z@[!)-!.6+!0,)E)(@4!
@E+!E,035)(E-&!@(?!1)E3,+-!Z=[!.6,03E6!Z?[!@,+!.6+!-+(-).)*)./!@(@4/-)-!
E,035)(E-!###þ9

A)E3,+!p#:#! $+(-).)*)./!01!?)11+,+(%+-!)(!5,+1+,+(%+-!10,!.,@*+4!.)>+!=@-+?!0(!E,035)(E!
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@(?!1)E3,+-!Z=[!@(?!Z%[!-60T!.6+!-+(-).)*)./!@(@4/-)-!E,035)(E-#!i0T!V!7!
,+5,+-+(.-!E,035)(E!)(?)*)?3@4-!!T).6!-+41V,@(U+?!U(0T4+?E+!01!9Vp&!@(?!
>0?+,@.+!V7!,+5,+-+(.!E,035)(E!)(?)*)?3@4-!T).6!-+41V,@(U+?!U(0T4+?E+!01!
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A)E3,+!p#s# $+(-).)*)./!01!?)11+,+(%+!)(!5,+1+,+(%+-!10,!4@/+,-!01!-5@T(!0(!=03E6!
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.6+!0,)E)(@4!U(0T4+?E+!E,035)(E&!@(?!1)E3,+-!Z=[!@(?!Z%[!@,+!.6+!-+(-).)*)./!
@(@4/-)-!U(0T4+?E+!E,035)(E-#!i0T!V7!,+5,+-+(.-!E,035)(E!)(?)*)?3@4-!!
T).6!-+41V,@(U+?!U(0T4+?E+!01!9Vp&!@(?!>0?+,@.+!V7!,+5,+-+(.!E,035)(E!
)(?)*)?3@4-!T).6!-+41V,@(U+?!U(0T4+?E+!01!qVs#!#################################þp

A)E3,+!p#I# K6@(E+!)(!5+,%+(.!%600-)(E!@-!4@/+,-!01!-5@T(!0(!=03E6!*@,/!1,0>!7!.0!
99!4@/+,-&!@(?!603,-!01!.,@*+4!.)>+!*@,/!1,0>!8#9!.0!M#!H3>=+,-!T).6)(!.6+!
%+44-!,+5,+-+(.!.6+!5+,%+(.!01!)(?)*)?3@4-!%600-)(E!@!-%+(@,)0!#############þq

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K0(.+>50,@,/!1)-6+,)+-!>@(@E+>+(.!./5)%@44/!.@U+-!@!>0?+4V0,)+(.+?!@55,0@%6!.6@.!54@%+-!C3@(.).@.)*+!-%)+(%+!@(?!>0?+44)(E!@.!.6+!%+(.,+!01!?+%)-)0(V>@U)(E!ZK0X!v!"+(-0(&!789s&!D+!i@!F@,+&!9rrM[#!R6+!>0?+4V0,)+(.+?!@55,0@%6!3-+-!-.0%U!@=3(?@(%+!@(?!%@.%6!>0().0,)(E!?@.@!.0!@??,+--!=)040E)%@4!C3+-.)0(-!@=03.!1)-6!-.0%U!-.@.3-!@(?!5,0?3%.)*)./&!.6+!6)-.0,)%@4!)>5@%.-!01!1)-6)(E&!@(?!10,+%@-.+?!-60,.V.+,>!-.0%U!,+-50(-+-!.0!6@,*+-.!%60)%+-!Zk)4=0,(!vY@4.+,-&!9rr7[#!A)-6+,/!>@(@E+>+(.!5,0%+--+-!@(?!03.%0>+-!6@*+!)>5,0*+?!-3=-.@(.)@44/!10,!>@(/!4@,E+V-%@4+!%0>>+,%)@4!1)-6+,)+-!.6@.!6@*+!@?05.+?!@!>0?+4V0,)+(.+?!@55,0@%6!ZF0,@!+.!@4#!788r[&!=+%@3-+!6@,*+-.!?+%)-)0(-!)(%,+@-)(E4/!@%%03(.!10,!3(%+,.@)(.)+-!@=03.!1)-6!50534@.)0(!?/(@>)%-!@(?!>0().0,)(E!?@.@#!N(?++?&!.6+!>0?+4V0,)+(.+?!@55,0@%6!6+45-!1)-6+,/!>@(@E+,-!@%6)+*+!-+*+,@4!+--+(.)@4!.+(+.-!01!.6+!5,+%@3.)0(@,/!@55,0@%6!.0!%@5.3,+!1)-6+,)+-!ZAPO!9rrs[#!

P.!.6+!-@>+!.)>+&!1)-6+,)+-!@,+!)(6+,+(.4/!%0>54+X&!T).6!)>50,.@(.!)(.+,@%.)0(-!@>0(E!=)040E)%@4!?/(@>)%-&!.6+!+(*),0(>+(.&!@(?!.6+!-0%)0V+%0(0>)%!-/-.+>-!)(!T6)%6!.6+/!@,+!+>=+??+?!Z;4@E@(/)!+.!@4#!789p&!B)(?0,1!+.!@4#!789I[#!R6+!>0?+4V0,)+(.+?!@55,0@%6!)-!3-3@44/!-0!10%3-+?!0(!>0?+44)(E!@(?!+-.)>@.)(E!.6+!?+.@)4-!01!-.0%U!?/(@>)%-!@(?!?@.@!.6@.!-0%)0V+%0(0>)%!?/(@>)%-!E+.!)E(0,+?!@(?&!%0(-+C3+(.4/&!-0!?0!0.6+,!U+/!.+(+.-!01!.6+!5,+%@3.)0(@,/!@55,0@%6&!-3%6!@-!40(EV.+,>!>@(@E+>+(.!E0@4-!4)U+!.6+!(++?-!01!13.3,+!E+(+,@.)0(-!@(?!@*0)?@(%+!01!),,+*+,-)=4+!%6@(E+#!!

F@(@E)(E!1)-6+,)+-!10,!=0.6!-60,.V!@(?!40(EV.+,>!-3-.@)(@=)4)./!,+C3),+-!@!?+%)-)0(V>@U)(E!54@(!.6@.&!)1!%0(-).+(.4/!,+5+@.+?!0*+,!.)>+!T)44!4+@?!.0!-3-.@)(@=4+!03.%0>+-!,+E@,?4+--!01!.)>+!-%@4+#!'(4)U+!.6+!>0?+4V0,)+(.+?!@55,0@%6&!.6)-!>@(@E+>+(.V0,)+(.+?!5@,@?)E>!ZF0;[!)(-.+@?!10%3-+-!0(!-.,@.+E)%!>@(@E+>+(.!E0@4-!.0!Z)[!+-.@=4)-6!=)040E)%@4&!-0%)@4&!@(?!+%0(0>)%!0=<+%.)*+-&!Z))[!?+*+405!@!-3).+!01!@4.+,(@.)*+!54@(-!0,!?+%)-)0(V>@U)(E!5,0%+?3,+-&!Z)))[!,@(U)(E!.6+!5,0%+?3,+-!)(!.+,>-!01!.6+),!+X5+%.+?!@=)4)./!.0!@%6)+*+!.6+!0=<+%.)*+-&!@(?!Z)*[!)>54+>+(.)(E!.6+!54@(!%0(-).+(.4/!0*+,!.)>+#!R6+!>@(@E+>+(.V0,)+(.+?!5@,@?)E>!)-!T+44V+-.@=4)-6+?!)(!-+*+,@4!4@,E+V-%@4+!1)-6+,)+-!@,03(?!.6+!T0,4?!@(?!)-!6+4?!@-!.6+!wE04?!-.@(?@,?w!01!+11+%.)*+!@(?!5,+%@3.)0(@,/!1)-6+,)+-!>@(@E+>+(.#!H+*+,.6+4+--&!.6+!F0;!@4-0!%0>+-!T).6!-0>+!10,>)?@=4+!%6@44+(E+-^!%6)+1!@>0(E!.6+-+!)-!.6+!(++?!.0!+-.@=4)-6!C3@(.).@.)*+!

0=‹+%.)*+-!.6@.!@,+!)>50,.@(.!@(?!@%%+5.@=4+!.0!@44!1)-6+,/!5@,.)%)5@(.-!ZK0X!v!"+(-0(!
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ℕ(?)E+(03-!%0>>3().)+-!,+E34@,4/!11++4!.6@.!.6+/!@,+!3(?+,V,+5,+-+(.+?!)(!
1)-6+,)+-!?+%)-)0(V>@U)(E#!P4.603E6!.6+!5,+%@3.)0(@,/!@55,0@%6!.0!1)-6+,)+-!
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,+-03,%+-!ZAHAK!788I&!W0(+-!v!;)(U+,.0(!789s&!*0(!?+,!;0,.+(!+.!@4#!789s[#!R6+/!6@*+!=++(!T0,U)(E!.6,03E6!.6+!%03,.-&!@-!T+44!@-!.6,03E6!53=4)%!504)%/!@*+(3+-!.0!+(E@E+!@-!+C3@4!5@,.(+,-!)(!1)-6+,)+-!?+%)-)0(V>@U)(E#!Y0,U)(E!.0!?+*+405!>@(@E+>+(.!-.,3%.3,+-!.6@.!,+%0E()L+!@(?!>++.!.6+!)(6+,+(.!,)E6.-!01!N(?)E+(03-!5+0504+!.0!-+41VE0*+,(@(%+!T)44!,+C3),+!

