R18 Regulation *Subject code:2P7CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, May 2026

OPERATION RESEARCH

(ME)

Maximum Marks: 70 Date: 07.05.2026 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.
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)		Marks	CO	BTL
1	What is Operations research?	2M	1	L1
2	What is a model? List the various classification schemes of Operations Research models.	2M	1	L1
3	How the assignment problem can be viewed as a linear programming problem?	2M	2	L1
4	Distinguish between assignment and allocation problem.	2M	2	L1
5	What is dynamic programming?	2M	3	L1
6	Explain the characteristics of processing n jobs through two machines ?	2M	3	L1
7	What is dynamic programming?	2M	4	L1
8	Define assignment problem.	2M	4	L1
9	What is the main limitation of graphical method of linear programming?	2M	5	L1
10	What is the importance of queuing line theory in O.R?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	What are the characteristics and application of operation research?	10M	1	L2
	OR			
12	Minimize $Z=5x_1+4x_2+3x_3$ subject to the constraints $x_1+x_2+x_3 = 100$; $x_1 \leq 20$; $x_2 \geq 30$; $x_3 \leq 40$ and $x_1,x_2,x_3 \geq 0$ Use big M method.	10M	1	L2
13	Solve the following transportation problem.	10M	2	L2

	D1	D2	D3	D4	D5	Supply
S1	4	2	3	2	6	8
S2	5	4	5	2	1	12
S3	6	5	4	7	3	14
Demand	4	4	6	8	8	

	OR			

14	Three jobs are to be done by 4 machines. Each job can be assigned to one machine only. The cost of each job on each machine is given in the following table What are the job assignments which will minimize the total cost?	10M	2	L2
15	Find the sequence that minimizes the total elapsed time required to complete the following jobs.	10M	3	L2
	OR			
16	A truck owner finds from his past records that the maintenance cost per year of a truckwhose purchase price is Rs.8000, are given below: Year: Determine at what time it is profitable to replace the truck.	10M	3	L2
17	(a) Write down limitations of game theory. (b) Distinguish between deterministic and probabilistic games.	5M 5M	4	L2
	OR			
18	Find the sequence that minimizes the total time required to perform the following jobs on three machines in the order ABC.The processing time (in hours) are given below.	10M	4	L2

	M1	M2	M2	M4
J1	18	24	28	32
J2	8	13	17	19
J3	10	15	19	22

Processing times in hours

No. of jobs:	1	2	3	4	5	6
Machine A:	4	8	3	6	7	5
Machine B:	6	3	7	2	8	4

Year:	1	2	3	4	5	6	7	8
Maintenance cost (Rs):	1000	1300	1700	2200	2900	3800	4800	6000
Resale Price :	4000	2000	1200	600	500	400	400	400

Job	Machine A	Machine B	Machine C
1	4	9	14
2	13	7	15
3	6	5	10
4	3	7	13
5	10	4	9
6	12	2	14

19	In a telephone booth the arrival follow poisons distribution with an average of 9 minutes between two consecutive arrivals, The duration of a telephone call is exponential with an average of 3 minutes. (a) find the probability that a person arriving at the booth has to wait (b) Find the average queue length (c)The company will install a second booth if a customer has to wait for a phone for at least 4 minutes. If so find the increase in the flow of arrivals in order that another booth will be installed.	5M 5M	5	L2
	OR			
20	The owner of four fruit shops has purchased 6 boxes of apple .The quantity in demand and the profits are different at these sores .The following table gives the total profit at each store for various numbers of boxes allotted.	10M	5	L2

Number of boxes	Stores 1	Stores 2	Stores 3	Stores 4
0	0	0	0	0
1	4	2	6	2
2	6	4	8	3
3	7	6	8	4
4	7	8	8	4
5	7	9	8	4
6	7	10	8	4