(6 pages)

OCTOBER 2011

P/ID 77502/PMBB/ PMB1B

Time : Three hours Maximum : 100 marks

PART A — (5 × 6 = 30 marks)

Answer any FIVE questions.

All questions carry equal marks.

1. Define conditional probability. Illustrate it with an example.

2. Distinguish between risk and uncertainty with suitable examples.

3. Distinguish between regression and correlation.

4. What is factor rotation? Explain its necessity.

5. Distinguish between consumer surplus and producer surplus.

6. List and explain the guidelines to prepare bibliography.

7. Explain profile graph in cluster analysis with a suitable example.

8. What are the types of hypothesis? Explain them with examples.

PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

All questions carry equal marks.

9. List and explain the approaches to probability.

10. A retail store desires to determine the optimal daily order size for a perishable item. The stores buys the perishable item at the rate of Rs. 60 per kg and sells at the rate of Rs. 90 per kg. If the order size is more than the demand. The excess quantity can be sold at Rs. 75 per kg in a secondary market. Otherwise, the opportunity cost for the store is Rs. 10 per kg for the unsatisfied portion of the demand. Based on the past experience, it is found that the demand varies from 50 kg to 200 kg in steps of 50 kg. The possible values of the order size are from 100 kg to 300 kg in steps of 100 kg. Determine the optimal order size which will maximize the daily profit of the store using (a) Laplace criterion (b) Maximin criterion.

11. A placement agency has conducted a competitive examination to create a potential database of applicants for the post of Quality Manager for their future recruitment. The classifications of the applicants who secured more than 80 percentile in the competitive examination are given below :

Check whether the present monthly salary is independent of the number of years of experience while grouping the applicants at a significance level of 0.05.

Summary of data of applicants

Present monthly salary (S)	No. of years of experience (n)		
(in thousands of Rs.)	$n < 2$	$2 < n < 5$	$5 < n$
$S < 10$	40	35	30
$10 < S < 14$	30	20	35
$14 < S < 18$	30	30	40
$18 < S$	35	40	35

12. Alpha Industries Limited has deputed four different batches of its employees to four different training organizations (A, B, C and D) for the

same training programme which aims to train them in improving their decision making skills. Each batch consists of five employees with similar qualifications and work experience. After the training programme, the company conducted a common examination to test their level of additional knowledge gained through the training programme. The percentage scores of the employees of the batches are summarized below :

Percentage scores of employees of batches in the examination training organization

A	*B*	*C*	*D*
80	70	65	90
90	60	50	89
96	55	58	85
85	85	55	95
70	90	40	80

Perform ANOVA to check whether there is significant difference between the training organizations in terms improving the decision making skills of the employees by assuming a significance level of 0.05.

13. What are the approaches of conjoint analysis? Explain the steps of any one of them.

14. Suppose a manufacturer can sell x items per week at a price, $P = 30 - 0.005x$ rupee each when it costs, $y = 4x + 1000$ rupees to produce x items. Determine the number of items he should produce per week for maximum profit.

15. What are the types of report? Explain them in brief.

16. The results of a survey on the sales of a product(Y) as a function of time period (X) are summarized below :

	X	Y
Mean	40	125
Standard deviation	2.5	16
Correlation coefficient (r)	0.85	

(a) Fit the regression line of Y on X and estimate the value of Y when X is 45

(b) Fit the regression line of X on Y and estimate the value of X when Y is 135.

PART C — (20 marks)

(Compulsory)

17. A District Industries Center (DIC) has collected data summarizing the number of industries in the district under each combination of R & D expenditure (in lakhs of rupees) and annual sales (in crores of rupees) as shown below. Find the correlation coefficient of this grouped data.

R & D Expenditure (in lakhs of rupees)

Annual sales (Crores of Rs.)	10–30	30–50	50–70
10 to 15	3	6	2
15 to 20	6	8	3
20 to 25	4	8	9
25 to 30	2	4	7