>@?+!35!01!.T0!>@)(!3-+,!E,035-&!%0>>+,%)@4!1)-6+,>+(&!@(?!H33V%6@6V(34.6!N(?)E+(03-!6@,*+-.+,-#!R6+!H33V%6@6V(34.6!@,+!@!E,035!01!9q!H@.)0(-!T60-+!.,@?).)0(@4!.+,,).0,)+-!0%%3,!@40(E!.6+!YKQN!@(?!T60!6@,*+-.!6+,,)(E!10,!=0.6!%0>>+,%)@4!@(?!100?!@(?!%+,+>0()@4!53,50-+-#!R6+!DAO!6@-!-.,3EE4+?!.0!>@(@E+!.6+!6+,,)(E!1)-6+,/!)(!@!-3-.@)(@=4+!T@/!.6@.!>++.-!.6+!(++?-!01!.6+!H33V%6@6V(34.6!@(?!.6+!(0(VN(?)E+(03-!%0>>+,%)@4!1)-6+,)+-&!4+@?)(E!.0!1,+C3+(.!%0(14)%.!=+.T++(!.6+!H33V%6@6V(34.6&!.6+!DAO&!@(?!.6+!%0>>+,%)@4!1)-6)(E!)(?3-.,/#!!

!k+,,)(E!0(!.6+!YKQN!6@-!+X5+,)+(%+?!>34.)54+!%044@5-+-!0*+,!.6+!5@-.!:8!/+@,-#!P!4@,E+!,+?3%.)0(!1)-6+,/!-.@,.)(E!)(!.6+!9rq8\-!4+?!.0!@!5053 4@.)0(!%044@5-+!)(!9rsM&!?,@-.)%@44/!4)>).)(E!.6+!6+,,)(E!=+)(E!6@,*+-.+?!=/!.6+!H33V%6@6V(34.6!10,!100?!@(?!%+,+>0()@4!53,50-+-#!$)(%+!.6+!%044@5-+!)(!.6+!9rs8\-&!6+,,)(E!-.0%U-!6@*+!=+6@*+?!+,,@.)%@44/!0(!.6+!YKQN&!>@U)(E!).!%6@44+(E)(E!.0!-3-.@)(@=4/!@44O%@.+!6@,*+-.!.0!=0.6!%0>>+,%)@4!@(?!100?!1)-6+,)+-!ZDAO!789M[#!$)(%+!.6+!+@,4/!7888\-!.6+!6+,,)(E!5053 4@.)0(!6@*+!+X5+,)+(%+?!@!5+,)0?!01!40T!5,0?3%.)*/.&!4+@?)(E!.0!)(%,+@-+?!.+(-)0(!=+.T++(!.6+!DAO!@(?!H33V%6@6V(34.6#!

1.3. D

6@,*+-.!,+E34@.)0(-!@(?!>@(@E+>+(.!?+%)-)0(-!)(!K@(@?@!@(?!G3,05+!ZP@-&!k@)?+,&!v!k3(.!7888&!k3(.!788:&!k3(.&!20(?+,&!v!k@)?+,!7898[&!.0!@--+--!1@,>+,-\!5,+1+,+(%+-!10,!>@(@E+>+(.!@%.)0(-!.0!>0?+,()-+!@E,)%34.3,+!)(!'E@(?@!ZW@>+-!7898[&!@(?!.0!+-.)>@.+!.6+!53=4)%{-!5,+1+,+(%+!10,!T@-.+!>@(@E+>+(.!05.)0(-!)(!F@%@0!ZW)(&!Y@(E&!v!B@(!788s[#!

1.3.1. D C E I C

DKG-!6@*+!>34.)54+!=+(+1).-!.6@.!%034?!6+45!N(?)E+(03-!1)-6+,)+-!>@(@E+,-!=+..+,!3(?+,-.@(?!.6+!5,+1+,+(%+-!01!.6+),!%0>>3().&!-3%6!@-!5,0*)?)(E!)(10,>@.)0(!@=03.!.6+!%0>>3().)+-!5,+1+,,+?!C3@(.).@.)*+!4+*+4-!10,!?)11+,+(.!0=<+%.)*+-#!k0T+*+,&!.6+-+!>+.60?-!6@*+!,@,+4/!=++(!3-+?!.0!+4)%).!.6+!5,+1+,+(%+-!01!N(?)E+(03-!%0>>3().)+-!T).6)(!@!,+-03,%+!>@(@E+>+(.!%0(.+X.#!R6+!3-+!01!@(/!Y+-.+,(!C3@(.).@.)*+!>+.60?-!.0!3(?+,-.@(?!N(?)E+(03-!5,+1+,+(%+-!-6034?!=+!?0(+!T).6!@(!@T@,+(+--!01!.6+!50.+(.)@4!)(@55,05,)@.+(+--!01!.6+-+!>+.60?-!)(!@(!N(?)E+(03-!%0(.+X.#!F@(/!N(?)E+(03-!-%604@,-!%@44!10,!.6+!3-+!01!.,@?).)0(@4!N(?)E+(03-!>+.60?040E)+-&!-3%6!@-!-.0,/V.+44)(E&!.0!E@.6+,!)(10,>@.)0(!@=03.!N(?)E+(03-!%0>>3().)+-&!)(V4)+3!01!Y+-.+,(!,+-+@,%6!>+.60?-!Z$)>5-0(!788q&!i03)-!788I[#!

P-!T+44&!.6+,+!>@/!@4-0!=+!?)11)%34.)+-!)(!3-)(E!DKG-!)(!@(!N(?)E+(03-!%0>>3()./!?3+!.0!->@44!-@>54+!-)L+-#!D)-%,+.+!%60)%+!+X5+,)>+(.-

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K3,,+(.4/&!.6+!H33V%6@6V(34.6!6@*+!@55,0X)>@.+4/!98&888!>+>=+,-&!T).6!>0-.!5+0504+!4)*)(E!0(!0,!(+@,!.6+),!.,@?).)0(@4!.+,,).0,/#!R6+!9q!H@.)0(-!1044OT!=0.6!@!6+,+?).@,/!@(?!+4+%.+?!E0*+,(@(%+!-/-.+>&!T).6!+@%6!H@.)0(!6@*)(E!@!E,035!01!k@\T))6!Zk+,+?).@,/!K6)+1-[&!@(?!@(!+4+%.+?!K6)+1!@(?!K03(%)4#!P44!9q!H@.)0(-!@,+!%0((+%.+?!.6,03E6!.6+!H33V%6@6V(34.6!R,)=@4!K03(%)4&!T6)%6!5,0*)?+-!-3550,.!5,0E,@>-!.0!.6+!H@.)0(-&!)(%43?)(E!1)-6+,)+-!>@(@E+>+(.#!

2.2. C -C R

N(?)E+(03-!%0>>3().)+-!6@*+!@!%0>54)%@.+?!6)-.0,/!T).6!@%@?+>)%!,+-+@,%6&!T).6!5,+*)03-!(+E@.)*+!+X5+,)+(%+-!>@U)(E!).!%6@44+(E)(E!.0!?+*+405!.,3-.)(E!@(?!50-).)*+!,+4@.)0(-6)5-!=+.T++(!@%@?+>)%-!@(?!%0>>3().)+-!ZK@-.+4?+(&!F0,E@(&!v!H+)>@()-!7898[#!N(!,+%+(.!/+@,-&!@%@?+>)%!,+-+@,%6+,-!6@*+!,+%0E()L+?!.6+!(++?!.0!%6@(E+!.6+),!=+6@*)03,!@(?!,+-+@,%6!@55,0@%6+-!.0!+(E@E+!,+-5+%.1344/!T).6!N(?)E+(03-!%0>>3().)+-!ZD,@T-0(&!R00>=-&!v!F3-6C3@-6!789I&!B)??+44&!$@4@>@(%@&!;+54+,&!K@,?)(@4&!v!F%N*0,!789I[#!A0,!.6)-!5,0<+%.&!@!,+-+@,%6!5@,.(+,-6)5!T@-!?+*+405+?!T).6!.6+!H33V%6@6V(34.6!%0>>3()./!E3)?+?!=/!.6+!=+-.!5,@%.)%+-!01!%0>>3()./V%044@=0,@.)*+!,+-+@,%6!ZKKB[&!T6)%6!)(*04*+-!+(E@E)(E!40%@4!%0>>3().)+-!@(?!)(?)*)?3@4-!)(!.6+!,+-+@,%6!5,0%+--!T).6!.6+!E0@4!01!-6@,)(E!0,!%0VE+(+,@.)(E!U(0T4+?E+!.0!3(?+,-.@(?!%0>54+X!5,0=4+>-!@(?!=,)(E!@=03.!%6@(E+!.6,03E6!504)%/!ZR0(?3!+.!@4#!789q[#!KKB!10%3-+-!0(!,+-5+%.)(E!@(?!3(?+,-.@(?)(E!%0>>3()./!(++?-&!=3)4?)(E!.,3-.!T).6)(!.6+!%0>>3()./&!@(?!>@U)(E!E+(3)(+!%044@=0,@.)*+!+110,.-!.0!+(E@E+!T).6!.6+!%0>>3()./!@(?!5,0>0.+!U(0T4+?E+!+X%6@(E+#!!R6,03E6!@!KKB!,+-+@,%6!@55,0@%6&!N!?+*+405+?!@!,+-5+%.134!,+-+@,%6!5@,.(+,-6)5!=+.T++(!>/-+41!@(?!.6+!H33V%6@6V(34.6!%0>>3()./&!>+@()(E1344/!)(*04*)(E!%0>>3()./!>+>=+,-!)(!>/!,+-+@,%6#!!N!5@,.(+,+?!T).6!'3V@V.643U&!.0!+(E@E+!T).6!H33V%6@6V(34.6!%0>>3()./!>+>=+,-!.0!?+-)E(!@(?!)>54+>+(.!@!-3,*+/&!@(?!.0!*@4)?@.+!.6+!,+-+@,%6!,+-34.-#!

