Total No. of Questions : 8]

SEAT No. :

P2344

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[5254]-679

B.E. (Computer Engineering)
OPERATIONS RESEARCH FOR ALGORITHMS IN SCIENTIFIC APPLICATIONS
(2012 Pattern)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) Discuss the scope of operation research in real world decision making problem? **[6]**

b) Explain Operation Research as tool for Decision Support System Give its one example? **[6]**

c) Solve the following LP Problem graphically. Maximize $Z = 2x_1+4x_2$ Subject to restrictions. **[8]**

$x_1 + 3x_2 \leq 3000,$

$x_1 + x_2 \leq 2500,$

$x_2 \leq 400$ and $x_1, x_2 \geq 0$

OR

Q2) a) How do you detect degeneracy, infeasibility and unboundedness in simplex iterations? **[6]**

b) Explain the transportation and Transshipment problems. **[6]**

c) Solve the following problem using the simplex method. **[8]**

Maximize

$Z = 3X_1 + 5X_2$

Subject to

$X_1 \leq 4$

$2X_2 \leq 12$

$3X_1 + 2X_2 \leq 18$

$X_1, X_2 \geq 0$

P.T.O.

Q3) a) All products manufactured are shipped out of the storage area at the end of the day. Therefore, the two products must share the total raw material, storage space and production time. The company wants to determine how many units of each product to produce per day to maximize its total income. **[8]**

b) Draw sketches to show unbounded solution and multiple optimal cases? **[6]**

c) Draw graph to show infeasibility and multiple optimal solution? **[3]**

OR

Q4) a) Explain the different decision rules usually adopted in context of decision-making. **[4]**

b) Differentiate slack, surplus and artificial variables? **[5]**

c) What is a queuing theory problem? Describe the advantages of queuing theory to a business executive with a view to persuading him to make use of the same in management. **[8]**

Q5) a) Explain the method of solving a zero-sum two person game as a linear programming problem. **[5]**

b) A project consist of a series or tasks labeled A,B,.....,H, I with the following relationship (W < X,Y, means X and Y cannot start until W is completed; X,Y < W means we cannot start until both X and Y are completed). With this notation, construct the network diagram having the following constraints: **[12]**

A < D, E; B, D < F; C < G; B < H; F, G < I.

Find also the optimum time of completion of the project, when the time (in days) of completion of each task is as follows:

Task	A	B	C	D	E	F	G	H	I
Time	20	6	22	14	20	16	17	2	12

OR

Q6) a) What is balanced transportation problem? What is its application? **[6]**

b) What is stepping stone transportation problem? **[5]**

c) Show that assignment model is a special case of transportation model. **[6]**

Q7) a) Explain single additive constraints, additively separable return model of dynamic programming. **[6]**

b) Discuss some important applications of queuing theory. **[5]**

c) Compare PERT and CPM. **[5]**

OR

Q8) Write short notes of the following: **[16]**

a) Guidelines for Network Construction.

b) Bellman's Principles of optimality.

c) Recent development on OR with perspective of Bio-Technology.