K24P 4005

Reg. No. : .....

Name : .....

I Semester M.A. Degree (C.B.S.S. – Supplementary) Examination, October 2024
(2021 and 2022 Admissions)
ECONOMICS/APPLIED ECONOMICS/DEVELOPMENT ECONOMICS
ECO1C03 : Quantitative Techniques for Economic Analysis

Time : 3 Hours

Max. Marks : 60

PART – A

Answer **all** questions.

1. What does the alternative hypothesis (**H1**or Ha) represent in hypothesis testing ?
   A) The hypothesis that is always true
   B) The hypothesis to be tested against the null hypothesis
   C) The type I error rate
   D) The population parameter

2. What is Type I error in hypothesis testing ?
   A) Failing to reject a false null hypothesis
   B) Rejecting a true null hypothesis
   C) The probability of accepting the null hypothesis
   D) The probability of accepting the alternative hypothesis

3. What is the purpose of a confidence interval ?
   A) To determine the sample size needed for estimation
   B) To estimate the standard error of an estimator
   C) To provide a range of values that likely contains the population parameter
   D) To calculate the p-value of a hypothesis test

4. Which of the following is a property of a consistent estimator ?
   A) It is always unbiased
   B) Its standard error is zero
   C) It converges to the true parameter value as the sample size increases
   D) It has a smaller mean squared error than any other estimator

5. What is the expected value of a random variable ?
   A) The most likely value of the variable
   B) The largest value the variable can take
   C) The average value of the variable, weighted by its probabilities
   D) The smallest value the variable can take

6. If two events are mutually exclusive, what is the probability of both events occurring ?
   A) 0 B) 1/2
   C) 1 D) Cannot be determined

7. When is a matrix considered singular ?
   A) When its determinant is zero B) When it has all zeros in every row
   C) When it has all ones in every row D) When it is a square matrix

8. The transpose of a matrix is obtained by
   A) Swapping the rows with the columns
   B) Doubling the elements in each row
   C) Adding the elements in each row
   D) Taking the square root of each element **(8×½=4)**

PART – B

Answer **any 8** questions.

9. Explain random experiments.

10. Find the determinant of $\begin{bmatrix} 5 & 2 & 1 \\ 3 & 0 & 2 \\ 8 & 1 & 3 \end{bmatrix}$.

11. Define Type I and Type II errors.

12. What is mutually exclusive events ?

13. Define conditional probability.

14. From a lot containing good and bad items, 3 items are chose. Prepare the sample space.

15. Distinguish between continuous and discrete random variables.

16. What is a confidence interval, and how is it related to hypothesis testing ?

17. What is a one-tailed test, and when is it appropriate to use it ?

18. What is the difference between point estimation and interval estimation ?

19. What is the central limit theorem, and how does it relate to sampling distributions ? **(8×2=16)**

PART – C

Answer **any 4** questions.

20. Discuss the properties of determinant.

21. Explain Axiomatic approach to probability.

22. Among applicants to a posts 60% are males and the rest are females. While 60% of the male applicants are graduates, only 50% of the female applicants are graduates. If a graduate is selected to the post, what is the probability that the selected candidate is a male ?

23. Write a note on matrix operations.

24. What are some common challenges or pitfalls in the estimation process ?

25. Find the Eigen values of the matrix $p = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$. **(4×5=20)**

PART – D

Answer **any 2** questions.

26. What is probability ? Discuss various approaches to the definition of probability.

27. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$.

28. Solve the following simultaneous equations using Crammer's rule.

$5x - 6y + 4z = 15$

$7x + 4y - 3z = 19$

$2x + y + 6z = 46$

29. On inspection of random sample of 500 items produced by a machine, 30 are found to be defective. Does this justify the assumption that this machine is producing 2% defective item on an average ? **(2×10=20)**