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.6+!H33V%6@6V(34.6!%0>>3().)+-#!$3=-+C3+(.!%0(-+(.!1,0>!.6+!6+,+?).@,/!%6)+1-!
4+E).)>)L+?!.6+!,+-+@,%6!5,0<+%.!T).6)(!.6+!H33V%6@6V(34.6!%0>>3()./#!!

P!10%3-!01!KKB!)-!.0!%0VE+(+,@.+!U(0T4+?E+&!@(?!?+*+4051,+-+@,%6!5@,.(+,-6)5-!
.6@.!@,+!=+(+1)%)@4!10,!@44!5@,.)+-!)(*04*+?!ZP?@>-!+.!@4!789q&!R0(?3!+.!@4#!789q[#!
G(E@E)(E!T).6!'3V@V.643U!>@(@E+,-!@(?!H33V%6@6V(34.6!%0>>3()./!>+>=+,-!@440T+?!
>+!.0!?+-)E(!@!-3,*+/!.6@.!T034?!6+45!.6+!H33V%6@6V(34.6!T).6!.6+),!1)-6+,)+-!
>@(@E+>+(.!E0@4-&!@(?!

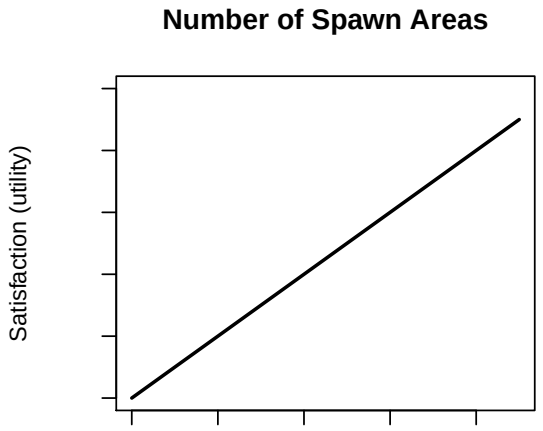
%6@,@%.+,)-.)%-!@(?!+X5+,)+(%+!T).6!%0>>+,%)@4!@(?!100?!@(?!%+,+>0()@4!6+,,)(E!
1)-6+,)+-#!R6+!-+%0(?!-+%.)0(!%0(.@)(+?!.6+!?)-%,+.+!%60)%+!+X5+,)>+(.!ZDKG[&!T6)%6!
@-U+?!)(?)*)?3@4-!.0!%600-+!=+.T++(!6+,,)(E!100?!@(?!%+,+>0()@4!-5@T(!1)-6+,/!
-%+(@,)0-#!R6+!.6),?!-+%.)0(!01!.6+!-3,*+/!@-U+?!C3+-.)0(-!@=03.!.6+!T)?+,!>@,)(+!
+%0-/-.+>&!@(?!,+C3+-.+?!C3@4).@.)*+!%0>>+(.-!0(!%6@,@%.+,)-.)%-!.6@.!.6+/!.603E6.!
T+,+!)>50,.@(.!)(!100?!@(?!%+,+>0()@4!6+,,)(E!-5@T(!1)-6+,/#!

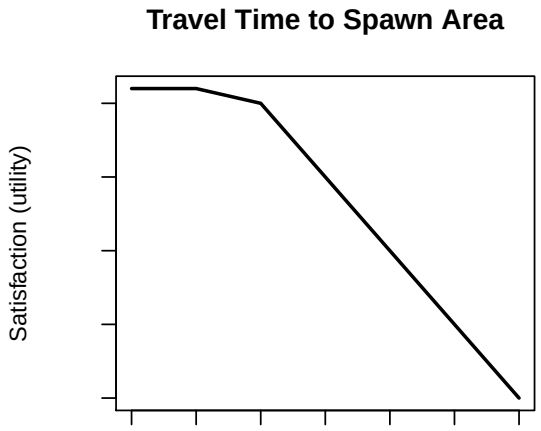
R6+!-3,*+/!T@-!?+-)E(+?!0*+,!M!>0(.6-!=/!>/-+41!@(?!.6+!k+,,)(E!K0>>)..++&!@!
E,035!>@?+!35!01!'3V@V.643U!>@(@E+,-!@(?!H33V%6@6V(34.6!%0>>3()./!>+>=+,-#!Y+!
3-+?!)(10,>@.)0(!1,0>!5,+*)03-!%0(-34.@.)0(-!=+.T++(!.6+!DAO!@(?!H33V%6@6V(34.6!0(!
6+,,)(E!1)-6+,/!0=<+%.)*+-!.0!1,@>+!.6+!-3,*+/&!@(?!.0!)?+(.)1/!.6+!./5+-!01!)(10,>@.)0(!
.6@.!T034?!=+!.6+!>0-.!6+45134!.0!'3V@V.643U!>@(@E+,-#!P!5,+4)>)(@,/!C3+-.)0((@),+!T@-!
@?>)()-.+,+?!.0!%0>>3()./!>+>=+,-!.0!=+..+,!3(?+,-.@(?!.6+!6+,,)(E!+%0-/-.+>!1,0>!@!
H33V%6@6V(34.6!5+,-5+%.)*+#!R6+!1)(@4!-3,*+/!@(?!?)-%,+.+!%60)%+!+X5+,)>+(.!T+,+!.6+(!
?+-)E(+?!3-)(E!)(()2(@)500T™/TT41Tf!@!

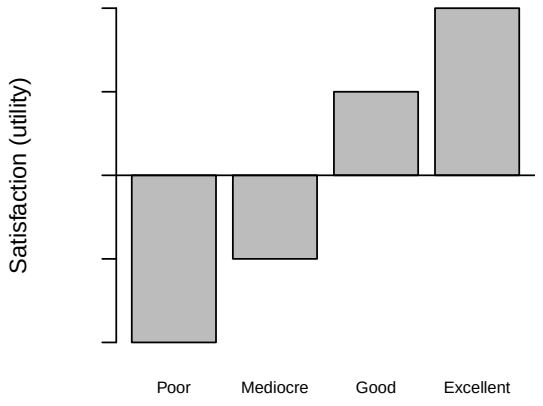
2.1 A

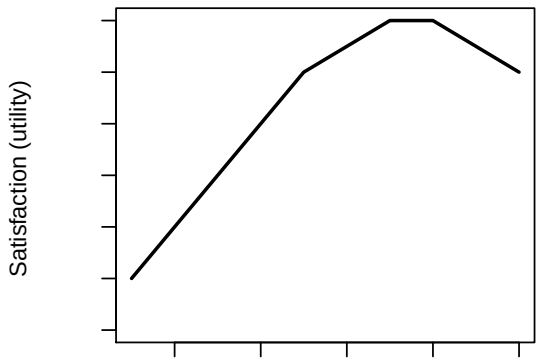
Attribute	Explanation	Level 1	Level 2

4@/+,-!01!-5@T(!0(!=03E6!3(.)4!@!%+,.@)(!.6)%U(+--#!P.!.6)-!50)(.&!-@.)-1@%.)0(!T034?!
54@.+@3!@(?!50.+(.)@44/!?+%,+@-+#!K0>>+(.-!1,0>!H33V%6@6V(34.6!6@,*+-.+,-!@-!T+44!@-!
,+-+@,%6!0(!.6+!K+(.,@4!K0@-.!01!"K!6@*+!?+-%,)=+?!@!?+%,+@-+!)(!-5@T(!C3@4)./!0(%+!
4@/+,-!,+@%6!@!%+,.@)(!.6)%U(+--!Z2@3*,+@3!+.!@4#!789I[#!k)E6!4@/+,-!01!-5@T(!0(!=03E6!
%@(!%@3-+!+EE-!.0!,0.!0,!5++4!011!=03E6-!Z2@3*,+@3!+.!@4#!789I[#!!









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F 2.2. H

DCE.

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2.3.4. E D

ℕ!%,+@.+?!@!13441@%.0,)@4&!0,.60E0(@4!?+-)E(!3-)(E!P!r#q#!;,)0,-!T+,+!(0.!3-+?!

P!%60)%+!+X5+,)>+(.!@--3>+-!.6@.!)(?)*)?3@4! !T)44!%600-+!@4.+,(@.)*+! !0*+,! @4.+,(@.)*+ !)1!U_{in}!}!U_{jn}#!R6+,+10,+&!.6+!5,0=@=)4)./!.6@.!5+,-0(! T)44!%600-+!@4.+,(@.)*+! 0*+,!@4.+,(@.)*+!)-]!!

$$Prob(i|C) = Prob\{V_{in} + \varepsilon_{in} > V_{jn} + \varepsilon_{jn}\};\ \forall j \in C$$!! ! GC3@.)0(!p!

