

PART - B (5 × 16 = 80 Marks)

11. (a) (i) A mathematics test was given to 50 girls and 75 boys. The girls made an average grade of 76 with an SD of 6 and the boys made an average grade of 82 with an SD of 2. Test whether there is any difference between the performance of boys and girls.
- (ii) Theory predicts the proportion of beans in the groups A, B, C, D as 9 : 3 : 3 : 1. In an experiment among beans the numbers in the groups were 882, 313, 287 and 118. Does the experiment support the theory?

OR

- (b) (i) 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test whether these two proportions are same.
- (ii) The IQ's of 10 girls are respectively 120, 110, 70, 88, 101, 100, 83, 98, 95, 107. Test whether the population mean IQ is 100.

12. (a) Three varieties of coal were analysed by 4 chemists and the ash content is tabulated here. Perform an analysis of variance. (16)

| | | Chemists | | | |
|------|-----|----------|---|---|---|
| | | A | B | C | D |
| Coal | I | 8 | 5 | 5 | 7 |
| | II | 7 | 6 | 4 | 4 |
| | III | 3 | 6 | 5 | 4 |

OR

- (b) The result of an RBD experiment on 3 blocks with 4 treatments A, B, C, D are tabulated here. Carry out an analysis of variance.

| Blocks | Treatment effects | | | |
|--------|-------------------|-----|-----|-----|
| I | A36 | D35 | C21 | B36 |
| II | D32 | B29 | A28 | C31 |
| III | B28 | C29 | D29 | A26 |

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13. (a) (i) Solve the following equations by Gauss elimination method :

$$2x + y + 4z = 12,$$

$$8x - 3y + 2z = 20,$$

$$4x + 11y - z = 33,$$

- (ii) Using power method find the dominant eigen value of the matrix

$$\begin{pmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{pmatrix}$$

OR

- (b) (i) If $A = \begin{pmatrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{pmatrix}$, find A^{-1} by Gauss-Jordan method.

- (ii) Solve the following equations by Gauss-Seidel method

$$x + y + 9z = 15,$$

$$x + 17y - 2z = 48,$$

$$30x - 2y + 3z = 75$$

14. (a) (i) Interpolate $y(12)$, if

$$x: \quad 10 \quad 15 \quad 20 \quad 25 \quad 30 \quad 35$$

$$y(x): \quad 35 \quad 33 \quad 29 \quad 27 \quad 22 \quad 14$$

- (ii) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by Simpson's (1/3) rule, dividing the range into four equal parts.

OR

- (b) (i) Find $y'(1)$, if

$$x: \quad -1 \quad 0 \quad 2 \quad 3$$

$$y(x): \quad -8 \quad 3 \quad 1 \quad 12$$

- (ii) Using Trapezoidal rule, evaluate $\int_1^2 \int_1^2 \frac{dx \cdot dy}{x+y}$ with $h = K = 0.5$.

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