C 42630 (Pages : 5) Name...

Reg. No....................................

SECOND SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2023

(CBCSS)

Economics

ECO 2C 08—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. If the sample is small and the population standard deviation is known, the test statistic is :

   a) χ^2.　　　　　　　　　　b) F test.

   c) t test.　　　　　　　　　　d) Z test.

2. A function of the population values is known as ————————.

   a) Parameter.　　　　　　　　b) Statistic.

   c) Sample space.　　　　　　　d) None of these.

3. The distribution used to describe the behaviour of rare events is ————————.

   a) Binomial.　　　　　　　　　b) Normal.

   c) Lognormal.　　　　　　　　d) Poisson.

4. ANOVA makes use of ———————— distribution.

   a) Chi-square.　　　　　　　　b) t.

   c) F.　　　　　　　　　　　　d) Z.

5. The axiomatic approach to probability was introduced by the Russian statistician :

   a) Gosset.　　　　　　　　　　b) AN Kolmogorov.

   c) Frank Ramsey.　　　　　　　d) Leonard Savage.

Turn over

6. The set of elements which belong to atleast one of the sets A and B is called :

    a) Intersection of A and B.   b) Disjoint Set.

    c) Union of A and B.   d) None of these.

7. The probability of the complementary event $\bar{A}$ of A is given by ———————.

    a) $P(\bar{A}) = 1 - P(A)$.   b) $P(\bar{A}) = 1 + P(A)$.

    c) $P(\bar{A}) = 1 - P(\bar{A})$.   d) None of these

8. Poisson distribution is a ———————.

    a) Continuous probability distribution.

    b) Both b) and c).

    c) Discrete probability distribution.

    d) Either a) or b).

9. ——————— is one in which a sample from the population is classified according to two or more attributes.

    a) Skewed frequency table.   b) Contingency table.

    c) Frequency table.   d) None of these.

10. For Z test the degree of freedom is :

    a) $n + 1$.   b) $n - 1$.

    c) Infinity   d) None of these.

11. Lorenz Ratio ia a ———————.

    a) Normal variate.   b) Lognormal variate.

    c) Either a) or b).   d) None of these.

12. Baye's Theorem is based upon ———————.

    a) Certain event.   b) Uncertain event.

    c) Inverse probability.   d) None of these.

13. The Binomial distribution is symmetrical if both p and q is equal to :

   a) 1.

   b) 0.5.

   c) 0.

   d) None of these.

14. ————————— of a random variable is defined to be the first moment.

   a) Covariance.

   b) Variance.

   c) Mean

   d) None of these.

15. From a Urn containing 12 balls of the same size of which 6 are red, 4 are blue and 2 are white, three balls are drawn at random. What is the probability that the balls are of different colour.

   a) 48/220.

   b) 56/220.

   c) 4/220.

   d) None of these.

$$(15 \times 1/5 = 3 \text{ weightage})$$

Part B (Very Short Answer Questions)

Answer any **five** *questions.*
Each question carries 1 *weightage.*

16. Write a very short note on joint and marginal probability distribution ?

17. Define power of a test ?

18. A machine produces following units per hour. The data is randomly collected for 10 hours. The production is 63, 64, 69,71,70,69, 63, 70, 65, 66 units per hour. If the mean (population) production is 65 units, calculate the value of t.

19. Distinguish between Estimate and Estimator.

20. Define Lognormal distribution.

21. Explain one way classification of ANOVA different from two way classification ?

22. Explain properties of estimators.

23. Define exponential distribution.

$$(5 \times 1 = 5 \text{ weightage})$$

Turn over

Part C (Short Answer Questions)

Answer any **seven** *questions.*
Each question carries weightage of 2.

24. Write a note on the concept of law of large numbers ?

25. Distinguish between Type I and Type II error.

26. Define Standard Error.

27. Explain the method of Maximum Likelihood Estimation.

28. Discuss the difference between simple and composite hypothesis ?

29. Explain Baye's theorem ?

30. Distinguish between Continuous and Discrete Random variables.

31. Out of a sample of 120 persons in a village 76 persons were administered a new drug for preventing influenza and out of them 24 persons were attacked by influenza. Out of those who were not administered the new drug, 12 persons were not affected by influenza :

    (a) Prepare a 2 × 2 table showing the actual and expected frequencies ; and

    (b) Use Chi-square test for finding out whether the new drug is effective or not. At 5 % level for 1 d.f. the value of Chi-square = 3.84.

32. Assuming that on an average 2 % of the output in a factory manufacturing certain bolts is defective and that 200 units are in a package. What is the probability that none is defective ? ($e^{-4} = 0.0183$)

33. Random samples of sizes 400 and 500 have means 10.9 and 11.5 respectively. Can the samples be regarded as drawn from the same population of variance 25 ? (Given table value at 5 % = 1.96)

(7 × 2 = 14 weightage)

Part D (Essay Questions)

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

34. Discuss the step by step procedure involved in testing the hypothesis.

35. What do you meant by Sampling Distributions ? Briefly explain Z, *t* Chi-square and F distribution ?

36. A manufacturer wants to test the hypothesis that the mean life times of two brands of machines are equal. The life time is measured by the number of operating hours between the overhauls. The manufacturer keeps overhaul statistics on all his machines. A random sample of 15 machines gives the following details.

Operating hours between overhauls

Brand X : 1050, 1150, 850, 800, 1000, 1350, 1100, 1300, 1450, 900, 1200, 1250, 1550, 825, 650

Brand Y : 1170, 970, 880, 1410, 700, 775, 940, 1650, 950, 1190, 600, 1600, 975, 450, 1290

Using Mann-Whitney test, will you conclude that the lifetimes of two brands are equal ?

37. Explain Binomial distribution? If 20 percent of the items produced turn out to be defective, then find out the probability that out of 4 items selected at random at most 2 items will be defective.

(2 × 4 = 8 weightage)