T6+,+! !)-!.6+!%0>54+.+!-+.!01!@44!50--)=4+!@4.+,(@.)*+-!1,0>!T6)%6!.6+!)(?)*)?3@4-!%@(!

6@*)(E!0(!U(0T4+?E+!.,@(->)--)0(!@%,0--!E+(+,@.)0(-#!O.6+,!ℕ(?)E+(03-!%0>>3().)+-!)(!
",).)-6!K043>=)@!6@*+!+X5+,)+(%+?!@!40--!01!.,@?).)0(@4!6@,*+-.!U(0T4+?E+!?3+!.0!@!4@%U!
01!@%%+--!.,@?).)0(@4!6@,*+-.)(E!@,+@-!ZR3,(+,!v!R3,(+,!788M[&!@(?!'3V@V.643U!)-!
)(.+,+-.+?!)(!T6+.6+,!.6)-!%34.3,@4!U(0T4+?E+!40--!)-!6@55+()(E!T).6)(!.6+!H33V%6@6V
(34.6!%0>>3()./#!!

P40(E!T).6!@!4@%U!01!@%%+--!.0!6+,,)(E!-5@T(&!)(?)*)?3@4-!3(?+,!.6+!@E+!01!:8!
6@*+!E,0T(!35!)(!@!*+,/!?)11+,+(.!T0,4?!.6@(!.60-+!0*+,!.6+!@E+!01!:8#!F0-.!01!.6)-!

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2.6. F C

P1.+,!.6+!C3@4).@.)*+!@(?!C3@(.).@.)*+!?@.@!@(@4/-)-!T@-!%0>54+.+&!.6+!,+-34.-!@(?!.6+!)(1+,+(%+-!N!?,+T!1,0>!.6+>!T+,+!?)-%3--+?!@(?!*@4)?@.+?!3-)(E!@!10%3-!E,035!T).6!'3V@V.643U!1)-6+,)+-!>@(@E+,-!@(?!%0>>3()./!>+>=+,-#!R6)-!10%3-!E,035!5,0*)?+?!%0>>3().!>+>=+,-!@(?!>@(@E+,-!.0!5,0*)?+!%0>>+(.-!0(!.6+!,+-+@,%6&!@(?!+X5,+--!@(/!%0(%+,(-!.6+/!>)E6.!6@*+!T).6!.6+!,+-34.-#!A++?=@%U!1,0>!5@,.)%)5@(.-!T@-!E@.6+,+?!*+,=@44/&!@(?!.6,03E6!@!-60,.!C3+-.)0((@),+#!

C 3. R

3.1. R C

R6+!-3,*+/!T@-!%0>54+.+?!)(V1344!=/!MI!,+-50(?+(.-&!T).6!@.!4+@-.!9!,+-50(-+!1,0>!+*+,/!H@.)0(!ZR@=4+!7[#!B+-50(?+(.-!T+,+!+*+(4/!-54).!@%,0--!-0%)0V?+>0E,@56)%!%6@,@%.+,)-.)%-&!T).6!qI•!01!,+-50(?+(.-!T+,+!>@4+!@(?!:p•!01!,+-50(?+(.-!T+,+!1+>@4+&!@(?!@E+-!,@

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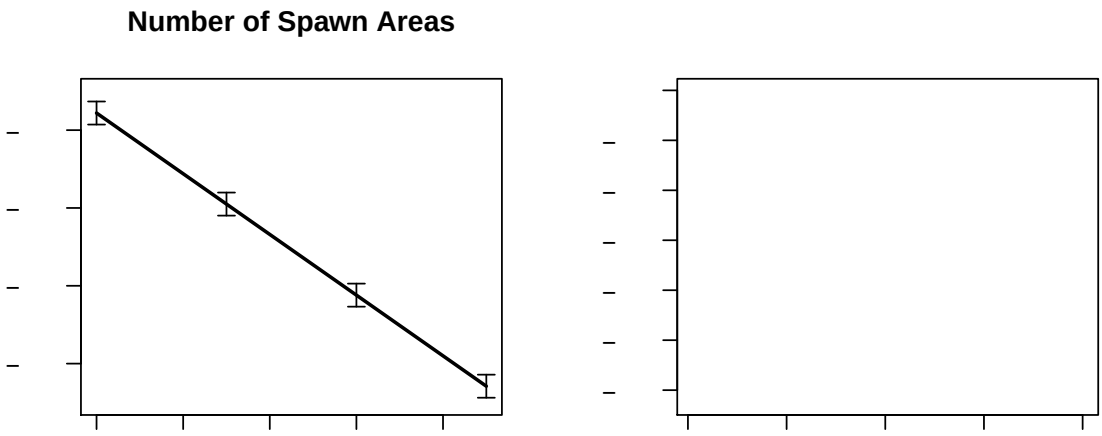

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F 3.1. B
DCE .

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F 3.2. D

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1-9, - 3-6,

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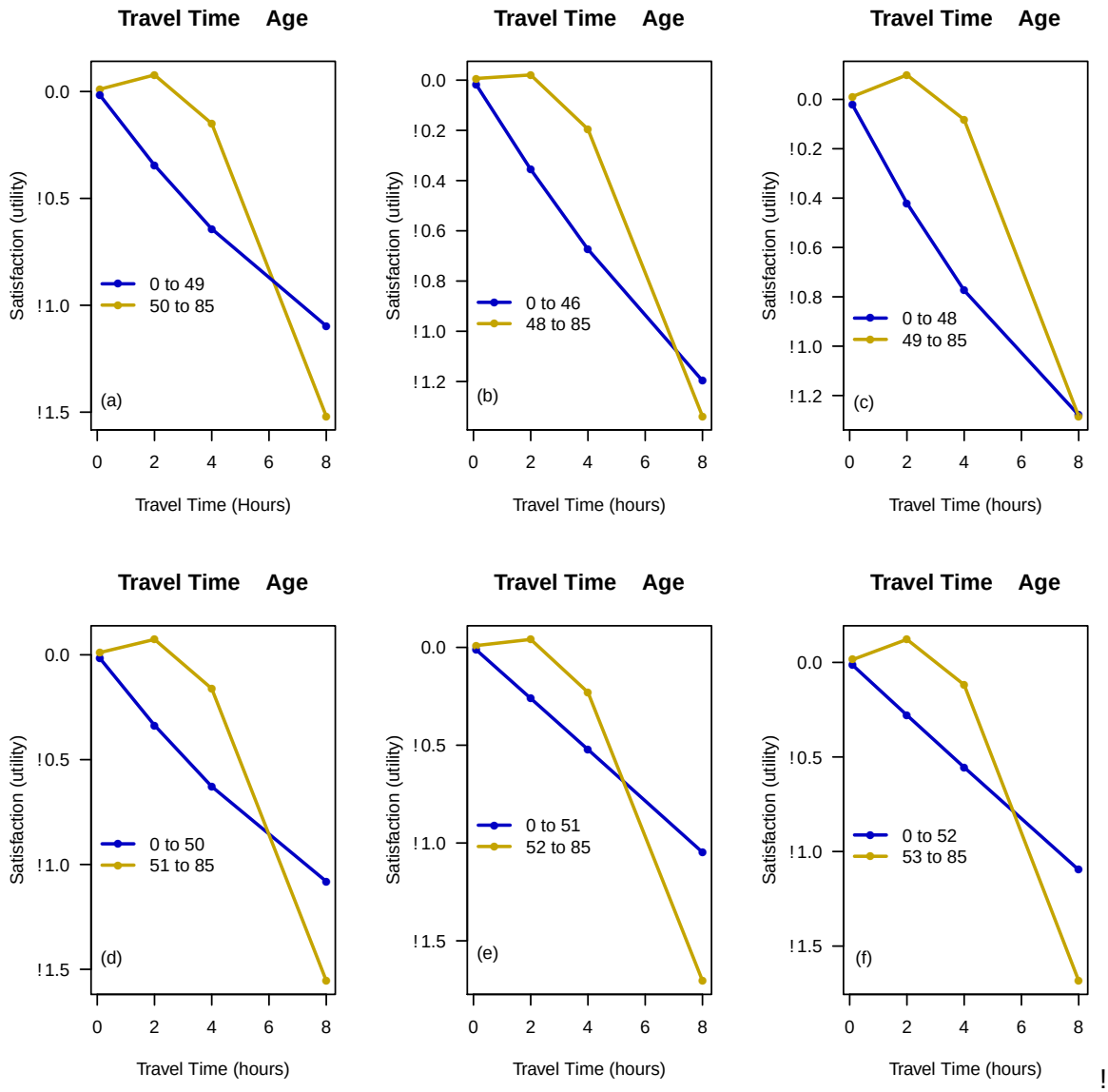
3.2.3.

4OOU)(E!@.!:!?)11+,+(.!@E+!E,035)(E-#!R6+!-+(-).)*)./!@(@4/-)-!@E+!E,035)(E-!T+,+!8Vqs!
@(?!qMVM:&!8VqM!@(?!qr!.0!M:&!8V:8!@(?!:9VM:&!8V:9!@(?!:7VM:&!8V:7!@(?!:pVM:#!!!!

