

## B.Sc. (Part-I) Semester-I Examination

## IS : STATISTICS

Time : Three Hours]

[Maximum Marks : 80

**Note** :— All questions are compulsory.

1. (A) Fill in the blanks :
- Deciles divide the series into \_\_\_\_\_ equal parts.
  - Probability lies between \_\_\_\_\_.
  - The mathematical expectation of product of \_\_\_\_\_ random variables is the product of their expectation.
  - The most stable measure of dispersion is \_\_\_\_\_.
- (B) Choose the correct alternative (MCQ) :
- The ideal measure of central tendency is :
    - Arithmetic mean
    - Harmonic mean
    - Geometric mean
    - Mode
  - The highest level of scale of measurement is :
    - Ordinal scale
    - Nominal scale
    - Ratio scale
    - Interval scale
  - If  $P(A) = 0$  then event A is called :
    - Probable event
    - Sine event
    - Impossible event
    - None of these
  - Standard deviation depends upon :
    - Origin
    - Scale
    - Origin and Scale
    - None of these
- (C) Answer in **one** sentence each :
- What do you mean by nominal data ?
  - Define random variable.
  - What is median ?
  - Define raw moment.
2. (A) Explain primary data and secondary data.
- (B) Explain the function of NSSO.
- (C) Define :
- Ratio scale
  - Interval scale.
- OR**
3. (P) What are the importance of statistics ?
- (Q) What are the functions of CSO ?
- (R) What are the limitations of statistics ?
4. (A) Show that algebraic sum of deviations of various values taken from arithmetic mean is zero.
- (B) How will you obtain median in case of continuous frequency distribution ?
- (C) Explain classification of data. State its various types.

**OR**

5. (P) What are the basic 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 frequency distribution. 4
6. (A) Obtain the relation between standard deviation & root mean square deviation. 4  
 (B) State the characteristics of an ideal measure of dispersion. 4  
 (C) Obtain the relationship between central moments and raw moment. 4

OR

7. (P) Show that standard deviation is least value of root mean 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,  
 $F(-\infty) = \lim_{x \rightarrow -\infty} F(x) = 0$   
 $F(\infty) = \lim_{x \rightarrow \infty} F(x) = 1$  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.  
 $X : 0 \quad 1 \quad 2 \quad 3$   
 $P(x) : 1/3 \quad 1/2 \quad 1/24 \quad 1/8$   
 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