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# MMS/M-17 13527

## MANAGEMENT SCIENCE

## CP-201

Time : Three Hours] [Maximum Marks : 70

**Note :** Attempt any *eight* questions from Section A (each of 5 marks) and any *three* questions from Section B (each of 10 marks).

### Section A

1. Highlight the essential characteristics of Management Science.

2. Discuss the assumptions and applications of Linear Programming.

3. Solve the following LPP graphically :

   Maximise $Z = 10x_1 + 15x_2$

   Subject to :

$$2x_1 + x_2 \leq 26$$

$$2x_1 + 4x_2 \leq 56$$

$$x_1 - x_2 \geq -5$$

$$x_1, x_2 \geq 0$$

4. Solve the following game :

| | | Player B | | | |
|---|---|---|---|---|---|
| | | $b_1$ | $b_2$ | $b_3$ | $b_4$ |
| Player A | $a_1$ | 3 | 2 | 4 | 0 |
| | $a_2$ | 3 | 4 | 2 | 4 |
| | $a_3$ | 4 | 2 | 4 | 0 |
| | $a_4$ | 0 | 4 | 0 | 8 |

5. Explain the motives for holding inventories and types of inventories.

6. Obtain an optimal solution for the following assignment problem :

**Time Taken (in minutes)**

| | | Jobs | | | |
|---|---|---|---|---|---|
| | | **A** | **B** | **C** | **D** |
| **Workers** | P | 45 | 40 | 51 | 67 |
| | Q | 57 | 42 | 63 | 55 |
| | R | 49 | 52 | 48 | 64 |
| | S | 41 | 45 | 60 | 55 |

7. Elaborate integer programming. Give an example each of a pure and a mixed integer linear programming problem.

8. Discuss the characteristics and limitations of PERT model.

9. Draw a network corresponding to the following information :

**Activity** : 1-2 1-3 2-6 3-4 3-5 4-6 5-6 5-7 6-7

**Duration (weeks)** : 4 6 8 7 4 6 5 9 10

Also determine the critical path.

10. Discuss the advantages and limitations of simulations.

## Section B

**11.** Solve the following LPP by Simplex Method :

Maximise $Z = 40x_1 + 35x_2$

Subject to

$$2x_1 + 3x_2 \leq 60$$
$$4x_1 + 3x_2 \leq 96$$
$$x_1, x_2 \geq 0$$

**12.** Solve the following transportation problem for maximising the total profit.

**Profit (Rs. per unit)**

| From \ To | P | Q | R | S | Supply |
|---|---|---|---|---|---|
| A | 12 | 10 | 12 | 13 | 500 |
| B | 7 | 11 | 8 | 14 | 300 |
| C | 6 | 16 | 11 | 7 | 200 |
| **Demand** | 180 | 150 | 350 | 320 | |

**13.** Discuss the methodology, scope and limitations of Management Science.

**14.** What is Waiting Line Theory ? What are its applications ? Discuss the general structure of a queuing system.

**15.** Write notes on the following :

(a) Sensitivity analysis

(b) Decision trees.