

TILAK MAHARASHTRA VIDYAPEETH, PUNE
BACHELOR OF SCIENCE
(DATA SCIENCE) (787)/
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING) (788)
EXAMINATION: JANUARY - 2026
SEMESTER - I

Sub: Fundamentals of Statistics (78725 -103, 78825-103)

Date : 8/01/2026

Total Marks : 60

Time: 10.00am To 12.30pm

Instructions:

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labelled diagrams wherever necessary.

Q.1. Solve the following Multiple Choice Questions

(5)

1. The set of all possible outcomes of a random experiment is called
 - a) Event
 - b) Sample space
 - c) Random variable
 - d) Trial
2. A subset of a sample space is called
 - a) Outcome
 - b) Event
 - c) Experiment
 - d) Trial
3. Tossing a coin is an example of
 - a) Deterministic experiment
 - b) Random experiment
 - c) Sure event
 - d) Impossible event
4. According to axioms of probability, the probability of sample space is
 - a) 0
 - b) 1
 - c) -1
 - d) ∞
5. If $P(A) > 0$, then conditional probability $P(B|A)$ is defined as
 - a) $P(A \cap B)$
 - b) $\frac{P(A)}{P(B)}$
 - c) $\frac{P(A \cap B)}{P(A)}$
 - d) $P(B) - P(A)$

Q.2 State whether the following statements are True or False

(5)

1. Primary data are collected by the investigator for the first time.
2. Nominal scale data can be meaningfully ordered.
3. Income is an example of ratio scale.
4. Histogram is used for qualitative data.
5. Ogive is used to represent cumulative frequency.

Q. 3. Answer the following (Solve Any FIVE) (10)

1. Find the probability distribution of a discrete random variable when a fair die is thrown.
2. Find the distribution function of a discrete random variable with values 0,1,2.
3. Find the distribution function of a continuous random variable with density $f(x) = 2x, 0 < x < 1$.
4. Calculate mean, median and mode for the data: 2, 4, 6, 8, 10.
5. State two merits and two demerits of arithmetic mean.
6. Find the quartiles for the data: 5, 7, 9, 10, 12, 15.

Q. 4. Answer the following in detail (Solve Any SIX) (30)

1. Calculate coefficient of range for the data: 10, 15, 20, 25, 30.
2. A sample of 200 items has 60 defectives. Test whether the population proportion of defectives is 0.25 at 5% level of significance. The Z-value from table is 1.96.
3. Define mathematical expectation. Find the expectation of X where $P(X = 1) = 0.2, P(X = 2) = 0.5, P(X = 3) = 0.3$
4. Find variance and standard deviation of the data: 3, 7, 11, 15.
5. The mean of a Poisson distribution is 4. Find the probability of exactly 2 occurrences.
6. Calculate Karl Pearson's coefficient of skewness for the data: Mean = 25, Mode = 20, Standard deviation = 5.
7. Find the Quartiles Q1, Q2 and Q3 for the data 8,11,15,7,3,2

Q. 5. Answer the following in detail (Solve Any ONE) (10)

1. State the significance of ANOVA. Perform one-way ANOVA for the following data:
The critical value of F is 5.14
Group A: 10, 12, 14 Group B: 8, 9, 11 Group C: 13, 15, 16.
2. Calculate Karl Pearson's coefficient of correlation for the data: X: 1, 2, 3, 4, 5 Y : 2, 4, 5, 4, 6. Also find the regression line of Y on X