D)11+,+(%+-!)(!5,+1+,+(%+-!10,!.,@*+4!.)>+!.0!-5@T(!@,+@!10,!+@%6!E,035)(E!01!



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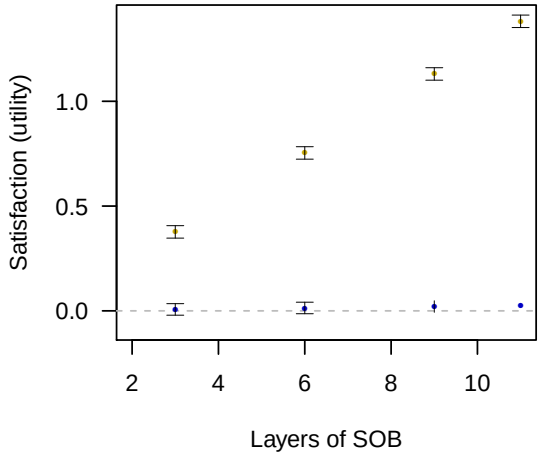
; ,+1+,+(%+-!10,!4@/+,-!01!-5@T(!0(!=03E6!T+,+!>0,+!-+(-).)*+!.0!60T!@E+!E,035-!T+,+!-54).!.6@(!5,+1+,+(%+-!10,!.,@*+4!.)>+!.0!-5@T(!@,+@#!O(%+!.6+!04?+,!@E+!E,035!T@-!)(%,+@-+?!.0!:7!@(?!0*+,&!.6+,+!T@-!(0!40(E+,!@!-)E()1)%@(.!?)11+,+(%+!)(!5,+1+,+(%+-!=+.T++(!.6+!/03(E+,!@(?!04?+,!@E+!%@.+E0,)+-!ZA)E#!p#q[#!!



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F 3.4.

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D)11+,+(%+-!)(!5,+1+,+(%+-!10,!.,@*+4!.)>+!T+,+!)(-+(-).)*+!.0!T6+.6+,!40T&!

>0?+,@.+&!@(?!6)E6!U(0T4+?E+!T@-!E,035+?!@-!9V7&!pVs&!IVr&!0,!9Vp&!qVs&!@(?!IVr&!0,!)1!

3.3. I - - A

' ()*@,)@.+!@..,)=3.+!@(@4/-)-!103(?!.6@.!.6+!C3@4)./!01!-5@T()(E!@,+@!6@?!.6+!
=)EE+-.!)>5@%.!0(!.6+!5+,%+(.!01!5+054+!%600-)(E!@!-%+(@,)0#! Y 6+(!@44!0.6+,!@..,)=3.+-!
@,+!6+4?!%0(-.@(.&!)(%,+@-)(E!.6+!C3@4)./!01!-5@T()(E!@,+@!11,0>!>+?)0%,+!.0!E00?!
)(%,+@-+-!.6+!5+,%+(.@E+!01!)(?)*)?3@4-!%600-)(E!.6+!I=+..+,m!-%+(@,)0!=/!97#7 • #!
F 34.)*@,)@.+!@..,)=3.+!@(@4/-)-!10,!.T0!@..,)=3.+-&!4@/+,-!01!-5@T(!0(!=03E6!@(?!.,@*+4!
.)>+!.0!-5@T(!@,+@!@,+!5,+-+(.+?!)(!.6)-!5@5+,!.0!5,0*)?+!@(!+X@>54+!01!60T!.6)-!
@(@4/-)-!%@(!=+!3-+?!@-!@!>@(@E+>+(.!?+%)-)0(!-3550,.!.004!ZA)E#!p#I[#!

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2 11 , 0.1 8. N

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3.5. F G C

' 3V@V.643U!1)-6+,/!>@(@E+,-!@(?!%0>>3()./!>+>=+,-!E+(+,@44/!1+4.!.6@.!.6+!C3@(.).@.)*+!,+-34.-!1,0>!.6)-!DKG!@(@4/-)-!,+14+%.+?!)(?)*)?3@4!5,+1+,+(%+-&!@(?!T+,+!@=4+!.0!5,0*)?+!1++?=@%U!0(!>/!)(.+,5,+.@.)0(!01!.6+!,+-34.-#!N!%044+%.+?!-3,*+/!1++?=@%U!0(!.6+!,+-34.-!01!.6+!-3,*+/!1,0>!:!H33V%6@6V(34.6!%0>>3()./!>+>=+,-&!T).6!@44!:!)(?)*)?3@4-!@E,++)(E!0(!.6+!,+-34.-!10,!5,+1+,+(%+-!10,!C3@4)./!01!-5@T(!@,+@&!.,@*+4!.)>+!.0!-5@T(!@,+@&!@(?!4@/+,-!01!-5@T(!0(!=03E6#!R6,++!)(?)*)?3@4-!@E,++?!T).6!.6+!,+-34.-!10,!5,+1+,+(%+-!10,!(3>=+,!01!-5@T(!@,+@-&!@(?!7!)(?)*)?3@4-!?)-@E,++?!T).6!.6+-+!,+-34.-#!

C 4. D

N(?)E+(03-!%0>>3().)+-!%3,,+(.4/!4@%U!.004-!@(?!5,0%+--+-!.0!6+45!C3@(.)1/!.6+),!0=<+%.)*+-!)(!@!T@/!.6@.!%@(!+11+%.)*+4/!)(10,>!.6+!DAO!5,0%+--+-!10,!>@(@E)(E!1)-6+,)+-#!'-)(E!@!%@-+!-.3?/!0(!.6+!Y+-.!K0@-.!01!Q@(%03*+,!N-4@(?&!.6)-!5,0<+%.!+X@>)(+?!60T!@!-3,*+/!T).6!@!?)-%,+.+!%60)%+!+X5+,)>+(.!%@(!=+!3-+?!.0!6+45!3(?+,-.@(?!N(?)E+(03-!5,+1+,+(%+-!10,!.6+!03.%0>+-!01!@!100?!@(?!%+,+>0()@4!1)-6+,/#!R6+!DKG!5,0*)?+?!C3@(.).@.)*+!)(10,>@.)0(!.0!-60T!50-).)*+!5,+1+,+(%+-!10,!)(%,+@-+?!4@/+,-!01!-5@T(!0(!=03E6!@(?!C3@4./!01!-5@T()(E!@,+@&!@(?!(+E@.)*+!5,+1+,+(%+-!10,!)(%,+@-)(E!(3>=+,!01!-5@T()(E!@,+@-!@(?!)(%,+@-)(E!.,@*+4!.)>+#!R6)-!C3@(.).@.)*+!5,+1+,+(%+!)(10,>@.)0(!%@(!=+!3-+?!.0!?+.+,>)(+!%0>>3()./!@%%+5.@(%+!01!?)11+,+(.!100?!@(?!%+,+>0()@4!1)-6+,/!03.%0>+-&!6+45)(E!>@(@E+,-!=+..+,!3(?+,-.@(?!T6+(!H33V%6@6V(34.6!100?!@(?!%+,+>0()@4!6+,,)(E!1)-6+,/!03.%0>+-!@,+!>+.#!!D+*+405)(E!>@(@E+>+(.!5,0%+?3,+-!.6@.!5,0>0.+!.6+-+!C3@(.).@.)*+!1)-6+,/!03.%0>+-!,+%0E()L+-!@(?!,+-50(?-!.0!.6+!H33V%6@6V(34.6\-!5,+1+,+(%+-!@(?!)-!@!U+/!-.+5!)(!,+%0E()L)(E!.6+!%0>>3().)+-\!*@43+-!@(?!N(?)E+(03-!,)E6.-!.0!@%%+--!6+,,)(E#!

$3,*+/!,+-34.-!)(?)%@.+?!.6@.!H33V%6@6V(34.6!5,+1+,,+?!6)E6+,!C3@4./!-5@T()(E!@,+@-!.6@.!T+,+!-6+4.+,+?!@(?!4+--!-@(?/!%0>5@,+?!.0!3(5,0.+%.+?!-@(?/!@,+@-#!R6+-+!@..,)=3.+-!%034?!,+14+%.!6@,*+-.+,-\!-@1+./!T6)4+!%044+%.)(E!-5@T(&!@-!T+44!@-!.6+!C3@4./!01!.6+!-5@T(!%044+%.+?!Z2@3*,+@3&!i+501-U/&!B3.6+,10,?&!v!B+)?!789I[#!P-!+X5+%.+?&!H33V%6@6V(34.6!@4-0!5,+1+,,+?!6)E6!C3@4./!1)-6)(E!@,+@-!@-!%40-+!@-!50--)=4+!.0!.6+),!%0>>3().)+-!@-!)(?)%@.+?!=/!-.,0(E!5,+1+,+(%+-!10,!-60,.+,!.,@*+4!.)>+-!.0!1)-6)(E!@,+@-#!$60,.+,!.,@*+4!.)>+-!6@*+!-+*+,@4!@?*@(.@E+-!10,!H33V%6@6V(34.6!100?!@(?!%+,+>0()@4!1)-6+,)+-#!A0,!)(-.@(%+&!-60,.!.,@(-).!.)>+-!-04*+!-+*+,@4!40E)-.)%@4!)--3+-!-3%6!@-!!Z)[!40T+,)(E!%0-.-!01!1)-6)(E!Z+#E#&!)(!.,@(-).!.)>+!@(?!13+4[&!T6)%6!)-!)>50,.@(.!=+%@3-+!100?!@(?!%+,+>0()@4!1)-6+,)+-!5,0*)?+!(0!?),+%.!>0(+.@,/!E@)(^!Z))[!+@-)(E!%0(%+,(-!@=03.!.6+!-@1+./!01!40(E!.,@(-).!.)>+-!.0!1)-6)(E!@,+@-!?3,)(E!4@.+VT)(.+,!@(?!+@,4/V-5,)(E!T6+(!-+@!-.@.+-!%@(!=+!?@(E+,03-^!Z)))[!05+,@.)0(@44/&!)(%,+@-)(E!.6+!%6@(%+!01!6@,*+-.+,-!E+..)(E!.0!.6+!-5@T(!+@,4/^!@(?!Z)*[!>@U)(E!).!>0,+!+11)%)+(.!.0!%6+%U!=03E6-!1,+C3+(.4/!?3,)(E!.6+!-5@T()(E!5+,)0?#!!

