E 9237

B.Sc. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Third Semester

Apparel and Fashion Technology

BFT 231 — APPLIED STATISTICS

(Regulation 2003)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is dispersion? What are the various measures of dispersion?

2. What is multiple correlation?

3. Define probability.

4. Define Poisson distribution. Give four examples.

5. What is sampling distribution?

6. Write down the test criterion for testing the equality of means of two populations with variance $\sigma_1^2 = \sigma_2^2$ (known) in the large samples.

7. What is interval estimation?

8. Define Time series. What are the various components of time series?

9. What is control chart?

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

11. (i) The distribution of numbers of mistakes 150 students made in translating a certain passage from French to English.

Numbers of Mistakes	No. of Students
20–22	6
23–25	62
26–28	38
29–31	25
32–34	16
35–37	3

Find :

(1) the average no. of mistakes made per student and mode of the distribution of numbers of mistakes.

(2) the standard deviation of mistakes and the coefficient of variation. Also comment on your findings.

(ii) State and prove Baye's theorem.

12. (a) What is correlation? Explain positive correlation and negative correlation with examples.

Raw material used in the production of synthetic fiber stored in place which has no humidity control. Measurements of the relative humidity in storage place and the moisture content of a sample of the material (both in percentages) on 12 days yielded the following result.

Humidity	Moisture–content
(1)	(2)
53	11
37	11
42	13
34	10
29	8
60	17
44	12

Humidity	Moisture-content
41	10
48	15
33	9
40	13
46	12

Find the correlation between humidity and moisture content.

Or

(b) Define normal distribution. Sketch its graph. What are the properties of normal distribution?

13. (a) Describe two sample 't' test in detail.

Or

(b) Explain a test procedure for testing the equality of two populations proportions.

14. (a) What is trend? What are the various methods of measuring trend? Below are given the figures of production (in thousand of tons) of a Sugar factory.

Year (t) :	1975	1976	1977	1978	1979	1980	1981
Productions :	77	88	94	85	91	98	90

(i) Fit a straight line trend by method of least squares and obtain the trend values.

(ii) What is the monthly increase in production?

Or

(b) (i) Explain point estimation. What are the characteristics of point estimation?

(ii) Construct a 95% confidence interval for the mean of a normal distribution with unknown variance σ^2.

15. (a) (i) Explain in detail $\overline{X}$ and R charts. What purposes do they serve?

(ii) A machine is manufacturing mica discs with specified thickness between 0.008" and 0.015". Samples of size 4 are drawn every hour. Their thickness in units (1 unit = .001") are recorded as follows :

Sample No.	Thickness of mica discs			
1	14	8	12	12
2	11	10	13	8
3	11	12	16 ·	13
4	15	12	14	11
5	10	10	8	8

For the data set up an R chart and $\overline{X}$-chart. Plot the observed points and give comments. (For $n = 4$, $A_2 = 0.729$, $D_3 = 0$ and $D_4 = 2.282$).

Or

(b) (i) The following are the figures of defectives in 22 lots each containing 2000 rubber belts.

425, 430, 216, 341, 225, 322, 280, 306, 337, 305, 356, 402,

216, 264, 126, 409, 193, 326, 280, 389, 451, 420.

Draw control chart for fraction defective and comment on the state of Control of the process.

(ii) Explain what is single sampling plan and double sampling plan.

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