FOURTH SEMESTER BA DEGREE EXAMINATION, APRIL 2024
(Regular/Improvement/Supplementary)
ECONOMICS
GECO4B05T: QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS - II

Time: **2 $\frac{1}{2}$ Hours**   **Maximum Marks: 80**

SECTION A: Answer the following questions. Each carries two marks.
(Ceiling 25 Marks)

1. Define mutually exclusive events. Represent it by using a Venn diagram.

2. Give the classical definition of probability.

3. Given $P(A) = 0.35$, $P(B) = 0.4$ and $P(A \cup B) = 0.9$. Find $P(A \cap B)$.

4. What is meant by probability distribution of a random variable? Give an example.

5. What are the properties of cumulative distribution function?

6. Suppose X and Y are independent random variables with $V(X) = 4$ and $V(Y) = 1$. Find $V(X - Y)$.

7. Define the terms 'parameter' and 'statistic'.

8. Give the mean of t distribution with 1 degree of freedom.

9. Define consistency of an estimator.

10. Let $X_1, X_2, \ldots, X_n$ be a r.s. taken from Poisson λ distribution. Check whether $\bar{X}$ is unbiased for λ.

11. Give the $100 \times (1 - \alpha)$ % confidence interval for population proportion.

12. Define null and alternative hypothesis. Give an example.

13. Define power of a test.

14. Give the test statistic for the significance of correlation coefficient.

15. When will one use paired t test?

SECTION B: Answer the following questions. Each carries five marks.
(Ceiling 35 Marks)

16. An urn 'A' contains two white and four black balls. Another urn 'B'contains 5 white and 7 black balls. A ball is transferred from urn A to urn B and a ball is drawn from urn B. Find the probability that the ball drawn is white.

17. Examine whether the following is a probability mass function.

x	0	1	2	3	4
$P(X = x)$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{1}{8}$	$\frac{1}{40}$

18. In a town 10 accidents took place in a span of 100 days. Assuming that the number of accidents follows Poisson, find the probability that there will be 3 or more accidents in a day.

19. Find the probability that the number of heads lie in the range 185 and 220 when a fair coin is tossed 200 times.

20. Define χ^2 statistic. What are its uses ?

21. Distinguish between an estimator and an estimate.

22. Distinguish between type I and type II errors.

23. Two random samples are taken from normal populations resulting in the following statistics

Size	Mean	S.D.
16	34	2.5
25	45	2.5

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

SECTION C: Answer any two questions. Each carries ten marks.

24. In a bolt factory, machine A, B and C manufacture respectively 25%, 35% and 40% of the total. Of their output, respectively 5 4 and 2 percent are defective. A bolt is selected at random and is found to be defective. What is the probability that it was produced by machine A?

25. A player tosses 3 coins. He wins Rs. 10 if three heads appears, Rs. 5 if two heads appears and Rs. 1 if one head appear. He will lose Rs. 12 if no head appears. What is the expected amount?

26. Explain in detail the term 'sampling distribution'.

27. Five different brands of tyres used by a car rental agency in the process of deciding the brand of tyre to purchase as standard equipment for their fleet. Find that each of five tyres of each brand last the following number of kilometers (in 1000s)

		Brand		
A	B	C	D	E
36	46	35	45	41
37	39	42	36	39
32	35	37	39	37
48	37	43	35	35
47	48	38	32	38

Test the hypothesis that the five tyre brands have identical average life.

(2 x 10 = 20 Marks)