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B.Sc. DEGREE EXAMINATION, MAY/JUNE 2006

Third Semester

Apparel and Fashion Technology

BFT 231 — APPLIED STATISTICS

(Regulation 2003)

Time : Three hours

Maximum : 100 marks

Use of statistical tables permitted

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is frequency distribution?

2. Explain the concept of multiple correlation. What is the range of multiple correlation coefficient R?

3. Define probability.

4. Define Binomial distribution. Give two examples.

5. What is standard error?

6. Write down the test criterion for testing the equality of means of two normal population with known and unequal variances based on large samples.

7. What is point estimation?

8. What is Time–series? Give two examples.

9. Write down the control limits for 'p' chart.

10. What is single sampling plan?

PART B — (5 × 16 = 80 marks)

11. (i) The following data refer to rate of diffusion of CO_2 through two kinds of soil with different porosity.

Through fine soil (f) :

20, 28, 23, 25, 29, 26, 24, 21, 29, 25

Through Coarse soil (c) :

18, 19, 16, 17, 18, 19, 12, 18, 17.

Examine whether there exists any significant difference in the average rate of diffusion of CO_2 between two soils (use α = .05)   (10)

   (ii) What is interval estimation? Derive 100 (1 – α) % confidence Interval for mean of a normal population with known variance σ^2 taking α = .05.   (6)

12. (a) (i) The following data refer to weights (in kg) of 55 students of a class.

52	83	42	74	50	46	75	121	60	85	125
60	90	53	100	76	49	65	129	62	52	112
75	110	68	110	104	50	82	80	60	90	113
82	111	66	69	110	48	110	75	70	92	95
90	120	72	49	120	52	120	62	80	82	92

Construct a suitable frequency distribution for the above data. (8)

(ii) The following are measurements on heights of soybean plants, a different random selection each week. (8)

Age in weeks : 1 2 3 4 5 6 7

Ht in centimeters : 5 10 16 23 33 38 40

Form the regression equation of height on Age of plants. Also predict the average height of plant at the age of 10 weeks of plants.

Or

(b) (i) Obtain mean and median for the following frequency distribution.

(8)

Profit in lakhs	0-2	2-4	4-6	6-8	8-10	10-12	12-14
No. of companies	2	4	8	20	10	4	2

(ii) Calculate the standard deviation for the following table giving the age distribution of 546 members. (8)

Age in years	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of members	3	61	132	157	140	51	2

Also find the co-efficient of variation and comment on variability of the distribution.

13. (a) (i) State and prove addition theorem on probability. (6)

(ii) In a bolt factory machines M–1, M–2 and M–3 manufacture respectively 25%, 35% and 40% of the total. Of their output, 5,4 and 2 percent are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine M–1, M–2 and M–3. (10)

Or

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(b) (i) Define probability distribution of a random variable X. A perfect coin is fossed three times successively. Obtain the probability distribution of no. of heads. (6)

(ii) Obtain the mean and variance of the Binomial distribution. (10)

14. (a) (i) What is sampling distribution? (6)

(ii) Define chi–square and obtain it's sampling distribution. (10)

Or

(b) (i) What are the various steps involved in test of significance? (8)

(ii) How will you carry out the test for testing the significant difference of two sample proportions in the case of large samples? (8)

15. (a) (i) Explain clearly what is meant by trend of a time series? Give two examples. (6)

(ii) Fit a parabolic curve of second degree to the data given below and estimate the value for 1984 and comment on it. (10)

Years :	1978	1979	1980	1981	1982
Sales in ('000 Rs)	10	12	13	10	8

Or

(b) (i) Explain the construction of 'C' chart. (8)

(ii) The number of defects in 20 pieces of cloth each of 100 meters length is given below

1, 3, 3, 1, 6, 4, 3, 7, 10, 2, 2, 4, 6, 4, 3, 2, 7, 1, 1, 5.

Draw the appropriate control chart and say whether the process can be considered to be in control. (8)