

2021

STATISTICS — HONOURS — PRACTICAL

Paper : DSE-B-1P

(Operations Research)

Full Marks : 30

The figures in the margin indicate full marks.

1. The advertising alternatives for a company include television, newspaper and radio advertisements. The cost for each medium with its audience coverage is given below.

| | Television | Newspaper | Radio |
|-----------------------------|------------|-----------|--------|
| Cost per advertisement (\$) | 2000 | 600 | 300 |
| Audience per advertisement | 100,000 | 40,000 | 18,000 |

The local newspaper limits the number of advertisements from a single company to ten. Moreover, in order to balance the advertising among the three types of media, no more than half of the total number of advertisements should occur on the radio. And at least 10% should occur on television. The weekly advertising budget is \$ 18,200. How many advertisements should be run in each of the three types of media to maximize the total audience? 14

2. Solve the assignment problem shown in the table below. The matrix entries are processing time of each man in hours. 7

| Job → | I | II | III | IV | V |
|-------|----|----|-----|----|----|
| 1 | 20 | 15 | 18 | 20 | 25 |
| 2 | 18 | 20 | 12 | 14 | 15 |
| 3 | 21 | 23 | 25 | 27 | 25 |
| 4 | 17 | 18 | 21 | 23 | 20 |
| 5 | 18 | 18 | 16 | 19 | 20 |

3. Solve the 3×3 game with the following payoff matrix to player A— 9

| | | B | | |
|---|-----|----|----|-----|
| | | I | II | III |
| A | I | −4 | 6 | 3 |
| | II | −3 | −3 | 4 |
| | III | 2 | −3 | 4 |
