

(6 pages)

MAY 2014

**P/ID 77719/MBN2D/
MBS2D**

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 3 = 30 marks)

Answer any TEN questions.

1. Define Ogive curve? Give its graphical plot.
2. Define quartile deviation.
3. What is seasonal variation? Discuss its impact on forecasting.
4. What are operations of matrices? Illustrate any one of them with an example.
5. What is cost of living index?
6. A bin consists of 100 pieces of a component. It contains 10 defects. If a piece is taken from the bin, compute the probability that it is a good piece.
7. What is stratified sampling?
8. Distinguish between level of significance and level of confidence.
9. Explain the limits of a function.

10. Distinguish between differentiation and calculus.
11. Define range and give the formula for range.
12. Define skewness and explain its types.

SECTION B — (5 × 6 = 30 marks)

Answer any FIVE questions.

13. What is tabulation of data? Give its types and give examples.
14. The distribution of annual revenues of 100 firms in a district is presented below. Find the mode of the annual revenue of the firms.

Annual revenue (In crores of rupees)	Number of firms	Annual revenue (In crores of rupees)	Number of firms
Less than 6	10	14-16	4
6-8	12	16-18	5
8-10	25	18-20	3
10-12	28	More than 20	4
12-14	9		

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15. Consider two different businesses with equal initial investments and equal lives whose expected cash flows in crores are as summarized below.

Period	1	2	3	4	5
Business A	90	150	100	200	300
Business B	80	100	200	300	100

Identify the business which is more consistent in terms of the cash flow.

16. List the types of index number and explain the method of computing any one of such index numbers.
17. Construct the probability mass function of tossing 2 coins.
18. Explain the steps of cluster sampling.
19. Suppose a manufacturer can sell x items per week at a price, $P = 20 - 0.001X$ rupees each when it costs, $Y = 5X + 2000$ rupees to produce X items. Determine the number of items to be produced per week for maximum profit.

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20. The monthly income of respondents in a survey follows normal distribution with finite population size of 1000. The expected mean of the monthly income of the respondents of the population is Rs. 8,000. The variance of the monthly income of the respondents of the population is Rs. 3,00,000 lakhs. The researcher feels that the mean monthly income of the respondents has declined from the expected mean of Rs. 8,000 in the recent past. A random sample of 64 respondents is taken from the normal population for which the mean monthly income is found to be Rs. 8,750. Check whether the mean monthly income has declined from the expected mean of Rs. 8,000 at a significance level of 0.01?

SECTION C — (2 × 20 = 40 marks)

Answer any TWO questions.

21. A consultant to a multi-plant organization is studying the age of employees in two different plants (Plant-1 and Plant-2) for their relative difference. The variance of the age of employees in the Plant-1 is 64 and that of the employees in Plant-2 is Rs.81. The consultant feels that the age

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of the employees in the Plant-1 is more than that of the employees in the Plant-2. To test his intuition, he has selected a sample of 81 employees from the Plant-I and their mean age is found to be 45 years. Similarly, he has selected a sample of 64 employees from the Plant-2 and their mean age is found to be 48 years. Test the intuition of the consultant at a significance level of 0.05.

22. The distribution of the cost of machines in a company is as shown below.

Cost of machine (Rs. in lakhs)	No. of machines	Cost of machine (Rs. in lakhs)	No. of machines
Less than 1	20	4-5	40
1-2	25	5-6	10
2-3	45	6-7	6
3-4	50	More than 7	4

Determine the Coefficient of Skewness of the cost of the machines and offer your comment.

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23. 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.
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