R18 Regulation *Subject code:2P7CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, December 2024

OPERATIONS RESEARCH

(ME)

Maximum Marks: 70 Date:30.12.2024 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)		CO	BTL
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	Give the applications of dynamic programming	5	L1
10	Describe the various elements of the queue.	5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Solve the following Linear programming problem by Big-M method? [10M] Maximize $Z=X_1+2X_2+3X_3-X_4$ and subject to constraints $X_1+2X_2+3X_3=15$, $2X_1+X_2+5X_3=20$, $X_1+2X_2+X_3+X_4=10$ and $X_1,X_2,X_3,X_4\geq 0$.	1	L2
	OR		
12	Explain the graphical method of solving a linear programming problem with an example. [10M]	1	L2
13	Obtain an initial basic feasible solution to the following transportation problem using North-West corner rule. [10M]	2	L2

		D1	D2	D3	D4	D_5	Supply		
	O1	2	11	10	3	7	4		
	O2	1	4	7	2	1	8		
	O3	3	9	4	8	12	9		
	Demand	3	3	4	5	6			
	OR								
14	a. Briefly explain the Hungarian Method procedure with example. Also write the assumption. [5M] b. Give the generalized mathematical formulation of an assignment problem. [5M]							2	L2
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	L2
	OR								
16	There are 7 jobs each of which to go through the Machines A and B in the order A,B. The Processing time in hours are given below. [10M] Machines/ Job: 1 2 3 4 5 A: 3 12 15 6 10 11 9 B: 8 10 10 6 12 1 3 Determine a sequence of these jobs that will minimize the total elapsed time. Also find the idle time of machines.							3	L2
17	solve the following game using dominance principle. [10M]							4	L2

		Player B			
		1	2	3	4
Player A	I	19	6	7	5
	II	7	3	14	6
	III	12	8	18	4
	IV	8	7	13	-1

	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	L2
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	L2