

2025

STATISTICS — MDC

Paper : MN-1

(Descriptive Statistics -I and Probability -I)

Full Marks : 75

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer **any five** questions :

2×5

- (a) Determine the geometric mean of the following data set : 0, 5, 7, 9, 25, 81, 999, 9785.
- (b) The frequencies of the values 1, 2, 3, and 4 are 2, 5, 8, and 5 respectively. Find the relative frequency corresponding to the value 4.
- (c) Define the mode of a set of observations.
- (d) Give two examples of discrete variable.
- (e) Explain the meaning of skewness of a data set.
- (f) If $P(A) = 0.5$, $P(B) = 0.3$, and $P(A \cup B) = 0.9$, determine $P(A \cap B)$.
- (g) Express the following statement using set notation : 'Events A and B both occur, but event C does not occur'.
- (h) When a die is rolled once, write the corresponding sample space.

2. Answer **any four** questions :

5×4

- (a) Distinguish between : (i) primary data and secondary data, (ii) attribute and variable.
- (b) Discuss the idea of median for both ungrouped and grouped data.
- (c) Define raw and central moments and express the third-order central moment in terms of raw moments.
- (d) What do you mean by coefficient of variation and how this measure is used to compare different data sets?
- (e) A card is drawn at random from a standard deck of 52 playing cards. If A and B denote the events that the card drawn is a red card and the card drawn is a king, respectively then find $P(A)$, $P(B)$, and $P(A \cap B)$ and also verify whether the events A and B are independent.
- (f) Define the following events : compound event, complementary event, mutually exclusive events, exhaustive events, equally likely events.

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3. Answer *any three* questions :

- (a) What do you mean by arithmetic mean (AM)? Write the formula of AM in case of both grouped and ungrouped data. Show that, for any n observations, the arithmetic mean can never be smaller than the geometric mean. Write the merits and demerits of AM. 2+3+6+4
- (b) (i) What do you mean by pie chart? How a pie chart can be drawn?
- (ii) Define an ogive. Distinguish between 'less than' and 'greater than' ogives with reference to their construction methods. Describe how the median of a grouped frequency distribution can be determined using an ogive. (2+4)+(2+4+3)
- (c) (i) What do you mean by standard deviation? Explain its significance as a measure of dispersion in statistical analysis. Write the properties of standard deviation. If $y = 0.5 - 2x$ and standard deviation of x is 2, then find the standard deviation and variance of y .
- (ii) Prove that mean deviation about mean can never exceed the standard deviation. (2+3+3+2)+5
- (d) (i) What do you mean by conditional probability? If A , B , and C be three events such that $P(A) = 0.4$, $P(B) = 0.5$, $P(C) = 0.3$, $P(A \cap B) = 0.2$, $P(B \cap C) = 0.15$, $P(A \cap B \cap C) = 0.1$ then find $P(A | B)$, $P(B | A)$, $P(A \cup C | B)$.
- (ii) A box contains 5 red balls, 4 blue balls and 3 green balls. Two balls are drawn without replacement. Find the probabilities that : both balls are red, the second ball is blue given the first ball is red and at least one ball is green. (2+6)+7
- (e) Write short notes on :
- (i) Tabular presentation of data
- (ii) Scales of measurement
- (iii) Classical definition of probability. 5+5+5
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