

**THE KAVERY ENGINEERING COLLEGE**  
(An Autonomous Institution)

MBA DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

*First Semester*

*Master of Business Administration*

PMBT2401/BA4101 – Statistics for Management

All Statistical Tables can be Permitted

*Common to Regulations – 2021 & 2024*

*Duration : 3 Hrs*

*Maximum : 100 Marks*

**PART – A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)**

| Q.No | Questions                                                                                                                                                                    | BLT | CO | Marks |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-------|
| 1.   | A card is drawn from a pack of 52 cards and then a second card is drawn. What is the probability that both the cards drawn are king?                                         | RE  | 1  | 2     |
| 2.   | The mean of a binomial distribution is 20 and standard deviation is 4. Calculate n, p and q.                                                                                 | UN  | 1  | 2     |
| 3.   | Where do you apply central limit theorem?                                                                                                                                    | RE  | 2  | 2     |
| 4.   | What is point estimation?                                                                                                                                                    | RE  | 2  | 2     |
| 5.   | Define type II error in the testing of hypothesis.                                                                                                                           | RE  | 3  | 2     |
| 6.   | In a before-after experiment if two sets of observations are related, what type of statistical test should be employed? How would the test statistic be calculated? Explain. | UN  | 3  | 2     |
| 7.   | Under what conditions Chi-square test for goodness of fit is applicable? Explain.                                                                                            | UN  | 4  | 2     |
| 8.   | How would you conduct a run test? Explain.                                                                                                                                   | UN  | 4  | 2     |
| 9.   | Define coefficient of correlation.                                                                                                                                           | RE  | 5  | 2     |
| 10.  | Write a formula for standard error of estimate in a regression line.                                                                                                         | RE  | 5  | 2     |

**PART – B (ANSWER ALL QUESTIONS) (Marks 5\*13 = 65)**

| Q.No | Questions                                                                                                                                                                                                                                                                                                                                                                            | BLT | CO | Marks |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-------|
| 11.  | a i One bag contains five red and four blue balls. Another bag contains seven red and nine blue balls. A ball is transferred from the first bag to the second and then a ball is drawn from the second. Find the probability of getting that the ball is red.                                                                                                                        | UN  | 1  | 7     |
|      | ii A certain production process produces items that are 20% defective. Each item is inspected before being supplied to customers but the inspector incorrectly classifies an item 10% of the time. Only items classified as good are supplied. If 820 items in all have been supplied, how many of them are expected to be defective?                                                | UN  | 1  | 6     |
|      | Or                                                                                                                                                                                                                                                                                                                                                                                   |     |    |       |
|      | b i In a certain factory turning out blades, there is a small chance of 1/500 for any blade to be defective. The blades are supplied in a packets of 10. Use Poisson distribution to calculate the approximate number of packets containing no defective, one defective, two defective and three defective blades in a consignment of 10,000 packets. [Given, $e^{-0.02} = 0.9802$ ] | AP  | 1  | 8     |
|      | ii Explain the properties of a normal curve.                                                                                                                                                                                                                                                                                                                                         | UN  | 1  | 5     |

12. a Classify various probability sampling techniques by giving their merits and demerits. UN 2 13

Or

- b i A factory is manufacturing 50,000 pairs of shoes daily. From a sample of 500 pairs, 2% were found to be of substandard quality. Identify the number of pairs that can be reasonably expected to be spoiled in the daily production and assign limits at 95% level of confidence. AP 2 7
- ii The business manager of a large company wants to check the inventory records against the physical inventories by a sample survey. He wants to almost assure that the maximum sampling error should not be more than 5% or below the true proportion of accurate records. The proportion of the accurate records is estimated at 35% from past experience. Identify the sample size. AP 2 6
13. a A company is interested in considering two different television advertisements for the promotion of a new product. The management believes that advertisement A is more effective than advertisement B. Two test market areas were selected. Advertisement A is used in one area and Advertisement B in the other area. In a random sample of 60 consumers who saw advertisement A, 18 tried the product. In a random sample of 100 consumers who saw advertisement B, 22 tried the product. Does this indicate that advertisement A is more effective than advertisement B, if a 5% level of significance is used? Test the hypothesis. AN 3 13

