

The direct cost of project is Rs. 100 per day. Find the crashed duration of the project with the optimal total cost. 15

SECTION – IV

8. (a) Explain Monte Carlo simulation and its application in industries. 7
(b) Find the value of π experimentally by simulation. 7
(c) Define simulation and its advantages. Also discuss its application areas. 6
9. (a) Compare uncertainty and risk with suitable example. 5
(b) Explain expected value of perfect information (EVPI) with suitable example. 5
(c) Given the following payoff function for each act A and B,
$$Q_A = -25 + 40x$$
$$Q_B = -80 + 29x,$$

(i) Find the break even value of x .
(ii) If $x = 5$, which is the better act ?
(iii) If $x = 5$, what is the target of the poor strategy ?
(iv) If $x = -10$, which is the better act ?
(v) If $x = -10$, what is the target of the poor strategy ? 10

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Roll No.

24478

B. Tech. 7th Sem. (ME) Examination – June, 2016

OPERATION RESEARCH

Paper : ME-405-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question no. 1 is compulsory. Attempt five questions in total by selecting at least one question from each Section.

1. Discuss about following : $4 \times 5 = 20$
(a) Decision making under uncertainty
(b) Degeneracy in deterministic model
(c) Resource leveling in project
(d) Process generation in simulation

SECTION – I

2. (a) Discuss origin and development of operation research with suitable classification. 10

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(b) Discuss the principle and scopes of operation research. 10

3. (a) Describe the properties of Linear Programming Solution. 5

(b) Solve the LP problem graphically.

$$\text{Minimize } Z = 45X_1 + 55X_2$$

Subject to

$$X_1 + 2X_2 \leq 30$$

$$2X_1 + 3X_2 \leq 80$$

$$X_1 - X_2 \geq 8$$

$$X_1, X_2 \geq 0$$

15

SECTION - II

4. (a) Describe a mathematical model for transportation problem and discuss types of transportation problem with suitable examples. 15

(b) Discuss practical application of assignment model. 5

5. (a) Discuss the various relations regarding primal and dual problems. 5

(b) Consider the following LP problem and solve it using its dual solution :

$$\text{Minimize } Z = 40X_1 + 30X_2 + 25X_3$$

Subject to

$$4X_1 + 2X_2 + 5X_3 \geq 30$$

$$3X_1 + 6X_2 + X_3 \geq 20$$

$$X_1 + 3X_2 + 6X_3 \geq 36$$

$$X_1, X_2, X_3 \geq 0$$

15

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SECTION - III

6. (a) Discuss the terminology of queueing problem. 5

(b) Discuss in detail a deterministic queueing model. 5

(c) On the average 96 patients per 24 hour day require the service of an emergency clinic. Also on the average, a patient requires 10 minutes on active attention. Assume that the facility can handle only emergency at a time. Suppose that it costs the clinic Rs. 100 per patient treated to obtain an average servicing time of 10 minutes, and that each minute of decrease in this would cost the clinic Rs. 10 per patient treated. How much would have to be budgeted by the clinic to decrease the average size of the queue from $4/3$ patients to $1/2$ patients? 10

7. (a) State the common difficulties in using the network problem. 5

(b) Consider the details of a project given below in table :

Activity	Immediate Predecessor(s)	Normal Time (days)	Normal Cost (Rs.)	Crash Time (days)	Crash Cost (Rs.)
A	-	6	600	4	750
B	A	5	400	4	450
C	A	6	1200	3	1650
D	A	7	1000	4	1360
E	B	10	500	8	550
F	C, E	5	800	4	910
G	D	4	1500	3	1660

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(3)

P. T. O.