BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)

B. Tech. Sem - IV COMPUTER SCIENCE & BUSINESS SYSTEMS : SUMMER : 2024

SUBJECT: OPERATIONS RESEARCH

Day : Friday
Date : 07/06/2024

S-24159-2024

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 non-programmable **CALCULATOR** is allowed.
4) Draw neat labeled diagrams **WHEREVER** necessary.
5) Assume suitable data, if necessary.

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

OR

Q.1 Explain in detail the characteristics and phases of operations research. **(10)**

Q.2 Solve the following LPP using the simple method. **(10)**

maxinze $z = 12x_1 + 16x_2$

Subjected to $10x_1 + 20x_2 \leq 120$

$8x_1 + 8x_2 \leq 80$

$x_1, x_2 \geq 0$

OR

Q.2 Solve the following problem using graphical method **(10)**

maxinze $z = 2x_1 + x_2$

Subjected to $x_1 + 2x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1 - 2x_2 \leq 1$

$x_1, x_2 \geq 0$

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

		Operation				
		1	2	3	4	5
Jobs	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

OR

Q.3 Explain in detail the north west corner rule to find the initial basic feasible solution and UV method to get the optional solution. **(10)**

P.T.O.

Q.4 A project schedule has following characteristics. (10)

Activity	Time (weeks)	Activity	Time (weeks)
1-2	4	5-6	4
1-3	1	5-7	8
2-4	1	6-8	1
3-4	1	7-8	2
3-5	6	8-10	5
4-9	5	9-10	7

Construct the network diagram. Calculate the EST and LFT for each event. Find the critical path.

OR

Q.4 Explain in detail the procedure to solve to PERT problem step wise. Also explain in detail the use of work breakdown structure in operation research. (10)

Q.5 A stockiest has to supply 10,000 units of a product per year to his customers. The demand is fixed and known. The shortage cost is assumed to be infinite. The inventory holding cost is Rs. 0.25 per unit per month and the order cost per order is Rs. 325. Determine. (10)

i) The optimal lot size.
ii) The optimal scheduling period.
iii) Minimum total variable yearly cost.

OR

Q.5 A company has a demand of 10,000 unit/year for on item and it can produce 2500 such unit per month. The cost of one set up is Rs 400 and the holding cost/unit/month is Rs. 0.20. Find the optimal lot size, total cost per year and optimal time interval. Assume cost of 1 unit as Rs. 5. (10)

Q.6 Explain in detail simulation and process of simulation. (10)

OR

Q.6 On an average, 6 customers reach a telephone booth every hour to make calls. Determine the probability that exactly 4 customers will reach in 30 minute period. Assuming that arrival follows Poisons distribution. (10)

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