BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - IV Computer Science & Business Systems : SUMMER : 2025
SUBJECT: OPERATIONS RESEARCH

Day : Friday
Date : 06/06/2025

S-24159-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** is allowed.

Q.1 Explain in detail the methodology to solve the operation research problem. **(10)**

OR

Q.1 Explain in detail the different types of mathematical models used in operation research. **(10)**

Q.2 Solve the following Linear Programming (LP) by using graphical method. **(10)**

Maximize $Z = 3x_1 + 4x_2$

Subjected to $5x_1 + 4x_2 \le 200$

$3x_1 + 5x_2 \le 150$

$5x_1 + 4x_2 \ge 100$

$8x_1 + 4x_2 \ge 80$

$x_1, x_2 \ge 0$

OR

Q.2 Use Simplex method to solve the following problem. **(10)**

Maximize $Z = 4x_1 + 3x_2 + 6x_3$

Subject to $2x_1 + 3x_2 + 2x_3 \le 440$

$4x_1 + 3x_3 \le 470$

$2x_1 + 5x_2 \le 430$

$x_1, x_2, x_3 \ge 0$

Q.3 What is MODI method? Describe the method stepwise. **(10)**

OR

Q.3 Solve the following assignment problem using Hungarian method. The matrix entries represent the processing turns in hours. **(10)**

	a	b	c	d	e
1	9	11	14	11	7
2	6	15	13	13	10
3	12	13	6	8	8
4	11	9	10	12	9
5	7	12	14	10	14

P. T. O.

Q.4 Draw a network to represent the project and find the minimum time of completion of the project when time, in days, of each task is as follows: **(10)**

Task	Precedence	duration (days)
A	-	8
B	-	10
C	-	8
D	A	10
E	A	16
F	B,D	17
G	C	18
H	C	14
I	F,G	9

Also identify the critical path.

OR

Q.4 Explain the different between PERT and CPM and also explain crashing in projects. **(10)**

Q.5 Discuss in detail with neat sketch the Economic Order Quantity when stock replenishment is non-instantaneous along with assumptions. **(10)**

OR

Q.5 A particular item has a demand of 8000 units / year. The cost of one procurement is Rs. 90 and the holding cost per unit is Rs. 2.60 per year. The replacement is instantaneous and no shortages are allowed. Determine the economic lot size, the number of order per year, the time between order and the total cost per year if the cost of one unit is Rs. 1. **(10)**

Q.6 Discuss the operating characteristic, assumption and limitations of Queuing model? **(10)**

OR

Q.6 The bakery keeps a record of sales of the number of cake of a certain type information relating to 200 days sales is **(10)**

Demand (no. of cakes)	5	6	7	8	9	10	11	12	**Total**
No. of days	4	10	16	50	62	38	12	8	**200**

The random number given are
61, 74, 24, 03, 39, 16, 84, 92, 52, 07.
Determine the demand for first 10 days.

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