INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

OPTIMIZATION TECCHNIQUES

Time: 2 Hours   (ME)   **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. Brief the about slack variable and surplus variable. **[5M]**

2. What are the methods to test for optimality in transportation problem? **[5M]**

3. What are the advantages of sequencing? **[5M]**

4. Explain discrete probabilistic demand model. **[5M]**

5. Suppose that the demand for a particular item is normally distributed with a mean of 175 units and the standard deviation of 25 units per day, Simulate the demand for the next 20 days. **[5M]**

6. Discuss the importance of operations research in the decision making process? **[5M]**

7. Explain practical steps involved in solving minimization type transportation problems. **[5M]**

8. Discuss about the terminology and notations followed in sequencing solution. **[5M]**

PART – B

9. A firm manufactures two products A and B on which the profits earned per unit are Rs.3 and Rs.4 respectively. Each product is processed on two machines and Product A requires one minute of processing time on and two minutes on while B requires one minute on and one minute on . Machine is available for not more than 7 hours 30 minutes while machine is available for 10 hours during any working day. Formulate the above as a LPP.

[10M]

10. Solve the following LPP by simplex method Minimize $z = 8x_1 - 2x_2$

subject to -$4x_4 + 2x_2 \leq 1$

$5x_1 - 4x_2 \leq 3$

and $x_1, x_2 \geq 0$.

[10M]

11. Explain Modi's algorithm for the optimal solution of a transportation problem with an example. **[10M]**

12. What is degeneracy? How the degeneracy during initial stage of transportation problem solving is resolved? **[10M]**

13. The cost of machine is Rs.5000, The maintenance cost of nth year is given by Cn = 500(n-1), n=1,2,3,4,… …, Suppose that money is worth 5% per year.,after how many years will it be economical to replace the machine by a new one? **[10M]**

14. Describe the step by step procedure of graphical method for processing two jobs through 'm' machines.

[10M]

15. The annual demand of a product is 10,000 units. Each unit costs Rs100 if the order quantity is less than 200 units. For orders 200 units and above, the cost is Rs 95 per unit. Annual inventory holding cost is 10 percent of the value of the item and the ordering cost is Rs 15 per order. Find the economic lot size. **[10M]**

16. The Production department of a company requires 3600 kg of raw material for manufacturing a particular item per year. The cost of placing an order is Rs36 and the cost of carrying the inventory is 25%of the cost of raw material. The cost is Rs10 per kg. Estimate i) Optimum lot size of raw material, ii)Optimal order cycle time,3.Total inventory cost. **[10M]**

17. What is simulation and discuss the types of simulation. **[10M]**

18. T.V repairman finds that the time spent on his job has an exponential distribution with mean of 30 minutes. If he repairs set in the order in which they came in and if the arrival of the sets is Poisson with an average rate of 10 per 8 hour day, what is his expected idle time? How many jobs are ahead of the average set just brought in?

[10M]

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