

Reg. No. : 

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

**Question Paper Code : 12038**

M.B.A. DEGREE EXAMINATIONS, JANUARY 2022.

First Semester

**BA 4101 – STATISTICS FOR MANAGEMENT**

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

(Use of Statistical Tables may be permitted)

1. State mathematical definition of Probability.
2. If  $npq = 2$ , and  $np = 4$  then find  $n$ ,  $p$  and  $q$  values in Binomial distribution.
3. What is meant by sampling distribution?
4. Find sample size  $n$ , if Standard error = 5 and Standard deviation = 10.
5. Write the formula for  $F$  statistics for the variance comparison.
6. How do you identify whether the sample size is small or large?
7. State two uses of Chi-Square test.
8. Kruskal-Wallis test is equivalent to ANOVA. Why?
9. State the formula for Rank correlation when ranks are repeated.
10. Why is method of least square called so?

PART B — (5 x 13 = 65 marks)

11. (a) A full quality inspection has taken place, and the following table gives the number of production units observed.

|         | Defective found | Non-defectives |
|---------|-----------------|----------------|
| Plant A | 30              | 120            |
| Plant B | 10              | 140            |

From the above lot of production, one item is selected as random sample. Find the probability that it is

- (i) From Plant A
- (ii) Defective
- (iii) Defective and the product is from plant A.
- (iv) If Plant A is alone taken for the inspection, what is the probability of randomly chosen one to be defective? (13)

Or

- (b) An Ebook chapter contains approximately 10000 words and of which 0.0001 be the chance of being a wrong word. Find the average number of wrong words in a book chapter. Suppose, that Ebook is open and a randomly found Chapter is counted for wrong words, what is the chance that it contains

- (i) no wrong word
- (ii) at least one wrong word. (13)

12. (a) State and explain Central limit theorem with its applications. (13)

Or

- (b) Explain Interval estimation with an example. (13)

13. (a) Some researches claim that 98% of the billionaires are introvert. To test the same, a survey is taken in TamilNadu with 1000 rich people and found that 900 of them are introverts. Frame the appropriate hypothesis and test the claim at 5% level of significance. (13)

Or

- (b) A set of 120 samples are examined and allocated under four groups as shown below:

|           |    |    |    |    |
|-----------|----|----|----|----|
| Brand I   | 0  | 4  | 8  | 15 |
| Brand II  | 5  | 8  | 13 | 6  |
| Brand III | 18 | 19 | 11 | 13 |

Test at 5% level of significance if the difference in the three brands are significant. (13)

14. (a) The Caffeine content of two brands of Coffee was found to be as follows:
- |         |     |     |     |     |     |     |     |     |     |     |  |  |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Brand A | 2.1 | 4.0 | 6.3 | 5.4 | 4.8 | 3.7 | 6.1 | 3.3 |     |     |  |  |
| Brand B | 4.1 | 0.6 | 3.1 | 2.5 | 4.0 | 6.2 | 1.6 | 2.2 | 1.9 | 5.4 |  |  |

Test the hypothesis that the average caffeine content of the two brands are equal against the alternative hypothesis that they are unequal. (13)

Or

- (b) Fit a Poisson distribution to the following data and test the goodness of fit at 5% level of significance (13)

|      |     |     |     |    |    |
|------|-----|-----|-----|----|----|
| $x:$ | 0   | 1   | 2   | 3  | 4  |
| $f:$ | 419 | 352 | 154 | 56 | 19 |

15. (a) Find Karl Pearson coefficient of Correlation for the following data: (13)

|                                      |     |     |     |     |     |    |
|--------------------------------------|-----|-----|-----|-----|-----|----|
| Price of the product<br>(Rs. 1000 s) | 1   | 2   | 3   | 4   | 5   | 6  |
| Sale in numbers ('000)               | 300 | 250 | 200 | 150 | 100 | 50 |

Or

- (b) Fit a line  $y = ax + b$  using the method of least squares for the data below.

|     |   |   |   |   |   |
|-----|---|---|---|---|---|
| $x$ | 0 | 1 | 2 | 3 | 4 |
| $y$ | 2 | 3 | 5 | 4 | 6 |

Estimate the value of  $y$  when  $x = 10$ . (13)

PART C — (1 × 15 = 15 marks)

16. (a) Sale per day in an Ecommerce website follows normal distribution with the mean of 50 crores and SD of 10 crores Rupees. A day sale is chosen at random, what is the probability that it is (i) less than 40 crores (ii) less than 60 crores (iii) between 40 crore and 60 crore rupees. (iv) Above 60 crores. If 100 days sale is taken, how many days the sale per day lies between 40 crore and 60 crore rupees? (15)

Or

- (b) A job satisfaction survey has been conducted in police department and tabulated the data in the following table,

| Gender | Satisfied with the job | Not satisfied |
|--------|------------------------|---------------|
| Male   | 450                    | 550           |
| Female | 150                    | 850           |

Apply chi-square test whether there is an association between the Gender and Job satisfaction. Which groups has more Job satisfaction? (Use 5% level of significance). (15)