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3 (Sem-3) STS M Pr

2017

STATISTICS

(Major Practical)

Paper : 3:3

Full Marks – 50

Time – Three hours

The figures in the margin indicate full marks for the questions.

PART- I

Answer any *four* questions taking *two* from each group.

GROUP – A

1. (a) Find the inverse of the matrix.

4

$$\begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 1 & 2 & 2 \end{bmatrix}$$

[Turn over

- (b) Determine the characteristic roots of the matrix. 3

$$A = \begin{bmatrix} 6 & 2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

2. (a) Find the rank of the matrix. 5

$$\begin{bmatrix} 1 & 2 & 3 & 1 \\ 2 & 4 & 6 & 2 \\ 1 & 2 & 3 & 2 \end{bmatrix}$$

- (b) Find the characteristic equation of the matrix. 2

$$\begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$$

3. Reduce the matrix : 7

$$A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$$

to the normal form.

4. Solve the system of linear equation : 7

$$x + y + z = 6$$

$$x + 2y + 3z = 14$$

$$x + 4y + 7z = 30$$

GROUP - B

5. Following table shows the result of throwing 12 fair dice 3500 times. A throw of 4, 5 or 6 being called a success. 8

Success	Frequency
0	—
1	6
2	85
3	218
4	426
5	624
6	856
7	746
8	354
9	132
10	45
11	8
12	—

Fit a binomial distribution and find the expected frequencies.

Either

6. The local authorities in a certain city install 10,000 electric lamps in the streets of a city. The lamps have an average life of 1000 burning hours with standard deviation 200 hours. Assuming normality, what number of electric bulbs might be expected to fail ? 8

(i) on the first 800 burning hours.

(ii) between 800 and 1200 burning hours.

(iii) After what period of burning hours would you expect that 10% of the bulbs will fail ?

Or

The following table gives baseball throws for a distance by 303 girls : 8

Distance in feet	No. of girls
15 - 25	01
25 - 35	02
35 - 45	07
45 - 55	25
55 - 65	33
65 - 75	53
75 - 85	64

Distance in feet	No. of girls
85 - 95	44
95 - 105	31
105 - 115	27
115 - 125	11
125 - 135	4
135 - 145	01

Fit a normal distribution and also find the expected frequencies.

7. Frequency distribution of mites on 150 leaves is shown in the following table : 8

No. of mites	No. of leaves
0	70
1	38
2	17
3	10
4	09
5	03
6	02
7	01
8 and above	0

Fit a negative binomial distribution to the above and compare the observed and theoretical frequencies.

PART - II

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|--------------------------|----|
| 8. Practical notebook. | 5 |
| 9. Viva voce. | 5 |
| 10. Internal Assessment. | 10 |