Decision Analysis Questions

18. An influence diagram helps the decision maker to organize decision variables and states of nature.
    A) True
    B) False

21. The expected value of perfect information can never be negative.
    A) True
    B) False

22. You have become a loan officer in a small bank. It is the bank's policy to make loans to people who seem to have a better than 50% chance of being a good credit risk. Further, the bank has determined that 90% of the people who are good credit risks have steady jobs, but only 25% of the people who are not good credit risks have a steady job. In probability notation:

P(S|G) = 0.9	P(S|B) = 0.25	[G = Good credit risk, B = Bad risk]
P(N|G) = 0.1	P(N|B) = 0.75	[S = Steady job, N = Nteady job]

A prospective customer comes to your desk seeking a loan. You immediately assess the probability of his being a good credit risk as P(G) = 0.25 [and thus P(B) = 0.75], but you permit him, as a courtesy, to complete an application. Checking his credit rating, you learn that he indeed has a steady job. Using Bayes' Theorem, revise your probability that he is a good credit risk. In other words, find P(G|S).
    A) 0.35
    B) 0.45
    C) 0.55
    D) 0.65
    E) 0.75

P(G)= .25	P(B)= .75	
P(S|G)= .9	P(S|B)= .25	
P(N|G)= .1	P(N|B)= .75	
P(S&G)=	P(S&B)=	P(S)=
P(N&G)=	P(N&B)=	P(N)=
P(G|S)=???		

23. In a decision problem where we wish to use Bayes' theorem to calculate posterior probabilities, we should always begin our analysis with the assumption that all states of nature are equally likely, and use the sample information to revise these probabilities to more realistic values.
    A) True
    B) False

27. When making a decision without perfect information, a decision tree offers little help.
    A) True
    B) False

Directions for Problems 28-31: Susan's Surprise Catering operates a sandwich truck in the downtown district, selling coffee, soft drinks, sandwiches, and desert snacks. Based on experience, the owner feels that during a Monday lunch hour, sandwich demand and its probability are correctly described in the table below. The Payout Table for various levels of demand and production choices is given below.

Sandwiches Made	Sandwiches Demanded 10 20 30						
10	15	15	15				
20	5	35	35				
30	-5	25	55				

28. How many sandwiches would Susan make using the Maximin criterion?
   A) -5
   B) 0
   C) 10
   D) 20
   E) 30

29. If Susan learned that $P(10) = 0.1$ and $P(20) = 0.5$, then she could apply the expected return (or EMV) criterion. What choice would Susan make using the expected return (or EMV) criterion?
   A) 0
   B) 10
   C) 20
   D) 30
   E) Can't be determined from the information given

30. What payoff will Susan receive for this decision?
   A) 0
   B) -5, 25, or 55 depending on the state of nature that occurs
   C) 10, 20, or 30 depending on the decision selected
   D) 30
   E) 55

31. Calculate the Expected Value of Perfect Information (EVPI) in this case.
   A) 7
   B) 30
   C) 32
   D) 34
   E) 41

33. With regard to decision trees, the term *folding back* means
   A) Dividing branches into states of nature
   B) Turning a choice node into a terminal node by giving it the value of its best branch
   C) Redrawing the tree such that the terminal nodes connect to the initial node
   D) A, B, and C
   E) None of the above

34. To determine how much a potential survey is worth to a company, one should:
   A) Calculate the EVSI.
   B) Calculate the EVPI.
   C) Determine the cost of previous surveys.
   D) Ask a senior manager in the company.
   E) Wait to calculate this amount based on the results of the survey.

35. The Ajaks Company is planning to introduce a new product, but it is considering a market research survey before making a decision. The expected return for the new product (prior to the consideration of a survey) has been estimated to be $320,000. It has also been estimated that the probability of a favorable survey result is 0.60, and the payoff for the new product will be $800,000 only if the survey result is favorable. The payoff only if the survey is unfavorable will be $100,000. Based on this information, we can say that:
   A) We should not introduce the new product.
   B) We should conduct the survey if the survey cost is less than $50,000.
   C) We should conduct the survey if the survey cost is less than $100,000.
   D) We should conduct the survey if the survey cost is less than $150,000.
   E) We should conduct the survey if the survey cost is less than $200,000.

36. Based on the decision tree below, should you make or buy? What is the expected return?
   A) Buy; $15.20
   B) Buy; $37.11
   C) Buy; $45.20
   D) Make; $11.20
   E) Make; $26.40
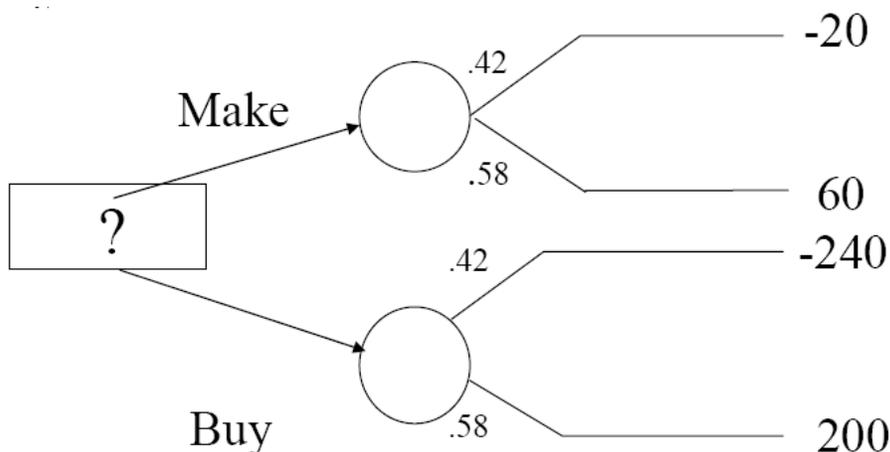
37. In decision analysis, the actual events that may occur in the future over which the decision maker has no control are known as:
    A) States of nature
    B) Alternatives
    C) Payoffs
    D) Criteria
    E) Posteriors