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

2S : STATISTICS

Time : Three Hours] [Maximum Marks : 80

Note :— All questions are compulsory.

1. (A) Fill in the blanks :— 2

(i) Correlation coefficient is _____ of change of origin and scale.

(ii) Mean, Median and Mode of the normal distribution _____.

(iii) Variance of binomial distribution with parameters (n, p) is _____.

(iv) The order of classes depends upon the number of _____ under study.

(B) Choose the correct alternative :— 2

(i) Karl Pearson's correlation coefficient lies between _____.

(a) 0 to +1 (b) –1 to 0

(c) –1 to +1 (d) –2 to +2

(ii) The value of β_2 for normal distribution is _____.

(a) –3 (b) +3

(c) 0 (d) 1

(iii) In binomial distribution mean is _____ variance.

(a) less than (b) greater than

(c) equal to (d) not equal to

(iv) The _____ distribution is said to lack memory in certain sense.

(a) binomial (b) hypergeometric

(c) exponential (d) geometric

(C) Answer the following questions in **one** sentence :— 4

(i) What do you mean by perfect correlation ?

(ii) State the continuous distribution for which mean is equal to variance.

(iii) What is ultimate class frequencies ?

(iv) What do you mean by standard normal variate ?

2. (A) State the formula of Karl-Pearson's correlation coefficient and show that the correlation coefficient is independent of change of origin and scale. 4

(B) Describe the scattar diagram. 4

(C) Obtain the formula for Kendall's rank correlation coefficient. 4

OR

3. (P) Define rank correlation coefficient and derive the formula of Spearman's rank correlation coefficient. 4

(Q) Show that correlation coefficients are independent of change of origin and of scale. 4

(R) Obtain the lines of Karl Pearson's correlation coefficient. 4

4. (A) Define Multiple correlation and partial correlation for trivariate distribution. 4

(B) Explain the concept of regression. What do you mean by lines of regression ? 4

(C) Explain the steps for fitting of exponential curve. 4

OR

5. (P) Explain the term partial correlation with the help of an example. 4

(Q) Define the two regression coefficients. 4

(R) Show that correlation coefficient is the G.M. of two regression coefficients. 4

6. (A) What do you mean by association of attributes ? State the conditions for positive and negative association of attributes A and B. 4

(B) Prove that $Q = \frac{2Y}{1+Y^2}$, where notations have their usual meanings. 4

(C) Find if attributes A and B are independent, positively associated or negatively associated in each of the following cases :

(i) $N = 1000$, $(A) = 470$, $(B) = 620$, $(AB) = 320$

(ii) $(A) = 490$, $(AB) = 294$, $(\alpha) = 570$, $(\alpha\ \beta) = 380$ 4

OR

7. (P) What do you mean by independence of attributes ? State the criterion of independence of two attributes A and B. 4

(Q) Define :—

(i) Order of a class and class frequencies.

(ii) Ultimate classes and ultimate class frequencies. 4

(R) Use Yule's coefficient of colligation Q to check whether the attributes A and B are independent, positively associated or negatively associated given that :

$N = 1482$, $(A) = 368$, $(B) = 343$, $(AB) = 35$ 4

8. (A) Define negative binomial variate and obtain its p.m.f. 6

(B) Derive the probability mass function of binomial distribution by stating the conditions. 6

OR

9. (P) Define Bernoulli trials and Bernoulli variate and obtain its mean and variance. 6

(Q) Obtain the m.g.f. of binomial distribution and hence find its mean and variance. 6

10. (A) Derive the m.g.f. of Poisson distribution and hence obtain its mean and variance. 6

(B) Obtain the mean and variance of hypergeometric distribution. 6

OR

11. (P) Define geometric distribution and obtain its mean and variance. 6

(Q) State the p.m.f. and probability recurrence relation of Poisson distribution. State the situation where Poisson distribution is employed. 6

12. (A) State the p.d.f. of normal distribution and obtain its mode. 4

(B) Define exponential distribution and obtain its mean and variance. 4

(C) State the chief characteristics of normal distribution. 4

OR

13. (P) Derive the m.g.f. of normal distribution. 4

(Q) State the p.d.f. of Gamma distribution, Beta distribution of first kind and Beta distribution of second kind. 4

(R) State the p.d.f. of continuous uniform distribution in the range (a, b) and obtain its mean and variance. 4