

B.Sc. (Part—I) Semester—II Examination
STATISTICS

Time : Three Hours]

[Maximum Marks : 80

Note :— All questions are compulsory.

1. (A) Fill in the blanks :

- (i) Karl Pearson's coefficient of correlation is also called as _____ correlation coefficient.
- (ii) The point of intersection of two lines of regression is _____.
- (iii) Mean, mode and median of the normal distribution are _____.
- (iv) In Poisson distribution mean and variance are _____. 2

(B) Choose the correct alternative :

- (i) For perfect negative correlation $r =$ _____.
 - (a) +1 (b) -1
 - (c) 0 (d) ∞
- (ii) The term regression was first studied by :
 - (a) Karl Pearson (b) Bernoulli
 - (c) Sir Francis Galton (d) R.A. Fisher
- (iii) The _____ distribution is said to have a property of lack of memory.
 - (a) Binomial (b) Poisson
 - (c) Exponential (d) Negative binomial
- (iv) For normal distribution $\beta_2 =$ _____.
 - (a) -3 (b) +3
 - (c) 0 (d) 1 2

(C) Answer the following questions in **one** sentence each :

- (i) What do you mean by dichotomous classification ?
- (ii) What is a correlation coefficient ?
- (iii) State the continuous distribution for which mean is equal to variance.
- (iv) What do you mean by standard normal variate ? 4

2. (A) Show that coefficient of correlation lies between -1 and +1. 4(B) Derive the formula for Spearman's rank correlation coefficient. 4(C) Define intraclass correlation with example. 4**OR**3. (P) Describe the Scatter diagram. 4(Q) Show that Karl Pearson's coefficient of correlation is independent of change of origin and scale. 4(R) Define and state the formula for Kendall's rank correlation. 4

4. (A) What do you mean by regression ? 4
 (B) Obtain the normal equations for fitting a straight line. 4
 (C) Explain the term multiple correlation with the help of example. 4

OR

5. (P) Define the two regression coefficients. Prove any one property of regression coefficient. 4
 (Q) Derive the equation of line of regression of Y on X. 4
 (R) Obtain the normal equations for fitting an exponential curve. 4
6. (A) Explain the term consistency of data. Obtain the condition of consistency in case of two attributes A and B. 4
 (B) Explain independence of attributes. State the criteria for independence of the attributes A and B. 4
 (C) Examine the consistency of given data $N = 1000$, $(A) = 600$, $(B) = 500$, $(AB) = 50$. 4

OR

7. (P) Define the following terms :
 (i) Ultimate classes
 (ii) Association of attributes
 (iii) Order of classes and class frequencies
 (iv) Positive class and negative class. 4
- (Q) Give the criteria for consistency of two attributes A, B and C. 4
 (R) Derive the relationship between Yule's coefficient of association (Q) and coefficient of colligation (Y). 4
8. (A) State the probability mass function of Binomial distribution and obtain its cumulant generating function. 6
 (B) Obtain mean and variance of discrete uniform distribution. 6

OR

9. (P) Derive the recurrence relation for the moments of Binomial distribution. 6
 (Q) Obtain the mgf of negative binomial distribution and hence find its mean and variance. 6
10. (A) Obtain the moment generating function of Poisson distribution. 4
 (B) Obtain mean and variance of hypergeometric distribution. 4
 (C) Define geometric distribution. Obtain its mgf and hence find mean and variance. 4

OR

11. (1) Show that Poisson distribution is a limiting case of Binomial distribution. 4

(Q) Show that mean and variance of the geometric distribution

$$p(x) = q^x p \quad x = 0, 1, 2, \dots$$

are respectively qp^{-1} , qp^{-2} .

4

(R) Define Hypergeometric distribution and show that it tends to Binomial distribution under certain condition. 4

12. (A) State the pdf of continuous uniform distribution and obtain its mgf. 6

(B) State the pdf of normal distribution and obtain its mode. 6

OR

13. (P) State the pdf of univariate gamma distribution and obtain its mean and variance. 6

(Q) State any four chief characteristics of normal distribution. 6

