AW—1630

B.Sc. (Part–I) Semester–I Examination

1S : STATISTICS

Time : Three Hours] [Maximum Marks : 80

Note :— All questions are compulsory.

1. (A) Fill in the blanks :
   (i) Deciles divide the series into _____ equal parts.
   (ii) Probability lies between _____.
   (iii) The mathematical expectation of product of _____ random variables is the product of their expectation.
   (iv) The most stable measure of dispersion is _____. 2

   (B) Choose the correct alternative (MCQ) :
   (i) The ideal measure of central tendency is :
   (a) Arithmetic mean (b) Harmonic mean
   (c) Geometric mean (d) Mode
   (ii) The highest level of scale of measurement is :
   (a) Ordinal scale (b) Nominal scale
   (c) Ratio scale (d) Interval scale
   (iii) If P(A) = 0 then event A is called :
   (a) Probable event (b) Sine event
   (c) Impossible event (d) None of these
   (iv) Standard deviation depends upon :
   (a) Origin (b) Scale
   (c) Origin and Scale (d) None of these 2

   (C) Answer in **one** sentence each :
   (i) What do you mean by nominal data ?
   (ii) Define random variable.
   (iii) What is median ?
   (iv) Define raw moment. 4

2. (A) Explain primary data and secondary data. 4
   (B) Explain the function of NSSO. 4
   (C) Define :
   (i) Ratio scale
   (ii) Interval scale. 4

OR

3. (P) What are the importance of statistics ? 4
   (Q) What are the functions of CSO ? 4
   (R) What are the limitations of statistics ? 4

4. (A) Show that algebraic sum of deviations of various values taken from arithmetic mean is zero. 4
   (B) How will you obtain median in case of continuous frequency distribution ? 4
   (C) Explain classification of data. State its various types. 4

OR

(P) Explain the principles of a good classification 4
(Q) Define arithmetic mean. State its merits and demerits 4
(R) Define the term less than and more than cumulative quency distribution. 4

6. (A) Obtain the relation between standard deviation & roc nean square deviation. 4
(B) State the characteristics of an ideal measure of dispe on. 4
(C) Obtain the relationship between central moments and w moment. 4

OR

7. (P) Show that standard deviation is least value of root m n square deviation. 4
(Q) Define Range and Coefficient of Range. 4
(R) Show that variance is independent of change of origin but not of scale. 4

8. (A) State axioms of probability. 4
(B) Define :
(i) Favourable Event
(ii) Random Experiment. 4
(C) A card is drawn from a well shuffled pack of playing cards. What is the probability that it is either a spade or an ace ? 4

OR

9. (P) What is the chance that non-leap year selected at random will contain 53 Sundays ? 4
(Q) Prove that : $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
where A and B are any two events. 4
(R) Define axiomatic approach of the probability. 4

10. (A) Define distribution function of a random variable X and prove that :
$P(a < x \leq b) = F(b) - F(a)$ 6
(B) Define variance of random variable in terms of mathematical expectations. Show that :
$V(ax + b) = a^2V(x)$ 6

OR

11. (P) If F is distribution of r. v. x then,
$F(-\infty) = \lim_{x \to -\infty} F(x) = 0$
$F(\infty) = \lim_{x \to \infty} F(x) = 1$ 6
(Q) Prove that :
(i) $E(ax + b) = a\,E(x) + b$
(ii) $E(ax) = a\,E(x)$
(iii) $V(ax + b) = a^2V(x)$ 6

12. (A) Let X be the r.v. with p.d.f.

X :	0	1	2	3
P(x) :	1/3	1/2	1/24	1/8

Find E(x), $E(x^2)$ and V(x) 6
(B) Define moment generating function. Find its effect of change of origin and scale. 6

OR

13. (P) State and prove addition property of m.g.f. Prove that $M_{cx}(t) = M_x(ct)$ 6
(Q) Explain joint probability mean function of marginal and conditional probability functions. 6