C 4602 **(Pages : 4)** **Name.....**

Reg. No.....

SECOND SEMESTER M.A. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2021

(CBCSS)

Economics

ECO 2C 08—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—II

(2019 Admissions)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Part A (Multiple Choice Questions)

Answer **all** *questions.*
Each question carries ¼ weightage.

1. How many four digit, numbers can be formed with the digits 3, 4, 5, 6, 7, 8 ?

   (a) 120. (b) 240.

   (c) 360. (d) 480.

2. For a binomial distribution, mean is ———————— variance.

   (a) Less than. (b) Equal to.

   (c) Greater than. (d) None of these.

3. If X is a random variable with mean μ, then $E(X)^r$ is called :

   (a) r^{th} row moment. (b) r^{th} central moment.

   (c) Variance. (d) Standard deviation.

4. If the two events A and B are mutually exclusive, then :

   (a) $P(A \cap B) = P(A) \cdot P(B)$. (b) $P(A \cap B) = P(A) \cdot P(B \mid A)$.

   (c) $P(A \cap B) = 0$. (d) None of these.

Turn over

5. For a standard normal distribution, median is always :

   (a) Equal to zero. (b) Not equal to zero.

   (c) Equal to three. (d) Not equal to three.

6. The variance of the difference of two independent random variables is equal to the ———— of their individual variances :

   (a) Sum. (b) Difference.

   (c) Product. (d) Ratio.

7. The square root of the variance of an estimator is called :

   (a) Significance level. (b) Statistic.

   (c) Parameter. (d) Standard error.

8. Ratio of two Chi-square variates will follow :

   (a) χ^2 distribution. (b) t distribution.

   (c) F distribution. (d) Normal distribution.

9. The distribution used for testing the equality of two population proportions is :

   (a) Normal distribution. (b) t distribution.

   (c) F distribution. (d) χ^2distribution.

10. If the statistic t gives all the information regarding the parameter θ contained in the sample, then t is a ———— estimator.

    (a) Sufficient. (b) Consistent.

    (c) Efficient. (d) Likelihood.

11. Whether a test is one-tailed or two-tailed depends on ———— hypothesis.

    (a) Null. (b) Alternative.

    (c) Simple. (d) Composite.

12. The expectation of the mean of a random sample of size n from a population with mean μ is :

    (a) $\frac{\mu}{n}$. (b) $n\mu$.

    (c) μ^2. (d) μ.

(12 × ¼ = 3 weightage)

Part B (Short Answer Type)

Answer any **five** *out of eight questions.*
Each question carries 1 *weightage.*

13. Compute the values of the following :

    (a) ${}_5P_2$; (b) ${}_{10}C_6$; (c) ${}_6C_2$; and (d) ${}_7P_5$.

14. Obtain the probability of getting a sum of 9 when two dice are thrown simultaneously.

15. In how many ways can 4 white and 3 black balls be selected from a box containing 20 white and 15 black balls ?

16. Briefly explain the probability function and parameters of a normal distribution.

17. Discuss the two types of errors associated with hypothesis testing.

18. Distinguish between point estimate and interval estimate.

19. Discuss the major applications of *t*-test.

20. Define a random variable. Also define expectation and variance of a random variable.

(5 × 1 = 5 weightage)

Part C (Paragraph Type)

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

21. Explain the frequency definition and axiomatic definition of probability.

22. Two persons A and D attempt independently to solve a puzzle. The probability that A will solve is $\frac{3}{5}$ and the probability that B will solve is $\frac{1}{3}$. Find the probability that the puzzle will be solved by

    (i) At least one of them ; and (ii) Both of them.

23. Explain the important properties of normal distribution.

24. A random sample of 50 Mathematics grades showed a mean of 75 and a standard deviation of 10. What are the 95 % confidence limits for the population mean ?

25. Three letters are selected from the letters of the word 'ASSASSINATIONS'. What is the probability that (i) all are 'S' ; (ii) Two are 'A' and one is 'N' ; (iii) Exactly one is 'I' ; and (iv) At least one is 'A'.

Turn over

26. The weekly wages of 1,000 workers are normally distributed around a mean of Rs.70 and with a standard deviation of Rs. 5. Estimate the number of workers whose weekly wages will be (i) between Rs.70 and Rs.72 ; (ii) between Rs.69 and Rs.72 ; (iii) more than Rs.75 ; and (iv) less than Rs. 63.

27. Explain the procedure for testing equality of two population means.

28. A soap manufacturing company was distributing a particular brand of soap through a number of retail shops. Before a heavy advertisement campaign, the mean sales per week per shop was 140 dozens. After the campaign, a sample of 20 shops was taken and mean sales was found to be 147 dozens with a standard deviation of 16. Can you consider the advertisement campaign effective ?

29. What do you mean by significance level, power and critical region of a test ?

30. Explain the desirable properties of an estimator.

(7 × 2 = 14 weightage)

Part D (Essay Type)

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

31. A random variable X follows a probability distribution as given below :

X	:	0	1	2	3
$p(x)$	:	$\frac{k}{2}$	$\frac{k}{3}$	$\frac{k+1}{3}$	$\frac{2k-1}{6}$

Find the value of k. Also find the mean and variance of the variable.

32. A systematic sample of 100 pages was taken from the Oxford Dictionary and the observed frequency distribution of foreign words per page was found to be as follows :

No. of foreign words per page (X)	:	0	1	2	3	4	5
Frequency	:	42	34	12	7	4	1

Calculate the expected frequencies using Poisson distribution.

33. The heights of six randomly chosen sailors are in inches : 63, 65, 68, 69, 71 and 72. Those of 10 randomly chosen soldiers are 61, 62, 65, 66, 69, 69, 70, 71, 72 and 73. Test whether the data support the claim that the sailors are on the average taller than soldiers.

34. A set of data involving four tropical feed stuffs A, B, C, D tried on 20 chicks is given below. All the 20 chicks were treated alike in all respects except the feeding treatments and each feeding treatment is given to 5 chicks. Analyze the data :

A	55	49	42	21	52
B	61	112	30	89	63
C	42	97	81	95	92
D	169	137	169	85	154

(2 × 4 = 8 weightage)