B.Sc. (M.S.Ds.)

Sub : Statistics

Paper-II : Probability Distributions

Important Questions.

UNIT - I

Long Answer Questions

Q1. Derive poisson distribution as a limiting case of binomial distribution.

Q2. Derive mode of binomial distribution.

Q3. Derive the first four central moments of binomial distribution and examine its skewness and kurtosis.

Q4. Derive the moment generating function of binomial distribution and find its mean and variance.

Q5. Derive the characteristic function of binomial distribution and find its mean and variance.

Q6. State and prove its lack of memory property of geometric distribution.

Q7. Derive mode of poisson distribution.

Q8. Derive the first four central moments of negative distribution and examine its skewness and kurtosis.

Q9. Derive the moment generating function of poisson distribution and find its mean and variance.

Q10. Derive the characteristic function of Poisson distribution.

Q11. Derive the first four central moments of geometric distribution and examine its skewness and kurtosis.

Short Answer Questions.

Q1. State and prove reproductive property of binomial distribution.

Q2. Draw the graph for Binomial distribution in the cases when $p<q$, $p=q$, $p>q$

Q3. State the physical conditions of binomial distribution.

Q4. Derive the probability mass function of binomial distribution.

Q5. Write the applications of binomial distribution.

Q6. Determine the binomial distribution for which the mean is 4 and variance 3 and find its mode.

Q7. Write the applications of poisson distribution.

Q8. State and prove reproductive property of poisson distribution.

Q9. A book contains 2000 printing mistakes distributed at random throught 200 pages what is the probability that a page observed at random contains at least two print mistakes?

Q10. State the physical conditions for the occurence of geometric distribution.

Q11. If the probability of success on each trial is 0.25, after how many trials can we expect first success.

Q12. If the probability that an applicant for a driver's license will pass road test on any given trial is 0.8. What is the probability that he will finally pass the test fewer than 4 trials?

Q13. State and prove reproductive property of geometric distribution.

UNIT - 2

LAQ.

1. Derive the Normal distribution as a limiting form of binomial distribution.
2. Derive the Normal distribution as a limiting form of Poisson distribution
3. Derive the Binomial distribution as a limiting form of Hypergeometric distribution.
4. In Normal distribution, show that

   $$Q.D : M.D : S.D :: 10 : 12 : 15$$

5. Derive the moment generating function of Normal distribution and find its mean and variance.
6. Derive the characteristic function of Normal distribution and from it evaluate mean and variance.
7. Define Hypergeometric distribution and derive mean and variance of hypergeometric distribution.
8. Derive the first four central moments of rectangular distribution and examine its Skewness and Kurtosis.

9. Derive the moment generating function of rectangular distribution and from it evaluate mean and variance.

UNIT -II SAQ

1. Derive cumulative distribution of Uniform distribution.
2. The mean and variance of a rectangular variate are 1.5 and 0.75 respectively. Obtain the Quartiles and hence find Quartile deviation.
3. Derive mean deviation of rectangular distribution.
4. Derive Quartile deviation of uniform distribution.
5. Derive median and mode of uniform distribution
6. The mean and variance of a uniform variable X are 1 and $4/3$. Find the parameters and median of X?
7. Write the characteristics of Normal distribution.

8. Evaluate the mean deviation of Normal distribution

9. State and prove additive property of Normal distribution.

10. Write the properties of Normal distribution.

UNIT - III

LAQ

1. Define Beta distribution of first kind and evaluate its mean and variance.

2. Define Beta distribution of second kind and evaluate its mean and variance.

3. State and prove its lack of memory property of Exponential distribution.

4. Define Cauchy distribution and derive the characteristic function of Cauchy distribution.

5. Obtain the first four central moments of gamma distribution.

6. Derive the moment generating function of gamma distribution and evaluate its mean and variance.

7. Obtain the first four central moments of exponential distribution.

8. Derive the moment generating function of exponential distribution and evaluate its mean and variance.

UNIT - III SAQ

1. Write applications of Exponential distribution
2. Write applications of gamma distribution
3. State and prove additive property of gamma distribution.
4. State and prove additive property of Exponential distribution.
5. Derive the inter-relationship between Beta - I and II kind distributions.
6. The life (in thousands of miles) which car owners get with a certain kind of tyres is a random variable having an exponential distribution with parameter 1/10. Find the probability that one of these tyres will last (i) at most 5000 miles and (ii) any where from 8000 to 12000 miles

7. Derive the cumulant generating function of gamma distribution

8. Derive the Cumulant generating function of exponential distribution.

UNIT - IV

LAQ

1. Derive the relationship between Chi-square and F-distributions.

2. Derive the moment generating function of Chi-square distribution and evaluate its mean and variance.

3. Derive Normal distribution as a limiting form of Chi-square distribution.

4. Derive Normal distribution as a limiting form of t-distribution.

5. Define standard error of a statistic, Explain it by taking the population of size of 5 units: 12, 11, 17, 18, 22 with a sample of size two without replacement for the statistics: Sample mean and Sample variance

6. Define χ^2-distribution and state its properties

7. Define t-distribution and state its properties.

8. Define F-distribution and state its properties

9. Define population, Sample, parameter, statistic and give two examples of each.

UNIT - IV SAQ

1. Draw the graph of χ^2-distribution
2. Draw the graph of t-distribution
3. Draw the graph of F-distribution
4. State and prove additive property of Chi-Square distribution
5. Derive the relationship between t and F-distributions
6. Define sampling distribution of a ~~stande~~ statistic
7. Define standard error and write standard error of various statistics