AU–25

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) CSO was set up in the year _____.

(ii) Deciles divide the series into _____ equal parts.

(iii) The probability of sure event is _____.

(iv) If X and Y are independent random variables then Cov (X, Y) = _____. 2

(B) Choose the correct alternative (MCQ) :

(i) Percentiles divide the series into _____ equal parts.

(a) Ten (b) Two

(c) Four (d) Hundred

(ii) Total probability is always equal to :

(a) Zero (b) Two

(c) One (d) None of the above

(iii) If X and Y are independent random variables then E(XY) = _____.

(a) $E(X) + E(Y)$ (b) $E(X) \cdot E(Y)$

(c) $E(X) - E(Y)$ (d) $\frac{E(X)}{E(Y)}$

(iv) The ideal measure of central tendency is :

(a) Mode (b) Harmonic Mean

(c) Geometric Mean (d) Arithmetic Mean 2

(C) Answer in one sentence each :

(i) Explain nominal scale.

(ii) What is cumulant generating function ?

(iii) What is mode ?

(iv) Define trial. 4

2. (A) What do you mean by statistics ? State its limitations. 4

(B) Explain the functions of NSSO. 4

(C) State the characteristics of ratio scale. 4

OR

3. (P) What do you mean by continuous data and discrete data ? 4

(Q) Explain the terms primary data and secondary data. 4

(R) State the scope of statistics in agricultural sciences. 4

4. (A) Define arithmetic mean. State merits and demerits of arithmetic mean. 6

(B) What do you mean by classification ? State the rules for classification. 6

OR

5. (P) Define Median. State its merits and demerits. 6

(Q) What do you mean by tabulation ? Explain the various parts of a table. 6

6. (A) Define range and state its merits. 4

(B) Explain the term Kurtosis. 4

(C) State the characteristics of an ideal measure of dispersion. 4

OR

7. (P) Define standard deviation and state its merits. 4

(Q) Explain the term Skewness. State its measures. 4

(R) Obtain the relationship between central moments and raw moment. 4

8. (A) State axioms of probability. 4

(B) Define :

(i) Random Experiment

(ii) Mutually Exclusive events,

with the help of examples. 4

(C) Two unbiased dice are thrown. Give its sample space and find the probability that the sum of the points on the dice is odd. 4

OR

9. (P) Explain the classical approach to probability. State its limitations. 4

(Q) Define with the help of examples :

(i) Exhaustive events

(ii) Independent events. 4

(R) State and prove addition theorem of probability for two events A and B. 4

10. (A) Define discrete random variable and continuous random variable. State one example of each of them. 4

(B) If a and b are constants then prove that :

$V(aX + b) = a^2V(X)$. 4

(C) X is the continuous random variable having p.d.f. $f(x) = Ax \quad 0 \leq x \leq 4$

Find :

(i) The value of constant A

(ii) E(X). 4

OR

11. (P) Define Mathematical expectation of random variable X and show that :

$E[aX + b] = a\ E(X) + b$

where a and b are the constants. 4

(Q) Show that :

$Cov\ (aX, bY) = ab\ Cov\ (X, Y)$

where a, b are the constants. 4

(R) For the given probability distribution,

X = x	:	1	2	3	4	5
P[X = x]	:	a	2a	4a	8a	16a

Find the value of (i) a (ii) E(X). 4

12. (A) Define m.g.f. State and prove additive property of m.g.f. 6

(B) The following table represents that joint probability distribution of X and Y :

X \ Y	1	2	3	4
-1	1/12	2/24	1/12	1/12
0	0	2/24	3/12	1/12
1	1/12	1/12	0	1/12

Find :

(i) Marginal distribution of X.

(ii) Marginal distribution of Y.

(iii) Conditional distribution of X given Y = 2. 6

OR

13. (P) Define Cumulant generating function. Discuss the effect of change of origin and scale on c.g.f. 6

(Q) The joint probability distribution of continuous random variables X and Y is defined as :

$$f(x, y) = A x y \quad 0 < x < 2,\ 0 < y < 2$$
$$= 0 \qquad \text{otherwise}$$

Find :

(i) The value of A

(ii) Marginal p.d.f. of X

(iii) Marginal p.d.f. of Y. 6