II Semester M.Com. Degree Examination, June 2009
(2007-08 Scheme) (NS)
COMMERCE
2.5 : Operations Research and Quantitative Techniques

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **any ten** of the following in about **3-4** lines each. Each sub-question carries **two** marks.

(2×10=20)

1. a) Define total float and free float.

   b) Distinguish between risk and uncertainty.

   c) What are empirical probabilities ?

   d) Discuss with decision trees.

   e) What do you mean by binomial distribution ?

   f) What are the cost relevant for inventory decisions ?

   g) Explain an feasible solutions.

   h) State the addition theorem of probability.

   i) What is multiple optimal solution ?

   j) What is random variable ?

   k) What is Mathematical Expectation ?

   l) What is stockout cost ?

SECTION – B

Answer **any three** of the following :

(3×5=15)

2. Define EVPI. How is it calculated ?

3. Bring out the importance of net work analysis in business decisions.

4. A and B appears for an interview for two vacancies in the same post. The probability of A's selection is $1/7$ and that of B's selection $1/5$ what is the probability that
   a) both of them will be selected.
   b) only one of them will be selected.
   c) none of them will be selected.

P.T.O.

5. A company uses annually 50,000 units of an Item. Each costing Rs. 1.20 each order costs Rs. 45 and inventory carrying charges 15% of the annual average inventory value.

   i) Find EOQ.

   ii) If the company operates 250 days a year the procurement time is 10 days and safety stock is 500 units find the re-order level. Maximum, minimum and average inventory values.

6. Write a short on significance of linear programming in Managerial Decision Making.

SECTION – C

Answer **any three** questions. **Each** question carries **15** marks.

7. A survey has been undertaken to determine if there is a relationship between a place of residence and ownership of foreign car. A random sample of 200 cars from large cities. 150 from suburbs and 150 from rural areas was selected with the results shown below :

Car ownership	Area of Residence			
	Large city	Suburb	Rural	Total
Own foreign car	90	60	25	175
Do not own foreign car	110	90	125	325
Total	200	150	150	500

If a car owner is selected at random. What is the probability that he or she :

1) a) Owns a foreign car ?

   b) Lives in a large city and owns a foreign car ?

   c) Own a foreign car or lives in a rural area ?

   d) A car owner selected at random is found to have a non-foreign car. What is the probability that he or she lives in a rural area ?

2) State the conditions under which the Binomial distribution can be used.

8. A home economics student has to devise a diet which achieves minimum levels of each of three nutrients, namely 10 units of nutrient A, 12 units of nutrient B and 6 units of nutrient C.

These nutrients can be provided from two foods. P and Q in the following quantities one kilo of food P costs 3.50 and contains 5 units of nutrient A. 4 units of nutrient B and 1 unit of nutrient C. Where as one kilo of food Q costs 4.00 and contains 2 units of nutrient A. 3 units of nutrient B and 3 units of nutrient C.

1) Formulate the information as a linear programming problem and show graphically the feasible combinations of the foods P and Q find the combination which gives minimum cost.

2) If the price of food P were to rise while that of food Q remained. Constant how much would this rise have to be in order to affect your previous answer.

9. A project consists of a series of tasks labeled. A, B, ...H I with the following constraints.

A < D. E; B, D < F; C < G; B < H; F, G < I, W < X, y means X and y can't start unit W is completed. You are required to construct a network using this notation. Also find the minimum time of completion of the project when the time of completion of each task is given as follows :

Task	A	B	C	D	E	F	G	H	I
Time (Days)	23	8	20	16	24	18	10	4	10

10. Explain the meaning of "Simulation" and state its usefulness in business decision making.

11. Write short notes on :

a) Simulation in financial management.

b) Decision trees.

c) Sensitivity analysis.