AS–1386

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) If we measure two variables on each unit of distribution it is called ______ distribution.

(ii) The _____ is a statistical tool which studies the linear relationship between two variables.

(iii) The classification in which the units of the population are divided into two exhaustive, mutually classes is called _____ classification.

(iv) If $X \sim B(n, p)$ then here p stands for ______ of success. 2

(B) Choose the correct alternative (MCQs) :

(i) Correlation coefficient lies between _______.

(a) 0 to 1 (b) –1 to +1

(c) 0 to ∞ (d) $-\infty$ to $+\infty$

(ii) If two variables are independent then correlation coefficient is ______.

(a) 0 (b) –1

(c) +1 (d) None of these

(iii) The ______ is a continuous distribution.

(a) Binomial (b) Poisson

(c) Geometric (d) Exponential

(iv) In case of ______ distribution, mean = median = mode.

(a) Exponential (b) Geometric

(c) Normal (d) Negative Binomial 2

(C) Answer in **ONE** sentence :

(i) What are the parameters of negative binomial distribution ?

(ii) Which is a discrete distribution for which mean and variance are same ?

(iii) What is pdf of exponential distribution ?

(iv) What is ultimate class in case of attribute ? 4

2. (A) Explain correlation. What are the types of correlation and explain it in brief ? Show that correlation coefficient is independent of change of origin and scale. 6

(B) Explain lines of regression. Define regression coefficient. Why two lines of regression, explain ? 6

OR

3. (P) Explain what do you mean by rank correlation ? Derive the formula for Spearman's rank correlation coefficient. 6

(Q) Explain the principle of least square in fitting of straight line. 6

4. (A) Explain concept of partial correlation. State its limits. 4

(B) Define the term residual and state the expression for variance of residual in trivariate distribution. 4

(C) Give the comparison between partial and multiple correlation. 4

OR

5. (P) Prove that

$$\gamma_{12.3} = \frac{\gamma_{12} - \gamma_{13}\,\gamma_{23}}{\sqrt{\left(1-\gamma_{13}^2\right)}\,\sqrt{\left(1-\gamma_{23}^2\right)}}$$ 4

(Q) Explain the concept of multiple correlation and state its limits. 4

(R) Prove that $1 - R_{1.23}^2 = \left(1-\gamma_{12}^2\right)\left(1-\gamma_{13.2}^2\right)$. 4

6. (A) Explain an association of attribute and criteria of association. 4

(B) What do you mean by consistency of given data ? State the condition for consistency of two attributes. 4

(C) Find if A and B are independent, positively associated in the following case :

N = 1000 (A) = 470 (B) = 620 and (AB) = 320. 4

OR

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7. (P) Explain independence of attributes. Give the criteria for independence of two attribute A and B. 4

(Q) Establish the relationship between Yule's coefficient of association and coefficient of colligation. 4

(R) Examine the consistency of the following data

N = 1000, (A) = 600, (B) = 500 and (AB) = 50. 4

8. (A) Define Bernoulli trials; write down pmf of Bernoulli distribution. 4

(B) Derive the expression for mean and variance of Binomial distribution. 4

(C) A coin with p =1/3 as the probability of head is tossed 6 times, then find probability of getting at least 2 heads by using binomial probability. 4

OR

9. (P) Define discrete uniform distribution; derive the expression for mean and variance of discrete uniform distribution. 4

(Q) Derive the Negative Binomial probability function. 4

(R) In a Binomial distribution, the mean and standard deviation are 12 and 2 respectively. Find n and p. 4

10. (A) Derive the Poisson distribution as a limiting case of Binomial distribution. 4

(B) Obtain mean and variance of hypergeometric distribution. 4

(C) State the condition under which Poisson distribution is used. 4

OR

11. (P) Obtain mean and variance of Poisson distribution. 4

(Q) Obtain moment generating function and cumulant generating function of Poisson distribution. 4

(R) Derive an expression for moment generating function of geometric distribution. 4

12. (A) Define normal distribution and obtain moment generating function of it. 6

(B) Define Beta distribution of first kind and second kind. Obtain the moment generation function of the Gamma distribution. 6

OR

13. (P) Define normal distribution and derive the expression for median of normal distribution. 6

(Q) Define exponential distribution with parameter θ. Find its moment generating function and also find its mean and variance. 6