2,+@.+,!.,@*+4!?)-.@(%+-!.0!@%%+--!6+,,)(E!-5@T(!)(%,+@-+-!.6+!(++?!.0!%,0--!)(.0!@(0.6+,!H@.)0(\-!.+,,).0,/!@(?!.6+,+10,+!0=.@)(!5+,>)--)0(!.0!1)-6!1,0>!0.6+,!H@.)0({-!

k@{T))6#!R6+!9q!H33V%6@6V(34.6!H@.)0(-!@44!6@*+!.,@?).)0(@4!.+,,).0,)+-!@40(E!.6+!%0@-.#!R6+!H@.)0(-!k@\T))6!@,+!,+-50(-)=4+!10,!>@(@E)(E!.6+),!.+,,).0,)+-!,+-03,%+-&!)(%43?)(E!1)-6+,)+-!ZP,=03,&!y3+%U-&!v!G?T@,?-!788M[#!N1!@(!)(?)*)?3@4!1,0>!@(0.6+,!H@.)0(!T)-6+-!.0!6@,*+-.!)(!@!H@.)0(\-!.+,,).0,/!.6@.!)-!(0.!.6+),!0T(&!.6+/!,+C3),+!5+,>)--)0(!1,0>!.6+!k@\T))6!01!.6+!0.6+,!H@.)0(!ZP,=03,!+.!@4#!788M[#!B+C3+-.-!10,!5+,>)--)0(!.0!6@,*+-.!@,+!@(!)>50,.@(.!.,@?).)0(@4!5,@%.)%+!.0!.6+!H33V%6@6V(34.6&!=3.!)(%,+@-+-!.6+!%0-.!@(?!

@4-0!%,+@.+-!@!-+(-+!01!53,50-+!@(?!-5),).3@4!%0((+%.+?(+--!.6@.!-3550,.-!T60!.6+/!@,+!@-!5+054+#!!

P!%0((+%.)0(!.0!.6+!0%+@(!@(?!.6+!,+-03,%+-!).!5,0*)?+-!)-!@!U+/!5)44@,!01!H33V%6@6V(34.6!%34.3,+!Z'3V@V.643U!789M[#!O*+,!.6+!/+@,-&!H33V%6@6V(34.6!1)-6+,>+(!6@*+!(0.)%+?!@!?+%4)(+!@(?!-6)1.!)(!.6+!E+0E,@56)%!40%@.)0(!01!1)-6+,)+-!)(!.6+),!.+,,).0,/&!>@U)(E!).!6@,?+,!10,!%0>>3().!>+>=+,-!.0!@%%+--!.6+),!.,@?).)0(@4!,+-03,%+-#!R6+!;@%)1)%!6+,,)(E!1)-6+,/!@40(E!.6+!YKQN!6@-!%6@(E+?!?,@>@.)%@44/!0*+,!.6+!5@-.!:8!/+@,-&!T).6!>@(/!H@.)0(-!%4@)>)(E!.6@.!.6+/!(0!40(E+,!6@*+!-5@T(!)(!.6+!=@/-!@,03(?!.6+),!%0>>3().)+-#!A0,!+X@>54+&!>@(/!C3@4).@.)*+!%0>>+(.-!?+-%,)=+!%6@(E+-!)(!6+,,)(E!-5@T(!?)-.,)=3.)0(!0*+,!.)>+]!

R6+!4+*+4-!10,!4@/+,-!01!-5@T(!0(!=03E6!T+,+!%60-+(!=@-+?!0(!%0(-34.@.)0(!T).6!
@!->@44!(3>=+,!01!H33V%6@6V(34.6!6@,*+-.+,-#!Y+!%60-+!.6+!4+*+4-!10,!4@/+,-!.0!.,/!.0!

q7!

5,+1+,+(%+-!6+4?!=/!.6+!H33V%6@6V(34.6#!Y6+,+!DKG!5,+1+,+(%+-!?)?!(0.!>@.%6!.6+!
6/50.6+-)L+?!5,+1+,+(%+-&!H33V%6@6V(34.6!6@,*+-.+,-!T+,+!@=4+!.0!5,0*)?+!)(10,>@.)0(!
.0!+X54@)(!.6+-+!?)11+,+(%+-#!

4.1. E N - -

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Theme	Example quote

H33V%6@6V(34.6!%0>>3().//!.0!.@U+!5@,.!)(!6@,*+-.)(E!@(?!.0!4+@,(!@=03.!-.+T@,?-6)5!
5,0%+--+-#!A0,!+X@>54+&!@(!9MV/+@,V04?!,+-50(?+(.!+X54@)(-!60T!40T!6+,,)(E!
@=3(?@(%+!6@-!)>5@%.+?!.6+),!@=)4)./!.0!4+@,(!@=03.!6+,,)(E!6@,*+-.)(E!1,0>!.6+),!>0.6+,]!

k+.+,0E+(+)./!)(!5,+1+,+(%+-!@%,0--!@E+!E,035-!0%%3,,+?!T).6)(!.6+!H33V%6@6V
(34.6!%0>>3()./&!T6)%6!,@)-+-!-0>+!%0(%+,(!@=03.!-6)1.)(E!=@-+4)(+-!,+E@,?)(E!.6+!
6+,,)(E!1)-6+,/#!$6)1.)(E!=@-+4)(+!-/(?,0>+!Z$"$[!,+1+,-!.0!@!%6@(E+!)(!63>@(!
5+,%+5.)0(-!01!=)040E)%@4!-/-.+>-!?3+!.0!40--!01!+X5+,)+(%+!@=03.!5@-.!%0(?).)0(-!
Z;@5T0,.6&!B)-.&!K0@?&!v!F)4(+,V234@(?!788r[#!!y(0T(!%4@--!+-.)>@.+-!1,0>!.6+!DKG!
-60T+?!)(?)*)?3@4-!3(?+,!.6+!@E+!01!:8!6@*+!>0,+!4)(+@,!?+%,+@-)(E!5,+1+,+(%+-!10,!
.,@*+4!.)>+!.0!-5@T(!@,+@!%0>5@,+?!.0!)(?)*)?3@4-!0*+,!.6+!@E+!01!:8&!T60!@,+!4+--!
-+(-).)*+!.0!.,@*+4!.)>+-!)(!.6+!8!.0!7V603,!,@(E+!Z=3.!-3=-+C3+(.4/!-60T+?!(+E@.)*+!
3.)4)./!10,!.,@*+4!.)>+-!E,+@.+,!.6@(!q!603,-[#!B+-50(?+(.-!3(?+,!.6+!@E+!01!:8!@4-0!6@?!
-)E()1)%@(.4/!?)11+,+(.!5,+1+,+(%+-!10,!4@/+,-!01!-5@T(!0(!=03E6!T6+,+&!5@,@?0X)%@44/&!
/03(E+,!)(?)*)?3@4-!6@?!(0!5,+1+,+(%+!10,!)(%,+@-)(E!4@/+,-!01!-5@T(!0(!=03E6#!$3%6!
?)11+,+(%+-!)(!5,+1+,+(%+-!>@/!0%%3,!+).6+,!=+%@3-+!01!E+(+,@.)0(@4!@>(+-)@&!T6+,+!

