R20 Regulation *Subject code:3P5CD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, December 2024

OPERATIONS RESEARCH

(ME)

Maximum Marks: 70 Date:03.01.2025 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)		CO	Bloom Tx
1	Explain phases of operations research.	1	L1
2	Give the limitations of graphical method of solving LPP.	1	L1
3	Explain the use of vogel's approximate method?	2	L1
4	Define saddle point game	2	L1
5	Give the advantages of sequencing in a flow shop manufacturing.	3	L1
6	What is meant by inventory control?	3	L1
7	State the rule of dominance.	4	L1
8	What are types of inventories?	4	L1
9	What is an assignment problem?	5	L1
10	What is waiting time in queuing theory?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Solve the following LPP by using simplex method. Maximize $Z = 2X_1+X_2$ Subject to the constraints $4X_1+3X_2 \leq 12$ $4X_1 + X_2 \leq 8$, $x_1, x_2 \geq 0$ (10M)	1	L3
	OR		
12	Explain the graphical method of solving a linear programming problem with an example. [10M]	1	L3
13	Solve the following transportation and obtain IBFS and OBFS.	2	L3

	D1	D2	D3	D4	Supply
O1	5	3	6	2	19
O2	4	7	9	1	37
O3	3	4	7	5	34
Demand	16	18	31	25	90

[10M]

	OR			
14	Solve the following travelling salesman problem. [10M] ∞ 3 6 2 3 3 ∞ 5 2 3 6 5 ∞ 6 4 2 2 6 ∞ 6 3 3 4 6 ∞		2	L3
15	Machine A costs Rs 9000. Annual operating cost is Rs 200 for the first year and then increase by Rs 2000 every year. Determine the year of replacement and average total cost that year. Machine B costs Rs 10000. Annual operating cost is Rs 400 for the first year and then increase by Rs 800 every year. You have a machine A, which is one year old. Should you replace it with B? If so, when? [10M]		3	L3
	OR			
16	Six jobs go first over Machine-1 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. Find the Optimal total time and the idle times of the machine. [10M] Job 1 2 3 4 5 6 Machine I 5 9 4 7 8 6 Machine II 7 4 8 3 9 5		3	L3
17	Reduce the following game by dominance and find the game value. [10M] Player B I II III IV Player A I 3 2 4 0 II 3 4 2 4 III 4 2 4 0 IV 0 4 0 8		4	L3
	OR			
18	a) Define EOQ and Explain the concept of EOQ with various costs. [7M] (b) Discuss the types of inventory and give examples. [3M]		4	L3
19	Discuss the concept of dynamic programing with an example. [10M]		5	L2
	OR			
20	A tax-consulting firm has 3 counters in its office to receive people who have problems concerning their income, wealth and sales taxes. On an average 48 persons arrive in an 8 hour day. Each Tax advisor spends 15 minutes on the average on an arrival. If the arrivals are Poisson distributed and service times are according to exponential distribution, find (i) Average number of customers in the system. (ii) Average time a customer spends in the system. (iii) Average waiting time for a customer in the queue. (iv) The probability that a customer has to wait before he gets service. [10M]		5	L3