

11. (P) State the p.m.f. of Poisson distribution with parameter λ . Also state and prove the additive or reproductive property of independent Poisson variates. 6

- (Q) Define hypergeometric distribution and obtain its mean and variance. 6

12. (A) State the p.d.f. of continuous uniform distribution and obtain its m.g.f. 4

- (B) Define Gamma variate with parameter λ and obtain its mean. 4

- (C) State any four chief characteristics of normal distribution. 4

OR

13. (P) State the p.d.f. of Beta distributions of first and second kind. 4

- (Q) State the p.d.f. of normal distribution and obtain its median. 4

- (R) Obtain the m.g.f. of exponential distribution and hence find its mean and variance. 4

AP-431

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) The qualitative characteristics are known as _____.

(ii) The probability curve of normal distribution is _____ shaped.

(iii) In Poisson distribution mean is _____ to variance.

(iv) For negative binomial distribution mean is _____ than variance.

- (B) Choose the correct alternatives : 2

(i) For normal distribution $\beta_1 =$ _____.

(a) +3

(b) -3

(c) 0

(d) None of the above

(ii) The term regression was first introduced by _____.

- (a) Karl Pearson
- (b) Bernoulli
- (c) Sir Francis Galton
- (d) R.A. Fisher

(iii) The p.m.f. of discrete uniform distribution on n points $\{x_1, x_2, \dots, x_n\}$ is _____.

(a) $P(x_i) = \frac{1}{n}$ (b) $P(x_i) = \frac{1}{n+1}$

(c) $P(x_i) = \frac{1}{n-1}$ (d) $P(x_i) = \frac{2}{n}$

(iv) Attributes A and B are said to be independent if _____.

(a) $(AB) > \frac{(A)(B)}{N}$

(b) $(AB) < \frac{(A)(B)}{N}$

(c) $(AB) \neq \frac{(A)(B)}{N}$

(d) $(AB) = \frac{(A)(B)}{N}$

(Q) Explain independence of attributes. State the criteria for independence of two attributes A and B. 4

(R) Examine the consistency of the following data :
 $N = 1000$ (A) = 600 (B) = 500 (AB) = 50

The symbols having their usual meaning. 4

8. (A) Define discrete uniform distribution with parameter n . Obtain its mean. 4

(B) State the p.m.f. of negative binomial distribution and obtain its mean. 4

(C) Obtain the m.g.f. of binomial distribution having parameters (n, p) and hence obtain its mean. 4

OR

9. (P) Define Bernoulli distribution and obtain its mean and variance. 4

(Q) State the p.m.f. of binomial distribution and obtain its cumulant generating function. 4

(R) Obtain the m.g.f. of negative binomial distribution and hence obtain its mean and variance. 4

10. (A) Obtain the cumulant generating function of Poisson distribution with parameter λ and show that all the cumulant are equal. 6

(B) Define Geometric distribution. Obtain its m.g.f. and hence find its mean and variance. 6

OR

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

4

- (i) What do you mean by Attribute ?
- (ii) What do you mean by line of best fit ?
- (iii) State the p.m.f. of binomial distribution.
- (iv) What is multiple correlation coefficient ?

2. (A) What do you mean by positive, negative and perfect correlation ? 4

(B) State and prove any two properties of regression coefficients. 4

(C) Obtain an equation of line of regression of Y on X. 4

OR

3. (P) What do you mean by regression ? Why there are always two lines of regression ? 4

(Q) Derive the formula for Spearman's Rank correlation coefficient. 4

(R) Define Karl Pearson's correlation coefficient and obtain its limits. 4

4. (A) Obtain the plane of regression of X_1 on X_2 and X_3 . 6

(B) Explain the term multiple correlation. State the properties of multiple correlation coefficient. 6

OR

5. (P) Explain the concept of partial correlation. Obtain the formula for $r_{12.3}$. 6

- (Q) Distinguish between partial and multiple correlation. Also show that :

$$1 - R_{1.23}^2 = (1 - r_{12}^2) (1 - r_{13.2}^2)$$

where notations have their usual meanings. 6

6. (A) Define :

- (i) Positive class
- (ii) Negative class
- (iii) Positive frequencies
- (iv) Negative frequencies. 4

- (B) Explain the term consistency of data and state the conditions for consistency of data for two attributes A and B. 4

- (C) Obtain the relationship between coefficient of association (Q) and coefficient of colligation (Y). 4

OR

7. (P) Define :

- (i) Attribute
- (ii) Dichotomous classification
- (iii) Manifold classification
- (iv) Order of the class. 4