

SECOND SEMESTER M.A. DEGREE EXAMINATION, APRIL 2025
(Regular/Improvement/Supplementary)

ECONOMICS

FECO2C08: QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS II

Time: 3 Hours

Maximum Weightage: 30

Part A: Multiple choice questions. Answer *all* questions. Each carries $\frac{1}{5}$ weightage.

1. If two events are such that $A \subset B$ and $B \subset A$ then the relation between $P(A)$ and $P(B)$ is:
a) $P(A) \leq P(B)$ b) $P(A) = P(B)$ c) $P(A) \geq P(B)$ d) None of the above
2. The probability of getting an odd sum while throwing two fair dice is
a) $\frac{1}{4}$ b) $\frac{1}{16}$ c) 1 d) $\frac{1}{2}$
3. Which of the following is not a discrete r.v?
a) Number of rooms in a house b) Number of defects in a dress material
c) Income of households in a locality d) None of the above
4. Which of the following is not a property of expectation of two random variables without any condition?
a) $E(x + y) = E(x) + E(y)$ b) $E(x y) = E(x) E(y)$
c) $E(x/y) = E(x)/E(y)$ d) None of these
5. For a log normal distribution:
a) Mean > Variance b) Mean < variance
c) Mean = variance d) Mean = standard deviation
6. For an exponential distribution with probability density function given by $f(x) = \theta e^{-\theta x}$, $x \geq 0$, $\theta > 0$, the mean of the distribution is:
a) $\frac{1}{\theta^2}$ b) θ c) θ^2 d) $\frac{1}{\theta}$
7. Which of the following statements is not true?
a) More the SE, better it is. b) Less the SE, better it is.
c) SE is always zero. d) SE is always infinity.
8. Student's 't' distribution was discovered by:
a) G. W. Snedecor b) R. A. Fisher c) W. S. Gosset d) Karl Pearson
9. By degrees of freedom we mean:
a) the number independent observations coming under a particular calculation.
b) the sample size minus number of restrictions.
c) both (a) and (b) are true.
d) both (a) and (b) are not true.

(P.T.O.)

10. is a range of values used to estimate an unknown population parameter.
- point estimate
 - interval estimate
 - estimate of confidence region
 - all the above
11. Power of a test is:
- $1 - P(\text{type I error})$
 - Prob (Type II error)
 - $1 - P(\text{type II error})$
 - Prob (Type I error)
12. The test used for testing the variance of a normal population is:
- Z – test
 - χ^2 - test
 - t – test
 - F – test
13. What do you mean by p – value?
- The level of significance
 - The actual level of significance
 - Probability of type I error
 - All the above
14. Kruskal- Wallis test is non-parametric analog of:
- Two – way ANOVA
 - t-test
 - One – way ANOVA
 - Chi – square test
15. Which of the following is not an application of Chi-square test?
- To test the variance of normal population.
 - To test the goodness of fit.
 - To test the independence of two attributes.
 - All the above.

(15 × $\frac{1}{5}$ = 3 weightage)

Part B: Very short answer questions. Answer any five questions. Each carries 1 weightage.

16. State classical definition of probability. What are the draw backs of this definition?
17. Given $f(x, y) = \frac{x+2y}{18}$, $x = 1, 2$; $y = 1, 2$
 $= 0$, elsewhere
 Obtain the marginal probability functions of X and Y.
18. Define Poisson distribution. State any three instances where Poisson law can be applied.
19. Distinguish between parameter and statistic, with suitable examples.
20. Define exponential distribution.
21. Distinguish between point estimation and interval estimation.
22. Define the following terms.
- Null and alternative hypothesis
 - Level of significance and p - value.
23. What are the assumptions of ANOVA?

(5 × 1 = 5 weightage)

Part C: Short answer questions. Answer any seven questions. Each carries 2 weightage.

24. The probability that A hits a target is $\frac{1}{4}$ and the probability that B hit it is $\frac{2}{5}$. If A and B each shoot at the target, what is the probability that:
- the target will be hitted?
 - exactly one will hit the target?

25. State Baye's theorem. In a factory, machines A, B and C produce 2000, 4000 and 5000 items in a month respectively. Out of their production 5%, 3% and 7% are defective ones. From the factory's products one is selected at random and inspected and found that it is good. What is the probability that it was from machine C?
26. Define normal distribution. Discuss the important properties of normal distribution.
27. Explain the concepts of law of large numbers and central limit theorem.
28. What is meant by statistical inference? What do you mean by sampling distribution? Mention some of the sampling distributions which you have studied.
29. Distinguish between small sample and large sample properties. Explain any two small sample distributions.
30. Explain with suitable examples the Fisher's properties of estimators.
31. Define the terms simple and composite hypothesis.
Also explain the terms: i) Critical region ii) Test Statistic.
32. Two random samples are taken from normal populations resulting the following statistics.

Size	Mean	SD
16	34	2.5
25	45	2.5

Test whether the samples can be regarded as coming from the same normal population.

33. In an experiment on immunization of Covid from the past years the following results were obtained.

	affected	not affected
Vaccinated	12	28
Not Vaccinated	13	17

Examine whether the vaccine is effective in controlling the incidence of COVID.

(7 × 2 = 14 weightage)

Part D: Essay questions. Answer any two questions. Each carries 4 weightage.

34. In litters of 4 mice the number of litters which contained 0, 1, 2, 3, 4 females were noted. The figures are given in the following table.

No. of female mice	0	1	2	3	4	Total
No. of Litters	2	32	34	24	6	98

If the chance of obtaining a female in a single trial assumed to be equal estimate this constant and find the expected frequencies and test the goodness of fit.

35. Define log normal distribution with all of its characteristics and explain the application of this distribution in economics and business.
36. A random sample of 16 men from country A had a mean height of 68 inches and the sum of squares from the sample mean 132. A random sample of 25 men from country B had the mean corresponding values 66.5 inches and 165 respectively. Can the samples be regarded as drawn from the same normal population?
37. What do you mean by an ANOVA? Set up an ANOVA table for the following acre per production data for three varieties of rice, each grown on 4 plots and state if the variety differences are significant at 5% level.

Plot of land	Variety of rice		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

(2 × 4 = 8 weightage)