Hall Ticket No | | | | | | | | | | | Question Paper Code: CMBB29

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

MODEL QUESTION PAPER

MBA III Semester Regular Examinations, November - 2019

Regulation: R18

QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

Time: 3 Hours **(MBA)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) "Operation Research is a tool for decision support system" - Justify the statement. **[7M]**
   (b) Discuss in detail about operation research, with special reference to an functional area of management. **[7M]**
2. (a) Elucidate the various models in Operation Research in business environment. **[7M]**
   (b) How far can quantitative techniques be applied in management decision making. **[7M]**

UNIT – II

3. A manufacturing of leather belts makes three types of belts A, B and C which are processed on 3 machines M_1, M_2, and M_3. Belt A requires 2 hrs on machine M_1, 3 hrs on machine M_2 and 2 hrs on machine M_3. Belt B requires 3 hrs on Machine M_1, 2hrs on machine M_2 and 2hrs on machine M_3. Belt C requires 5 hrs on machine M_2 and 4 hrs on machine M_3. There are 8 hrs of time per day available on machine M_1, 10 hrs of time available in machine M_2 and 15 hrs of time per day available on machine M_3. The profit gained from belt A is Rs.3 per unit, from belt B is Rs.5 per unit and from belt C is Rs.4 per unit. What should be the daily production of each type of belt so that the profit is maximum. **[14M]**
4. (a) Write an algorithm for solving transportation problem to obtain initial basic feasible solution. **[4M]**
   (b) Obtain an optimal solution to the following problem by using "MODI" Method from Table 1. **[10M]**

Table 1

D/S	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	34

UNIT – III

5. (a) "Hungarian method of assignment provides us an efficient means to find the optimal solution". Justify the statement. **[4M]**

   (b) A marketing manager has five sales districts. Considering the capabilities of the salesmen and the nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district is given in Table 2. Find the assignment of salesmen to districts that will result in maximum sales. **[10M]**

Table 2

salesmen/Districts	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

6. (a) How will you solve an assignment problem where a particular assignment is prohibited? How can you maximize an objective functions in an assignment problem? **[4M]**

   (b) A company has four zones open and four salesmen available for assignment. The zones are equally rich in their sales potential. It is estimated that a typical salesman operating in each zone would bring the weekly sales are Zone I Rs.1,26,000, Zone II Rs.1,05,000, Zone III Rs.84,000, Zone IV Rs.63,000. The four salesmen are also considered to differ in inability. It is estimated that working under the same condition, their weekly sales for salesmen A, B, C, and D are 7, 5, 5 and 4 respectively. If the criterion is maximum expected total sales, the intuitive answer is to assign the best salesman to the richest territory, the next best salesman to the second richest and so on. **[10M]**

UNIT – IV

7. (a) Discuss the differences between decision-making under certainty, decision-making under risk and decision-making under uncertainty. **[4M]**

   (b) A finance manager is considering drilling a well. In the post, only 70% of wells drilled were successful at 20 meters depth in that area. Moreover on finding no water at 20 meters, some persons in that area drilled in further up to 25 meters but only 20% struck water at that level. The prevailing cost of drilling is Rs. 500 per meter. The finance manager in his own well, he will have to pay Rs.15,000 to buy water from outside for the same period of getting water from the well. Draw on appropriate decision tree and determine the finance manager's optimal strategy. The following decisions are considered: **[10M]**

   i. Do not drill any well,

   ii. Drill up to 20 meters and

   iii. If no water is found at 20 meters, drill further up to 25 meters.

8. (a) State the basic steps involved in decision making process. Write a brief note on different environments in which decisions are made. **[7M]**

   (b) A TV dealer finds that the cost of a TV in stock for a week is Rs.30 and the cost of a unit storage is Rs.70. For one particular model of TV the probability distribution of weekly sales is 0, 1, 2, 3, 4, 5, 6 with probability of 0.1, 0.1, 0.2, 0.25, 0.15, 0.15, 0.05 respectively. How many units per week should the dealer order? Also, find E.V.P.I. **[7M]**

UNIT – V

9. (a) In a tool crib manned by a single assistant, the operators arrive at the tool crib at the rate of 10 per hour. Each operator need 3 minutes on an average to be served. Find out the loss of production due to waiting of an operator in an shift of 8 hours if the rate of production is 100 units per shift. **[7M]**

   (b) In a bank cheques are cashed at a single teller counter customers arrive at the counter in a poison's manner at an average rate of 30 customers per hour. The teller asks, on an average, a minute and half to cash a cheque. **[7M]**

      i. Calculate the percentage of time the teller is busy.

      ii. Calculate the average time a customer is expected to wait.

10. (a) A super market has two counter sale girls effecting sales at the counters. If the service time for each customer is exponential with mean 3 minutes and the arrival rate of the customers to the super market is 2 customers per minute. Compute: **[7M]**

      i. The probability that both the sales girls would be idle.

      ii. The probability that there shall be one customer in the supermarket.

      iii. The average number of customers waiting in the queue.

      iv. The average number of customers being serviced.

      v. The average time a customer spends waiting for service.

      vi. The average time a customer spends in the super market.

   (b) In a railway Marshalling yard, goods train arrive at a rate of 30 trains per day. Assuming that inter arrival time follows an exponential distribution and the service time (the time taken to hump train) distribution is also exponential with the average of 36 minutes. **[7M]**

      i. Calculate expected queue size.

      ii. Probability that the queue size exceeds 10. If the arrival rate of train increases to 33 per day.

      iii. What will be the change in (a) and (b).