5,+1+,+(%+-!10,!.,@*+4!.)>+!@(?!4@/+,-!01!-5@T(!0(!=03E6!T+,+!-)E()1)%@(.4/!?)11+,+(.!=+.T++(!,+-50(?+(.-!T).6!40T!U(0T4+?E+!01!6+,,)(E!6@,*+-.!@(?!-.+T@,?-6)5&!@(?!.60-+!T).6!>+?)3>!0,!6)E6!6+,,)(E!U(0T4+?E+#!B+-50(?+(.-!T).6!40T!U(0T4+?E+!6@?!>0,+!4)(+@,!5,+1+,+(%+-!10,!.,@*+4!.)>+!.6@(!>+?)3>!@(?!6)E6!U(0T4+?E+!)(?)*)?3@4-#!$)>)4@,!.0!.6+!%03(.+,V)(.3).)*+!5,+1+,+(%+-!10,!.,@*+4!.)>+!-60T(!=/!,+4@.)*+4/!/03(E+,!-3,*+/!5@,.)%)5@(.-&!40T!U(0T4+?E+!)(?)*)?3@4-!-60T+?!?+%,+@-)(E!3.)4)./!@-!.6+!(3>=+,!01!4@/+,-!01!-5@T(!0(!=03E6!)(%,+@-+?&!T6)%6!T@-!0550-).+!.0!T6@.!0(+!T034?!+X5+%.#!N(?++?&!.6+-+!5,+1+,+(%+-!T+,+!0550-).+!.0!>0?+,@.+!@(?!>0,+!U(0T4+?E+!,+-50(?+(.-!T60!-60T+?!)(%,+@-)(E!3.)4)./!10,!)(%,+@-)(E!4@/+,-!01!-5@T(!0(!=03E6#!R6+-+!?)11+,+(%+-!6)E64)E6.!.6+!)>5@%.!.6@.!40T+,!6+,,)(E!U(0T4+?E+!6@-!0(!5,+1+,+(%+-&!@(?!.6+!)>50,.@(%+!01!,+-.0,)(E!6+,,)(E!-5@T(!(+@,!H33V%6@6V(34.6!%0>>3().)+-!.0!)(%,+@-+!6+,,)(E!U(0T4+?E+!.6,03E603.!.6+!%0>>3()./#!!

4.4. P H N - - A - E

K0(*+,-@.)0(-!T).6!H33V%6@6V(34.6!%0>>3()./!>+>=+,-!@(?!C3@4).@.)*+!%0>>+(.-!1,0>!.6+!-3,*+/!6)E64)E6.!.6@.!6@,*+-.@=4+!-5@T(!=)0>@--!@(?!-5@.)@4!?)-.,)=3.)0(!01!-5@T()(E!@%.)*)./!,+5,+-+(.!=0.6!@!5+,%+5.)0(!01!+%040E)%@4!-/-.+>!6+@4.6!@-!T+44!@-!?++5!%34.3,@4!*@43+-!10,!.6+!H33V%6@6V(34.6#!!k)E6+,!@>03(.-!01!6@,*+-.@=4+!=)0>@--!>+@(!>0,+!-5@T(!0(!=03E6!10,!5+054+!.0!-3554+>+(.!.6+),!?)+.-&!@(?!>0,+!-5@T(!10,!%34.3,@4!+*+(.-#!$5@T(!+*+(.-!.6@.!@,+!%40-+,!.0!%0>>3().)+-!6@-!.6+!?3@4!+11+%.!01!@440T)(E!E,+@.+,!%0>>3()

6+,,)(E!6@,*+-.&!@(?!+%0⁴0E)%@⁴!@..,)=3.+-&!-3%6!@-!.6+!6@,*+-.@=⁴+!=)0>@--&!@(?!.6+!
5,0X)>).!0¹!-5@T(!.0!%0>>3().)+-#!!

4.5. I N - - ? ( ) P

R6+!0*+,@,%6)(E!E0@⁴!0¹!.6)-!,+-+@,%6!T@-!.0!)>5,0*+!03,!3(?+,-.@(?)(E!0¹!H33V
%6@6V(3⁴.6!5,+¹+,+(%+-!¹0,!6+,,)(E!¹00?!@(?!%+,+>0()@⁴!¹)-6+,/!03.%0>+-!3-)(E!@!
?)-%,+.+!%60)%+!+X5+,)>+(.#!R6+!>0?+⁴-!5,0?3%+?!=/!DKG\-!6@*+!E,+@.+,!-.@.)-.)%@⁴!
50T+,!@-!/03!)(%,+@-+!.6+!-@>5⁴+!-)L+#!Y6)⁴+!T+!T+,+!605)(E!.0!E+.!=+.T++(!9:8V788!
,+-50(-+-&!=/!.6+!+!+(?!0¹!.6+!-.3?/!0(⁴/!T+!6@?!0(⁴/!MI!,+-50(-+-&!+*+(!@¹.+,!
)>5⁴+>+(.)(E!@!%@-6!)(%+(.)*+#!R6+!⁴0T+,!(3>=+,!0¹!,+-50(-+-!T@-!⁴)U+⁴/!?3+!.0]!Z)[!
.)>)(E!0¹!.6+!,+-+@,%6&!@(?!Z))[!⁴)>).+?!+(E@E+>+(.!¹,0>!H33V%6@6V(3⁴.6!H@.)0(!¹)-6+,)+-!
-.@¹¹#!!

N>5⁴+>+(.)(E!.6+!-3,*+/!?3,)(E!.6+!-3>>+,!>+@(.!.6+,+!T+,+!¹+T+,!)(?)*)?3@⁴-!
@,03(?!.6+),!%0>>3().)+-!.0!@(-T+,!.6+!-3,*+/&!@(?!.6@.!)(?)*)?3@⁴-!T+,+!E+(+,@⁴⁴/!=3-/!
@(?!¹0%3-+?!0(!-3>>+,!,+-03,%+!6@,*+-.)(E#!R6+!.)>)(E!0¹!.6+!-3,*+/!?)-.,)=3.)0(!T@-!
=⁴(+.)⁴Z⁴(+.)⁴Z⁴+cmB¹⁴507?(%)¹2())!.*+/&!m/(?-6(E)-6(!.)]TJETQq0.20166.24000.249548 7.44cmBT45004500Tm/T

?)-.,)=3.)(E!.6+!-3,*+/!.0!.6+),!H@.)0(&!@(?!T6+.6+,!ℕ!%034?!*)-).!%0>>3().)+-!.0!6+45!
?)-.,)=3.+!.6+!-3,*+/&!=3.!.6+,+!T@-!4)>).+?!+(E@E+>+(.!=@%U!1,0>!.6+!-.@11#!!

F@(/!01!.6+!H@.)0(\-!1)-6+,)+-!-.@11!@,+!05+,@.)(E!@.!@!%@5@%)./!?+1)%).&!T).6!>0,+!
5,0<+%.-&!,+-+@,%6!,+C3+-.-!@(?!%0(-34.@.)0(-!.6@(!.6+/!%@(!6@(?4+!ZK@-.4+?+(!+.!@4#!
7897[#!ℕ!?0!(0.!=+4)+*+!.6@.!.6+/!?)?(\.!+(E@E+!T).6!.6+!-3,*+/!=+%@3-+!.6+/!T+,+!
3()(.+,+-.+?&!=3.!=+%@3-+!.6+/!?)?!(0.!6@*+!.6+!%@5@%)./!.0!.@U+!0(!@(0.6+,!5,0<+%.#!
A)-6+,)+-!-.@11!@,+!@4-0!%40-+4/!)(*04*+?!)(!.6+!%0>>3().)+-!01!.6+!H@.)0(!.6+/!T0,U!10,&!
T).6!>@(/!-.@11!=+)(E!1,0>!.6+!H@.)0(!.6+>-+4*+-#!R6)-!>+@(-!.6@.!%0>>3()./!)--3+-&!
)44(+--+-!@(?!?+@.6-!)>5@%.!.6+>!@(?!.6+),!@=)4)./!.0!.@U+!0(!0.6+,!5,0<+%.-#!ℕ(!.6+!13.3,+&!
,+4@.)0(-6)5-!T).6!)(?)*)?3@4!H@.)0(!1)-6+,)+-!-.@11!-6034?!=+!?+*+405+?!+@,4)+,!0(!)(!.6+!
,+-+@,%6!5,0%+--#!ℕ.!T034?!@4-0!6@*+!=++(!=+(+1)%)@4!.0!0,E@()L+!10,>@4!%0>>3()./!
+*+(.-!)(!+@%6!H@.)0(!.6@.!10440T+?!H33V%6@6V(34.6!5,0.0%04!T6+,+!@!>+@4!T@-!-+,*+?&!
@(?!)(?)*)?3@4-!T+,+!4+?!.6,03E6!.6+!-3,*+/#!R6)-!T034?!6@*+!E)*+(!5+05+4+!@(!
0550,.3()./!.0!@-U!C3+-.)0(-!@=03.!.6+!,+-+@,%6&!@(?!.0!%4@,)1/!C3+-.)0(-!.6+/!6@?!@=03.!
.6+!-3,*+/&!)(!5@,.)%34@,!,+4@.+?!.0!.6+!DKG!-+%.)0(#!

