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B.A. (Programme)/III   E

APPLICATION COURSE—BASIC STATISTICS

Time : 2 Hours   *Maximum Marks* : 55

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory.

Attempt *four* more questions from question

numbers **2** to **7** selecting at least one from each

of the Sections I, II and III. Full explanation is to

be given for these questions. Marks are indicated

against each question. Use of simple calculator is allowed.

Candidates can ask for Log/Statistical Tables

1. Short answers with proper justification are expected in all the
    five parts of this question. Each part is of 3 marks. 3×5= 15

    (*i*)   Find the variance for the probability distribution :

X	0	1	2	3
P(X)	1/8	3/8	3/8	1/8

(*ii*)   The average salary of male employees in a firm is Rs. 5,200 and that of females is Rs. 4,200. The mean salary of all employees is Rs. 5,000. Find the percentage of male and female employees.

(*iii*)   Find the probability distribution of the number of boys in families with 3 children, assuming equal probabilities for boys and girls.

(*iv*)   In case of normal population, define the simple and composite hypothesis on the basis of the following statements :

   (*i*)   Mean (μ) = 20, Variance (σ^2) = 5

   (*ii*)   Mean (μ) = 20, Variance (σ^2) > 1

(*v*)   Show that for a random variable X, $E(aX + b) = aE(X) + b$.

Section I

2. Find the median and the median class of the data given below : 10

Class Boundaries	Frequency
10—20	2
20—30	10
30—40	15
40—50	12
50—60	6
60—70	5

3. The following summations are given for 20 items :

$$\Sigma X^2 = 50, \ \Sigma X^2 = 80, \ \Sigma XY = 60, \ \Sigma X = 15 \text{ and } \Sigma Y = 10$$

Calculate the correlation coefficient and the regression equation of Y on X. 10

Section II

4. If the probability of defective bulbs produced by a machine is 0.4, find the probability that, out of 5 bulbs chosen at random : 10

(i) exactly 2 bulbs will be defective

(*ii*)   no bulb will be defective

(*iii*)   at most 1 bulb will be defective.

5.   The daily wages of 5000 women (in Rupees) in a city is found
to be normally distributed with mean 700 and standard
deviation 40. Find how many women are there whose daily
wages are :

(*i*)   more than Rs. 500   5

(*ii*)   less than Rs. 900   5

Section III

6.   The mean weekly sales of soap bars is departmental stores
was 146.3 bars per store. After an advertising campaign the
mean weekly sales in 22 stores for a typical week increased
to 153.7 and showed the standard deviation of 17.2. Was the
advertising campaign successful ?   10

7.   The contents of 7 similar containers of sulphuric acid are 9.8,
10.2, 10.4, 9..8, 10.0, 10.2 and 9.6 litres. Find 95% confidence
interval for the mean of all such containers assuming an
approximate normal distribution $t_{0.025}$ = 2.477.   10