

O.C.

**E 9104**

B.Sc. (Applied Science) DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Third Semester

Apparel and Fashion Technology

FT 3.2 — APPLIED STATISTICS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. The following table gives the monthly incomes of 10 employees in an office.  
Income (Rs.) 1780, 1760, 1690, 1750, 1840, 1920, 1100, 1810, 1050, 1950.  
Calculate the arithmetic mean of the income.
2. If covariance between X and Y is 10 and the variance of X and Y are 16 and 9, find the coefficient of correlation.
3. The probability that a boy will get a scholarship is 0.9 and that a girl will get is 0.8. What is the probability that atleast one of them will get the scholarship.
4. A coin is tossed six times. What is the probability of obtaining four or more heads?
5. Define  $\chi^2$  distribution.
6. Write two applications of  $t$ -distribution.
7. Define with an example "unbiased estimator".
8. Explain the term seasonal variations in time series.
9. Write a note on control chart.
10. Mention two advantages of statistical quality control.

PART B — (5 × 16 = 80 marks)

11. (i) Calculate the median and mode of : (8)

Central size :	15	25	35	45	55	65	75	85
Frequency :	5	9	13	21	20	15	8	3

- (ii) The following table shows the ages (X) and blood pressure (Y) of 8 persons : (8)

X :	52	63	45	36	72	62	47	25
Y :	62	53	51	25	79	43	60	33

Obtain the regression equations.

12. (a) (i) The following mistakes per page were observed in a book : (10)

Number of mistakes per page :	0	1	2	3	4
Number of times the mistakes occurred :	211	90	19	5	0

Fit a Poisson distribution to fit the data.

- (ii) State and prove addition theorem as probability. (6)

Or

- (b) (i) In a distribution exactly normal, 7% of items are under 35 and 39% are under 63. Find the mean and standard deviation. (8)

- (ii) State and prove Baye's theorem. (8)

13. (a) (i) For a random sample of 10 rats fed on a diet A another group of 12 rats fed on a different diet B, recorded the following increase in weight.

A :	10	6	16	17	13	12	8	14	15	19	lbs		
B :	7	13	22	15	12	14	18	8	21	23	10	17	lbs

Does it show the superiority of diet A over the diet B? (8)

- (ii) The following table gives the weight of chicks in two series A and B.

A :	9	18	14	16	10	15	13	13
B :	8	15	11	10	13	9		

Test whether the weights of the series A have the same variability as those of series B. (8)

Or

- (b) (i) A sample of 1600 leaves has a mean length of 5.4". Could it be reasonably regarded as a sample from a population of leaves whose mean is 5.25" and standard deviation is 2.6". (8)
- (ii) Two samples of sizes 300 and 400 are found to have the variance 5.85 and 7.29. Test the hypothesis that these two samples belong to the same population. (8)
14. (a) (i) Let  $X_1, X_2, \dots, X_n$  be a random sample from a uniform population on  $[0, \theta]$ . Find the sufficient estimator for  $\theta$ . (8)
- (ii) Find the ML estimator for  $\theta$  for  $f(x) = \theta x^\theta, 0 < x < 1$ . (8)

Or

- (b) Fit a second degree parabola to the following :

X:	4	6	8	9	10
Y:	10	11	13	17	20

Estimate Y when  $X = 12$ . (16)

15. (a) The following data refers to visual defects found during the inspection of the first 10 samples of size 50 each from a lot of two-wheelers manufactured by an automobile company.

Sample number :	1	2	3	4	5	6	7	8	9	10
Number of defects :	4	3	2	3	4	4	4	1	3	2

Draw the  $p$ -chart to show that the fraction of defectives are under control. (16)

Or

- (b) Draw an O.C. curve of the double sampling plan given that  $N = 1,000$ ,  $\pi_1 = 50$ ,  $C_1 = 1$ ,  $\pi_2 = 25$ ,  $C_2 = 2$ . (16)