Y6)4+!6@*)(E!>0,+!-3,*+/!,+-50(-+-!T034?!6@*+!E,+@.4/!)(%,+@-+?!.6+!,+4)@=)4)./!
01!.6+!,+-34.-!1,0>!.6+!?)-%,+.+!%60)%+!>0?+4-&!.6+!-3,*+/!@(?!DKG!).-+41!%034?!@4-0!6@*+!
=++(!)>5,0*+?!.0!5,0*)?+!=+..+,!@(?!>0,+!3-+134!)(10,>@.)0(#!"@-+?!0(!1++?=@%U!1,0>!
'3V@V.643U!-.@11!@?>)()-.+,)(E!.6+!-3,*+/!)(!5+,-0(&!.6+!T0,?)(E!@(?!-.,3%.3,+!01!-0>+!
C3+-.)0(-!T+,+!%6@(E+?!.0!)>5,0*+!%4@,).!/!@(?!3(?+,-.@(?)(E#!k0T+*+,&!)(?)*)?3@4-!
%0>54+.)(E!.6+!-3,*+/!-.)44!%0>>+(.+?!0(!5@,.-!01!.6+!-3,*+/!.6+/!103(?!%0(13-)(E!@(?!
3(%4+@,#!$5+%)1)%@44/&!>@(/!)(?)*)?3@4-!103(?!.6+!?)-%,+.+!%60)%+!.@-U-!%0(13-)(E!@(?!
3()(.3).)*+#!k@*)(E!@!-.+5V=/V-.+5!?+-%,)5.)0(!01!60T!.0!%0>54+.+!.6+!DKG&!T).6!@!
-@>54+!DKG!10,!)(?)*)?3@4-!.0!%0>54+.+!T034?!6@*+!4)U+4/!)>5,0*+?!,+-50(-+-#!

k@*)(E!@40(E+,!.)>+!.0!?+-)E(!@(?!)>54+>+(.!.6+!-3,*+/!T034?!@4-0!6@*+!
)>5,0*+?!.6+!-3,*+/!@(?!DKG#!P!40(E+,!-.3?/!5+,)0?!T034?!6@*+!@40T+?!3-!.0!E+.!@!
>0,+!)(53.!1,0>!H33V%6@6V(34.6!%0>>3()./!>+>=+,-!@=03.!@55,05,)@.+!4+*+4-!10,!.6+!

=+.T++(!C3@4).@.)*+!%0>>+(.-!1,0>!.6+!-3,*+/!@(?!.6+!DKG!03.53.-!4+@?-!3-!.0!=+4)+*+!

C 5. C F R

5.1. C

R0!03,!U(0T4+?E+&!.6)-!)-!.6+!1),-.!.)>+!@!DKG!6@-!=++(!@554)+?!)(!@(!N(?)E+(03-!1)-6+,)+-!>@(@E+>+(.!%0(.+X.#!!R6)-!,+-+@,%6!5,0*)?+-!@(!+X@>54+!01!@!>+.60?040E/!.6@.!%@(!6+45!N(?)E+(03-!%0>>3().)+-!.0!.,@(-4@.+!.6+),!E+(+,@4!1)-6+,/!E0@4-!)(.0!-5+%)1)%!>+@-3,+@=4+!0=<+%.)*+-&!@440T)(E!.6+),!E0@4-!@(?!*@43+-!.0!=+!=+..+,!,+5,+-+(.+?!@(?!)(%43?+?!)(!1)-6+,)+-!>@(@E+>+(.!?+%)-)0(V>@U)(E#!R6)-!%@-+!-.3?/!0(!.6+!YKQN!;@%)1)%!6+,,)(E!1)-6+,/!-60T-!.6@.!@!DKG!5@),+?!T).6!@!-)>54+!C3@4).@.)*+!-3,*+/!%@(!5,0*)?+!)>50,.@(.!C3@(.).@.)*+!@(?!C3@4).@.)*+!)(10,>@.)0(!@=03.!N(?

%0>>3().)+-#!H+T!?@.@!%044+%.)0(!5,0.0%04-!@(?!>0?+4-!(++?!.0!=+!?+*+405+?!.0!@440T!
>@(@E+>+(.!.0!0%%3,!@.!.6+!-5@.)@4!-%@4+-!,+4+*@(.!.0!.6+!H33V%6@6

R

P@-&!O#&!k@)?+,&!Y#&!k3(.&!i#!7888#!P(E4+,!,+-50(-+-!.0!50.+(.)@4!6@,*+-.!,+E34@.)0(-!)(!
@!H0,T+E)@(!-50,.!1)-6+,/]!P!%0(<0)(V=@-+?!%60)%+!>0?+4)(E!@55,0@%6#!
#!78]rq8Vr:8!

P?@>-&!F#!$#&!W#!K@,5+(.+,&!W#!P#!k03-./&!D#!H+@-40--&!;#!K#!;@C3+.&!K#!$+,*)%+&!W#!
Y@4U3-&!@(?!K#!R#!D@,)>0(.#!789q#!R0T@,?!)(%,+@-+?!+(E@E+>+(.!=+.T++(!
@%@?+>)%!@(?!)(?)E+(03-!%0>>3()./!5@,.(+,-!)(!+%040E)%@4!,+-+@,%6#!G%040E/!
@(?!$0%)+./!9r#!

P50-.04@U)-&!P#&!W@11,/&!$#!788:#!P!%60)%+!>0?+4)(E!@554)%@.)0(!10,!2,++U!6+,).@E+!
@..,@%.)0(-#! #!qp]p8rVp9M!

P,=03,&!D#&!y3+%U-&!"#&!G?T@,?-&!D#!788M#!H33V%6@6V(34.6!K+(.,@4!B+E)0(!A),-.!H@.)0(-!
20*+,(@(%+!$.,3%.3,+-#!K4@/0C3.!B+50,.#!P%%+--+?!@.]!6..5]nn+%0.,3-.#%@nT5V
%0(.+(.n3540@?-n789:n87nGKB+50,.VAH20*+,(@(%+#5?1!

P,.+44+&!y#!P#&!W#!$.+56+(-0(&!K#!",@EE&!W#!P#!k03-./&!Y#!2#!k03-./&!F#!y@T6@,3&!v!H#!W#!
R3,(+,#!789M#!Q@43+-V4+?!>@(@E+>+(.]!.6+!E3)?@(%+!01!54@%+V=@-+?!*@43+-!)(!
+(*),0(>+(.@4!,+4@.)0(-6)5-!01!.6+!5@-.&!5,+-+(.&!@(?!13.3,+#!
7pZp[]p:!

P.4+0&!G#B#!788q#!

2@3*,+@3&!P#!F#&!D#!i+501-U/&!F#!B3.6+,10,?&!@(?!F#!B+)?#!789I#!IG*+,/.6)(E!,+*04*+-!
@,03(?!.6+!6+,,)(Em]!.6+!k+)4.-3U!6+,,)(E!,+4@.)0(-6)5!.6,03E6!.)>+#!

i3?T)E&!D0(!v!k)4=0,(&!B@/!v!Y@4.+,-&!K@,4#!Z9rrp[#!'(%+,.@)(./&!B+-03,%+!GX540).@.)0(&!
@(?!K0(-+,*@.)0(]!i+--0(-!A,0>!k)-.0,/#! #!7s8#!9IVps!

F@(-U)&!K#A#!9rII#!R6+!-.,3%.3,+!01!,@(?0>!3.)4).//!>0?+4-#! !
MZp[]77rV7:q!

F@,.+44&!$#W#D#&!$%6T+)E+,.&!W#A#&!k@)-.&!Q#&!K4+@,/&!W#$#!7899#!F0*)(E!.0T@,?-!.6+!
-3-.@)(@=4+!1)-6+,)+-!1,@>+T0,U!10,!;@%)1)%!6+,,)(E]!?@.@&!>0?+4-&!@(?!@4.+,(@.)*+!
@--3>5.)0(-^!$.0%U!P--+-->+(.!@(?!F@(@E+>+(.!P?*)%+!10,!.6+!"),).)-6!
K043>=)@!;@%)1)%!k+,,)(E!$.0%U-]!7899!P--+-->+(.!@(?!7897!A0,+%@-.-#!DAO!
K@(#!$%)#!P?*)-#!$+%#!B+-#!D0%#!

F0,@&!K#&!F/+,-&!B#P#&!K044&!F#&!i)=,@4@.0&!$#&!;).%6+,&!R#W#&!$3>@)4@&!B#'#&!~+44+,&!D#&!
Y@.-0(&!B#&!2@-.0(&!y#W#&!v!Y0,>&!"#!788r#!F@(@E+>+(.!G11+%.)*+(+--!01!.6+!
Y0,4?\-!F@,)(+!A)-6+,)+-#! #!IZs[!

F3,,@/&!2#&!D\P((@&!i#&!F@%?0(@4&!;#!789s#!F+@-3,)(E!T6@.!T+!*@43+]!R6+!3.)4)./!01!
>)X+?!>+.60?-!@55,0@%6+-!10,!)(%0,50,@.)(E!*@43+-!)(.0!>@,)(+!-0%)@4V+%040E)%@4!
-/-.+>!>@(@E+>+(.#.#104Tc4500450 0Tm/TT6M())110(3)(!)-1(6#"!!1-!-1(44)6(!)]TJETQq0.24 30JE3 2 2

$@..+,1)+4?&!R#&! 2 ,+E0, /&!B#&!y4@)(&!$#&!B0=+,.-&! F #&!K6@(&!y#F #!7897#!K34.3,+&!)(.@(E)=4+-!
@(?!>+.,)%-!)(!+(*),0(>+(.@4!>@(@E+>+(.#!
#!99 I]98p∨99q!

$%634.L&! i #&!K#!A04U+&! k #! ƒ -.+,=40>&!@(?! ; #!O4--0(#!789 : #!P?@5.)*+!E0*+,(@(%+&!
+%0-/-.+>!>@(@E+>+(.&!@(?!(@.3,@4!%@5).@#!

Y @4?,@>&!W#"#&!k+,,)(E&!P#&!S03(E&!R#y#!788s#!