JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
STA 2310 DECISION THEORY

CAT 2 _____ Time: 1.25 Hours

Instructions: answer all questions

Question one

a) Differentiate between the following terms/concepts:
   i) Risk and uncertainty (2 marks)
   ii) Utility function and expected utility. (2 marks)
   iii) Risk aversion, risk seeking, and risk neutrality. (3 marks)

b) A graduating MBA student has job offers from two brokerage firms. Firm #1 pays a straight salary of $70,000 (but no commission bonuses). Firm #2 pays a salary of $6,000 plus a commission bonus, with a fixed bonus schedule based on annual sales; the potential commission bonus for firm #2's job is as follows: $150,000 with a probability of 11%, $50,000 with a probability of 83%, $20,000 with a probability of 5%, and zero with a probability of 1%.
   i) What is the expected monetary value of Firm #2's job? (1 mark)
   ii) The student claims to be *indifferent* between the two job offers. If this is true, is the student risk averse, risk loving, or risk neutral, and why? (2 marks)

c) Ann's current job pays $40,000 per year. She is considering quitting her job next year and using her savings to finance a Master's degree that is expected to take two years. After she gets her Master's degree, she expects to earn $65,000 per year. Tuition, fees, books and other expenses amount to $20,000 per year. How many years should Ann plan to work after getting the Master's degree, for it to be a worthwhile investment? Assume Ann's discount rate is 0. (2 marks)

d) Daniel's total wealth is $1000. He has been given a lottery ticket which has a 40% probability that he will win $25 and a 60% probability that he will win $175. Daniel's utility function is $U(w) = \sqrt{w}$ where w is his wealth.
   i) Calculate the least that Daniel would be willing to accept for him to sell the lottery ticket. Use a sketch chart to illustrate your answer. (3 marks)
   ii) How does the amount that Daniel is willing to accept for the lottery ticket compare with how much the lottery ticket would be worth to his poor brother Thomas who has nothing? Calculate the least that Daniel and his poor brother Thomas (who still has nothing) would accept to sell the ticket if their utility functions were $u(w) = Ln(w)$? (3 marks)

Question Two

a) Suppose you have a $200,000 home (wealth) and there is a 2% chance that a fire will damage your house. If it does, it will generate $75,000 in loss. Given $U(W) = ln(W)$, find the ending wealth under the 2 possible outcomes. Suppose you can add a fire detection/prevention system to your house. This would reduce the chance of a bad event to 0 but it would cost you $C to install. What is the most you are willing to pay for the security system? (3 marks)

1