



R18 Regulation

Subject code: 2E8EE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VIII Semester Supplementary Examinations, April, 2024

Operation Research

(Computer Science and Engineering)

Maximum Marks: 70

Date: 24.04.2024 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10X2M=20 Marks)

- 1 What is a model?
- 2 What are the limitations of LP problem?
- 3 Explain the steps in transportation algorithm.
- 4 Formulate the travelling – Salesman problem as an assignment problem.
- 5 What are the assumptions made in the sequencing problem?
- 6 What is Johnson's rule in sequencing.
- 7 Explain the terms i) Pure strategy ii) Mixed strategy.
- 8 Which competitive situation is called a game?
- 9 Describe the various elements of the queue.
- 10 What is Kendall's notation of queuing?

Part-B

Answer All the following questions.

(5X10M = 50 Marks)

- 11 Use simplex method to solve the following LPP: [10]

Minimize $Z = X_2 - 3X_3 + 2X_5$

subject to constraints:

$3X_2 - X_3 + 2X_5 \leq 7$, $-2X_2 + 4X_3 \leq 12$, $-4X_2 + 3X_3 + 8X_5 \leq 10$; and $X_2 \geq 0$, $X_3 \geq 0$, $X_5 \geq 0$

OR

- 12 What is a simplex method? Describe simplex method of solving linear programming problem. [10]

- 13 What is the unbalanced Assignment problem? How is it solved by the Hungarian method? [10]

OR

- 14 Find the Total cost using North-west corner method. Also find the optimal assignment. [10]

	W1	W2	W3	W4	capacity
F1	95	105	80	15	12
F2	115	180	40	30	7
F3	195	180	95	70	5
Requirement	5	4	4	11	

- 15 Find the sequence that minimizes the total time required in performing the following jobson three machines in the order A-B-C as shown in the below table. Also find the total elapsed time. [10]

Machine/Job	1	2	3	4	5	6
A	8	3	7	2	5	1
B	3	4	5	2	1	6
C	8	7	6	9	10	9

OR

- 16 Six jobs go first over Machine-I and then over Machine-II. The orders of completion of jobs have no significance. The following gives the machine times in hours for six jobs and the two machines.

Job	1	2	3	4	5	6
Machine I	5	9	4	7	8	6
Machine II	7	4	8	3	9	5

Find the Optimal total time and the idle times of the machine.

[10]

- 17 A. Obtain the optimal strategies for both persons and the value of the game for zero-sumtwo-person game whose payoff matrix is given below: [10]

3	2	4	0
2	4	4	2
4	2	4	0
0	4	0	8

OR

- 18 Use the graphical method for solving the following game and find the value of game? [10]

Player A	Player B			
A1	2	2	3	-2
A2	4	3	2	6

- 19 Jobs arrival at a workstation in a manufacturing plant is in a Poisson fashion at an average rate of five per hour. The time to machine one job is an exponential distribution with a mean time of 20 minutes. What is the expected time a job has to wait at the workstation? What will be the average number of jobs waiting at the workstation at any time? What is the probability that there will be more than four jobs? [10]

OR

- 20 At what average rate a clerk at a super market work in order to ensure a probability of 0.90 that the customer will not have to wait longer than 12 minutes? It is assumed that there is only one counter to which customers arrive in a Poisson fashion at an average rate of 15 per hour. The length of service by the clerk has an exponential distribution. [10]