Or

- b The following are the number of words per minute which a secretary typed on several occasions on three different typewriters. AN 3 13

|              |    |    |    |    |    |    |    |    |
|--------------|----|----|----|----|----|----|----|----|
| Typewriter 1 | 71 | 78 | 70 | 69 | 77 | 72 | 65 | 69 |
| Typewriter 2 | 74 | 76 | 72 | 70 | 69 | 68 | 72 | 73 |
| Typewriter 3 | 70 | 72 | 66 | 64 | 63 | 67 | 69 | 70 |

Test whether the differences among the mean of the three typewriters can be attributed to chance. Using a 5% level of significance, perform a one-way ANOVA to examine the hypothesis.

14. a A sample of 870 trainees was subjected to different types of training classified as intensive, good and average. Their performance was noted as above average, average and poor. The resulting data is presented in the table below. Use a 5% level of significance to examine whether there is any relationship between the type of training and performance. AN 4 13

| Performance   | Training  |      |         |
|---------------|-----------|------|---------|
|               | Intensive | Good | Average |
| Above Average | 100       | 150  | 40      |
| Average       | 100       | 100  | 100     |
| Poor          | 50        | 80   | 150     |

Or

- b Three machines are used in the packaging of 10 kg of wheat flour. Each machine is designed so as to pack on an average 10 kg of flour per bag. Samples of six bags were selected from each machine and the amount of wheat packaged in each bag is shown below: AN 4 13

|           |      |      |      |      |      |      |
|-----------|------|------|------|------|------|------|
| Machine 1 | 15.8 | 15.9 | 16.2 | 15.7 | 16.3 | 15.8 |
| Machine 2 | 16.5 | 16   | 15.4 | 15.9 | 16.2 | 16.1 |
| Machine 3 | 15.7 | 16.4 | 16.2 | 15.9 | 15.7 | 16.3 |

Use a 5% level of significance to test the hypothesis that the amount of wheat packaged by the three machines is the same.

15. a Calculate the coefficient of correlation for the following pairs of values of X and Y: AP 5 13

|   |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|
| X | 17 | 19 | 21 | 26 | 20 | 28 | 26 | 27 |
| Y | 23 | 27 | 25 | 26 | 27 | 25 | 30 | 33 |

Or

- b i For the following data, calculate the coefficient of Rank Correlation: AP 5 6

|   |     |     |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|-----|-----|
| X | 80  | 91  | 99  | 71  | 61  | 81  | 70  | 59  |
| Y | 123 | 135 | 154 | 110 | 105 | 134 | 121 | 106 |

- ii Fit a straight line of Y on X from the following data: UN 5 7

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Y | 2 | 1 | 3 | 2 | 4 | 3 | 5 |

*PART - C (Marks 1\*15 = 15)*

| Q.No | Questions | BLT | CO | Marks |
|------|-----------|-----|----|-------|
|------|-----------|-----|----|-------|

16. a The following table presents the number of the defective pieces produced by three workmen operating in turn on three different machines AN 3 15

|           | Machine 1 | Machine 2 | Machine 3 |
|-----------|-----------|-----------|-----------|
| Workman 1 | 27        | 34        | 23        |
| Workman 2 | 29        | 32        | 25        |
| Workman 3 | 22        | 30        | 22        |

Conduct a two-way ANOVA to test at 5% level of significance, whether:

- The difference among the means obtained for the three workmen can be attributed to chance.
- The differences among the means obtained for the three machines can be attributed to chance.

Or

- b Find the two lines of regression from the following data: UN 5 15

|   |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|
| X | 57 | 58 | 59 | 59 | 60 | 61 | 62 | 64 |
| Y | 67 | 68 | 65 | 68 | 72 | 72 | 69 | 71 |

Find the estimate for Y when X = 66.