D 122350 **(Pages : 6)** **Name.....**

Reg. No.....

SECOND SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2025

(CBCSS)

Economics

ECO2C08—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Part A

Multiple Choice Questions.
Answer **all** *questions.*
Each question carries 1/5 *weightage.*

1. The power set of a set A is defined as :

   (a) The set containing all the elements of A.

   (b) The set containing all the proper subsets of A.

   (c) The set containing all the subsets of A, including A itself.

   (d) The set containing all the elements except A.

2. Type I error is also known as :

   (a) False positive. (b) False negative.

   (c) True positive. (d) True negative.

3. The number of accidents occurring on a particular road follows a Poisson distribution with an average rate of 0.5 accidents per day. What is the probability of having no accidents on a given day ?

   (a) 0.091. (b) 0.181.

   (c) 0.303. (d) 0.612.

Turn over

4. The Kruskal-Wallis test is a non-parametric alternative to :

   (a) Independent *t*-test. (b) Paired *t*-test.

   (c) One-way ANOVA. (d) Chi-square test.

5. The maximum likelihood estimator is :

   (a) The parameter value that maximizes the likelihood function.

   (b) The parameter value that minimizes the iikelihood function.

   (c) The parameter value that maximizes the sum of squared residuals.

   (d) The parameter value that minimizes the sum of squared residuals.

6. A box contains 10 black balls and 8 white balls. If 6 balls are drawn with replacement, what is the probability of getting exactly 4 black balls ?

   (a) 0.213. (b) 0.246.

   (c) 0.295. (d) 0.344.

7. The *p*-value in ANOVA represents :

   (a) The probability of obtaining the observed F-statistic or a more extreme value, assuming the null hypothesis is true.

   (b) The probability of obtaining the observed F-statistic or a less extreme value, assuming the null hypothesis is true.

   (c) The probability of obtaining the observed F-statistic, regardless of the null hypothesis.

   (d) The probability of obtaining a statistically significant result.

8. The area under the probability density function (PDF) of a continuous probability distribution represents :

   (a) The probability of a specific outcome.

   (b) The cumulative probability up to a certain value.

   (c) The mean of the distribution.

   (d) The variance of the distribution.

9. The Law of Large Numbers is important in statistics because it provides a theoretical justification for :

   (a) Estimating population parameters from sample data.

   (b) Conducting hypothesis tests.

   (c) Calculating p-values.

   (d) Generating random numbers.

10. A survey found that out of 500 randomly selected people, 80 % preferred brand X over brand Y. What is the 95 % confidence interval for the population proportion of people who prefer brand X ?

   (a) (0.756, 0.824). (b) (0.770, 0.810).

   (c) (0.784, 0.796). (d) (0.795,0.805).

11. A box contains 5 red balls, 3 green balls, and 2 blue balls. In how many ways can 3 balls be chosen from the box ?

   (a) 60. (b) 120.

   (c) 84. (d) 56.

12. Efficiency in estimation refers to :

   (a) How close the estimator is to the true population parameter.

   (b) The variability of the estimator.

   (c) The unbiasedness of the estimator.

   (d) The precision of the estimator relative to other estimators.

13. The degrees of freedom for a chi-square distribution depend on :

   (a) The sample size.

   (b) The number of groups being compared.

   (c) The level of significance.

   (d) The type of statistical test being performed.

14. The central limit theorem states that as the sample size increases, the sampling distribution of the sample mean :

    (a) Becomes more skewed.

    (b) Becomes more platykurtic.

    (c) Becomes more leptokurtic.

    (d) Approaches a normal distribution.

15. Let X and Y be two independent random variables with expectations E [X] = 7 and E [Y] = 5. What is the expectation of their product, E [XY] ?

    (a) 12. (b) 35.

    (c) 42. (d) 60.

(15 × 1/5 = 3 weightage)

Part B (Very Short Answer Questions)

Answer any **five** *questions.*

Each question carries a weightage of 1.

16. What are moments ?

17. Define the uniform distribution.

18. What is the F distribution ?

19. What is the level of significance ?

20. What is the explained sum of squares ?

21. What is a sign test ?

22. Define Point estimation.

23. What is the students' *t*-test ?

(5 × 1 = 5 weightage)

Part C (Short Answer Questions)

Answer any **seven** *questions.*

Each question carries a weightage of 2.

24. Describe the Bayes' Theorem.

25. Discuss the salient features of the Poisson distribution.

26. What is Z-test used for ?

27. Distinguish between the Type I and Type II error.

28. What is the significance of the two-way ANOVA in statistical analysis ?

29. What is the chi-square test for independence of attributes used for ?

30. A researcher wants to investigate the relationship between the number of hours students spend studying and their exam scores. The researcher collects data from a sample of 10 students and records the number of hours studied (independent variable) and the corresponding exam scores (dependent variable). The data are as follows :

Hours studied	:	5	3	7	6	4	8	2	9	7	6
Exam scores	:	70	65	80	75	68	85	60	90	82	78

Calculate the correlation co-efficient between the number of hours studied and exam scores.

31. What is the significance of moments ?

32. Distinguish between point and interval estimators.

33. Discuss the central limit theorem.

(7 × 2 = 14 weightage)

Part D (Essay Type Questions)

Answer any **two** *questions.*
Each question carries a weightage of 4.

34. Discuss in detail how the Exponential Distribution is used as a tool for Modeling.

35. Discuss the principles of the method of least squares.

36. Explain The Wilcoxon Mann-Whitney U Test.

Turn over

37. A study was conducted to compare the effects of three different exercise programs on weight loss. Three groups of participants were randomly assigned to each exercise program, and their weight loss results were recorded. The following data were obtained :

Group 1 : 4, 6, 5, 7, 3

Group 2 : 2, 3, 4, 2, 5

Group 3 : 6, 5, 3, 4, 7

At a 5 % level of significance, test whether there is a significant difference in the average weight loss among the three exercise programs.

(2 × 4 = 8 weightage)