

Time allowed : 3 hours] [Maximum marks : 40

Note : Attempt one question from each unit. Q. No. 9 is compulsory. Simple calculator is allowed.

Section-I

1. (a) Find real positive root of the equation $x^3 - 9x + 1 = 0$ by bisection method correct upto two places of decimal.
- (b) Find real root of the equation $x^3 + x^2 - 1 = 0$ by Newton-Raphson method, correct to three places of decimal.

92244-P-7-Q-9 (24)

[P.T.O.]

2. Evaluate $\int_0^2 \frac{1}{1+x^2} dx$ using

- (i) Trapezoidal rule, taking $h = \frac{1}{4}$
- (ii) Simpson's $\frac{1}{3}$ rd rule, taking $h = \frac{1}{4}$

Section-II

3. (a) A problem in statistics to be given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. What is the probability that the problem will be solved?
- (b) A number was drawn at random from the number 1 to 50. What is the probability that it will be a multiple of 2 or 3 or 10.
4. (a) One bag A contains 10 white and 3 black balls. Another bag B contains 3 white and 5 black balls. Two balls are transferred from bag A and put in to

92244

(3)

92244

the bag B and a ball is drawn from the bag B. Find the probability that the ball drawn is a white ball.

- (b) There are two urns. Urn I contains 1 white and 6 red balls. Urn II has 4 white and 3 red balls. One of the urn is selected at random and a ball is drawn from it and found to be white. What is the probability that is drawn from the 1st urn?

Section-III

5. (a) From the following data, calculate Karl Pearson's coefficient of correlation

X	2	3	4	5	6	7	8
Y	4	7	8	9	10	14	18

- (b) Find out the coefficient of correlation X and Y by the method of rank correlation :

X	46	56	39	45	54	58	36	40
Y	30	60	40	50	70	70	30	50

[P.T.O.]

92244

(4)

92244

6. (a) Given that $\bar{X} = 15$, $\bar{Y} = 12$, $\sum XY = 1500$, $\sigma_x = 6.4$, $\sigma_y = 9.0$, $N = 10$

Compute :

- (i) Two regression Coefficients

- (ii) Correlation coefficient between X and Y

- (b) Obtain the regression equation of Y on X from the following data :

X	78	89	97	69	59	79	68	61
Y	125	137	156	112	107	136	124	108

Section-IV

7. (a) A survey of 800 families with four children each revealed the following distribution :

No. of boys	0	1	2	3	4
No. of girls	4	3	2	1	0
No. of families	32	178	290	236	64

92244

(5)

92244

Is this result consistent with the hypothesis that male and female births are equally probable?

- (b) The heights of six randomly chosen sailors are (in inches) : 63, 65, 68, 69, 71 and 72. Those of 10 randomly chosen soldiers are 61, 62, 65, 66, 69, 69, 70, 71, 72 and 73. Discuss, the light that these data thrown on the suggestion that sailors are on the average taller than soldiers.

4

8. (a) The mean weekly sales of soap in 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 a standard deviation of 17.2. Was the advertising campaign successful?

92244

[P.T.O.]

(6)

92244

- (b) Write a short note on 'ANOVA' for one way classified data.

Section-V

(Compulsory Question)

9. (a) Define Quadrature.
- (b) Using Trapezoidal rule, evaluate $\int_0^1 x^3 dx$ taking 5 sub-intervals.
- (c) For two series X and Y, $\text{Cov}(X, Y) = 15$, $\text{Var}(X) = 36$, $\text{Var}(Y) = 25$. Calculate the coefficient of correlation.
- (d) A card is drawn out of a pack of cards. Find the probability that the card is an ace, a king, a queen or a card of clubs.
- (e) Write a short note on Analysis of variance two way classified data.

92244

- (f) Write a short note on estimation of a single proportion.
- (g) Define mutually exclusive events.
- (h) If $b_{yx} = -\frac{3}{2}$ and $b_{xy} = -\frac{1}{6}$, what is the value of Correlation Coefficient ?