

Code No: R164205C

**R16**

**Set No. 1**

**IV B.Tech II Semester Regular/Supplementary Examinations, July - 2021**

**OPERATION RESEARCH  
(Computer Science and Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B  
Answer ALL sub questions from Part-A  
Answer any FOUR questions from Part-B  
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**PART-A (14 Marks)**

1. a) Distinguish between feasible and optimal solution. [2]
- b) Explain Vogel approximation method. [3]
- c) What are the practical applications of traveling salesman model? [2]
- d) Explain Maximin principle. [2]
- e) What are situations that make the replacement of items necessary? [3]
- f) List different types of cost in inventory system. [2]

**PART-B (4x14 = 56 Marks)**

2. a) Solve the following LPP :  
Max  $Z = 2X_1 + 4X_2$   
Subject to  $2X_1 + X_2 \leq 18$   
 $3X_1 + 2X_2 \geq 30$   
 $X_1 + 2X_2 = 26$   
 $X_1, X_2 \geq 0$  [10]
- b) Write the limitations of Operations research [4]
3. a) Find the optimal solution to the following transportation problem. Use Least cost method for initial feasible Solution and MODI method for optimal solution.

	Destination				
Source	D1	D2	D3	D4	Supply
S1	23	27	16	18	30
S2	12	17	20	51	40
S3	22	28	12	32	53
Demand	22	35	25	41	

- b) Explain north-west corner rule for finding initial solution for a transportation problem. [4]

4. a) Four different jobs are to be done on four machines, one job on each machine, as set up costs and times are too high to permit a job being worked on more than one machine. The matrix given below gives the times of producing jobs on different machines. Assign the jobs to machine so that total time of production is minimized.

**Machines (Time in Hrs)**

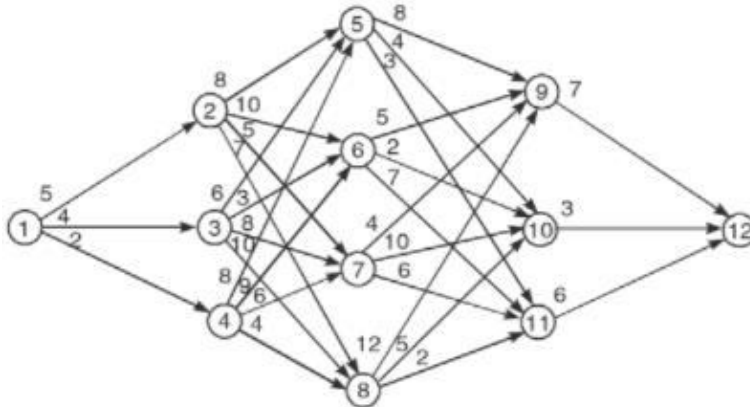
Jobs	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>
P	10	14	22	12
Q	16	10	18	12
R	8	14	20	14
S	20	8	16	6

[7]

- b) Give procedure for determining an optimal sequence for processing n jobs on three machines.

[7]

5. Find the shortest path from 1 to 12 through the network given in fig. below.



[14]

6. a) A fleet owner finds from his past records that the cost per year of running a vehicle whose purchase price is Rs. 50000/- are as below:

Year	1	2	3	4	5	6	7
Running cost(Rs)	5000	6000	7000	9000	21500	18000	18000
Resale value(Rs)	30000	15000	7500	3750	2000	2000	2000

Thereafter running cost increases by Rs.2000/- per year but resale value remains constant at Rs.2000/-. At what stage the replacement is due?

[9]

- b) Discuss about group replacement policy.

[5]

7. a) Explain the concept of Economic order quantity(EOQ). What are the basic ideas behind this concept?

[7]

- b) The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs. 36 and the cost of carrying inventory is 25% of the investment in the inventories. The price is Rs. 10 per kg. Help the purchase manager to determine an ordering policy for a raw material.

[7]