Total No. of Questions : 10]

SEAT No. :

P3122

[Total No. of Pages : 4

[5154]-689

B.E. (Computer Engineering)

OPERATION RESEARCH FOR ALGORITHMS IN SCIENTIFIC APPLICATIONS

(2012 Pattern) (Elecitve-IV) (Open Elective) (EndSemester) (Semester - II) (410452B)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Define Operations Research and explain the methodology of Operations Research. **[5]**

b) What do you understand by Deterministic and Probabilistic models with reference to Operations Research. **[5]**

OR

Q2) a) Formulate the following problem as linear programming problem Let us consider a company making single product. The estimated demand for the product for the next four months are 1000,800,1200,900 respectively. The company has a regular time capacity of 800 per month and an overtime capacity of 200 per month. The cost of regular time production is Rs.20 per unit and the cost of overtime production is Rs.25 per unit. The company can carry inventory to the next month and the holding cost is Rs.3/unit/month the demand has to be met every month. Formulate a linear programming problem for the above situation. **[5]**

b) Solve following system of equation with graphical method. **[5]**

$x_1 + 7x_2 = 4$

$x_1 + 5x_2 = 5$

$2x_1 + 3x_2 = 9$ such that $x_1, x_2 > 0$.

P.T.O.

Q3) a) Solve following LP Problem using Simplex Method. **[5]**

Maximize $Z = 4x_1 + 3x_2$ subject to the constraints.

$8x_1 + 6x_2 \leq 25,\ 3x_1 + 4x_2 \leq 15$ and $x_1, x_2 \geq 0.$

b) Describe steps of Simplex algorithm for obtaining an optimal solution to a linear programming problem. **[5]**

OR

Q4) a) State the steps of solving Assignment Problem. **[5]**

b) Obtain an initial basic feasible solution, using the north-west corner rule for the following transportation problem. **[5]**

	Demand 1	Demand 2	Demand 3	Availability
Source 1	2	7	4	5
Source 2	3	3	1	8
Source 3	5	4	7	7
Source 4	1	6	2	14
Demand	7	9	18	34

Q5) a) Paraphrase summary of various types of queuing models. **[8]**

b) Solve the following game with Pay-off matrix. **[5]**

	B1	B2	B3	B4
A1	1	7	3	4
A2	5	6	4	5
A3	7	2	0	3

c) In a game of matching biased coins, player A gets Rs 8 if two heads turn up and Rs 1 if two tails turn up. Player B gets Rs 3 if it is otherwise. Solve the game. **[5]**

OR

Q6) a) Discuss with respect to game theory **[10]**

i) Two person Zero Sum Games.

ii) Games with Saddle Point.

iii) Games without Saddle Point.

iv) Dominance Property.

b) A TV repairing man finds that the time spent on repairing has an exponential distribution with mean 30 minutes per unit. The arrival of TV sets is Poisson with an average of 10 sets per day of 8 hours. What is his expected idle time per day? How many sets are there on the average? **[8]**

Q7) a) Describe following terminologies with PERT Chart **[8]**

i) Total Float.

ii) Free Float.

iii) Independent Float.

iv) Dummy Arrows in a network.

b) For the following activity data draw the network, find the critical path and float for each activity. **[8]**

Activity	1-2	1-4	2-3	3-5	3-8	4-8	5-6	5-8	6-7	7-8	7-9	8-9	9-10
duration	4	36	2	15	10	2	4	9	9	9	8	20	20

OR

Q8) a) Explain various application area of PERT / CPM techniques. **[8]**

b) Explain algorithm of finding critical path. **[8]**

Q9) a) What is Dynamic programming? Describe mathematical model of Bellman's Principal of optimality. **[8]**

b) Explain Mathematical formulation of Multistage Model. **[8]**

OR

Q10)a) What is importance of decision tree with respect to Dynamic Programming? State a sufficient condition for two stage optimization problem to be solved by Dynamic programming. **[8]**

b) Describe the recursive equation approach to solve dynamic programming problem. **[8]**

⊗⊗⊗