

Total number of printed pages-6

3(Sem-1/CBCS)CC/ECO/PG

2025

ECONOMICS

Paper : ECO1035C

(Statistical Methods for Economics)

Full Marks : 70

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Answer the following questions : $1 \times 5 = 5$
 - (a) Define conditional probability.
 - (b) Write the equation of the standard normal probability distribution curve.
 - (c) What is a statistical hypothesis ?
 - (d) Second moment about mean gives the variance of the distribution.
(True/False)
 - (e) What is standard error of a statistic ?

2. Answer the following questions: $2 \times 5 = 10$

- (a) Define complementary events.
- (b) Write *two* uses of non-parametric test.
- (c) Mention the axiomatic definition of probability.
- (d) Distinguish between type-I error and type-II error of hypothesis.
- (e) State the Bayes's theorem.

3. Answer **any three** of the following questions: $5 \times 3 = 15$

- (a) The first three moments of a distribution about the value 67 of the variable are 0.45, 8.73 and 8.91. Calculate the second and third central moment and the moment co-efficient of skewness. Indicate the nature of the distribution.
- (b) If $P(A) = 0.4$, $P(B) = 0.7$ and $P(A \cup B) = 0.8$, find P (only one of A and B).
- (c) Explain the properties of Normal Distribution.

- (d) A random variable X is defined as the sum of faces when a pair of dice is thrown. Find the expected value of X .
- (e) Find the probability that at most 5 defective bolts will be found in a box of 200 bolts if it is known that 2 per cent of such bolts are expected to be defective. ($e^{-4} = 0.0183$ given).
- (f) Explain the steps involved in testing hypothesis.

4. Answer **any four** of the following questions: $10 \times 4 = 40$

- (i) A large-scale survey found that the marks of students in an economics exam follow a normal distribution with mean of 65 and standard deviation of 10.
 - (a) What percentage of students scored more than 75 marks?
 - (b) What percentage scored between 55 and 70?
 - (c) Find the marks that separate the top 5% of students. $3+3+4=10$

- (ii) Probability of hitting a target is $1/10$. 5 shots are fixed independently. Find the probability of hitting the target.

- (a) Exactly one
(b) Atleast one
(c) At most one

$$3+3+4=10$$

- (iii) A milk producers union wishes to test whether the preference pattern of consumers for its products is dependent on income levels. A random sample of 500 individuals give the following data below can you conclude the preference patterns are independent of income levels ($\chi^2 = 5.99$ for $v=2$ at 5% level of significance)

Income	Product A	Product B	Product C
Low	160	300	140
Medium	140	100	160
High	300	400	300

- (iv) The sales data of an item in six shops before and after a special promotion campaign are as under.

Shop	A	B	C	D	E	F
Before	53	28	31	48	50	52
After	58	29	30	55	56	45

Can campaign be claimed as success ?
Test at 5% level of significance
($t_{0.05}=2.57$; $V=5$)

- (v) If 5% of the electric bulbs manufactured by a company are defective use poisson distribution to find the probability that in a sample of 100 bulbs (Given $e^{-5} = 0.007$).

- (a) None of the bulbs is defective.
(b) Five bulbs are defective.

$$5+5=10$$

- (vi) H is 8:5 against of the wife who is 40 years old living till she is 70 and 4:3 against her husband now 50 living till he is 80. Find the probability that 30 years hence

- (a) Both will be alive

(b) None will be alive

(c) Only wife is alive

(d) Only one is alive.

(e) At least one will be alive.

$$2+2+2+2+2=10$$
