Dec-25-0233

ME-604

B.Tech. 6th (CBCS)

ME-604 (Operation Research)

Time : 3 Hours   **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from Unit I, II, III & IV. Question No. 9 is compulsory.

UNIT - I

1. Define operation research. Explain different techniques and tools of OR. (10)

2. Explain in detail the following OR models:
   - (a) Inventory models
   - (b) Routing models
   - (c) Allocation models
   - (d) Queuing models

   (4×2½=10)

UNIT - II

3. A firm manufactures two items. It purchases castings which are then machined, bored and polished. Castings for items A and B costs Rs. 2 and Rs. 3 respectively and are sold at Rs. 5 and Rs. 6 each respectively. Running costs of the three machines are Rs. 20, Rs. 14 and Rs. 17.50 per hour respectively. Capacities of the machines are:

	Part A	Part B
Machining Capacity	25/hr	40/hr
Boring Capacity	28/hr	35/hr
Polishing Capacity	35/hr	25/hr

Formulate the L.P. model to determine the product mix that maximizes the profit. (10)

4. Find the basic feasible solution of the following transportation problem by north - west corner rule. Also find the optimal transportation plan.

	1	2	3	4	5	Available
A	4	3	1	2	6	80
B	5	2	3	4	5	60
C	3	5	6	3	2	40
D	2	4	4	5	3	20
Required	60	60	30	40	10	200 Total

(10)

UNIT - III

5. A person repairing radios finds the time spent on the radio has exponential distribution with a mean of 20 mins. If the radios are repaired in the order in which they come in and their arrival is approximately Poisson with an average rate of 15 for 8-hour day, what is the repairman's expected idle time each day? How many jobs are ahead of the average set just brought in? (10)

6. In a game of matching coins, player A wins Rs. 2 if there are two heads, wins nothing if there are two tails and loses Rs. 1 when there are one head and one tail. Determine the payoff matrix, best strategies for the player and the value of game to A. (10)

UNIT - IV

7. Explain the following terms used in PERT:
   - (i) Optimistic time
   - (ii) Most likely time
   - (iii) Pessimistic time

   (3½+3½+3=10)

[P.T.O.]

8. Tasks A, B, C,......, H, I constitute a project. The precedence relationships are:

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

Draw a network diagram to represent the project and find the minimum time of completion of the project when time, in days, of each task is as follows:

Task	A	B	C	D	E	F	G	H	I
Time	8	10	8	10	16	17	18	14	9

Also identify the critical path.

(10)

(Compulsory)

9. a. Give two definitions of a model.

b. Differentiate between deterministic and probabilistic models?.

c. Write four advantages of linear programming method.

d. What is degeneracy in transportation problems?

e. Differentiate between balanced and unbalanced transportation problems.

f. What is looping in transportation problems?

g. Define a CPM and its two advantages.

h. What is a balanced assignment problem?

i. Mention two limitations of critical path.

j. What do you mean by slack?

(10×2=20)