Faculty of Science

B.Sc (Statistics)I-Year, CBCS –II Semester

Regular Examinations –June/July, 2022

PAPER-II: Probability Distributions

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following   (8x4=32 Marks)

1. Define Bernouli Variable with an example

2. Show that for Binomial distribution mean is greater than variance

3. Show that the difference between the poissonvariates is not a poissonvariate

4. Derive the moments of Binomial distribution from Negative binomial distribution

5. Explain the memoryless property of Geometric distribution

6. Explain the Mass function of Hypergeometric distribution with an example

7. Suppose $x \sim U(2,6)$ then find mean and variance

8. Find the mean deviation from mean of normal distribution

9. Explain the Area property of normal distribution

10. Find the MGF of exponential distribution. Hence find mean and Variance

11. Explain the Reproductive property of Gamma distribution

12. Define convergence in Law and Almost sure in probability

Section-B

II. Answer the following   (4x12=48 Marks)

13. (a) Define Binomial distribution .Explain the Recurrence relation for its moments also find its moments

(OR)

(b) Stating the assumptions show that poisson distribution is limiting form of Binomial distribution.

14. (a) Find the PGF of Negative binomial distribution. Hence find μ_3

(OR)

(b)Stating the assumptions show that Hyper geometric distribution is a limiting form of binomial distribution

15. (a) Define Normal distribution. Show that mean, median and mode are equal.

(OR)

(b) Show that Normal distribution is limiting form of Poisson distribution.

16. (a) Define Beta distribution of second kind. find its Harmonic Mean

(OR)

(b) Define Cauchy distribution. Find its characteristic function

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Faculty of Science

B. Sc (Statistics) I-Year, CBCS –II Semester Backlog Examinations –Jan, 2023

PAPER: Probability Distributions

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following questions   (8x4=32 Marks)

1. Define Bernoulli distribution and derive its mean and variance.
2. A skill typist, on routine work, kept the following record of mistakes made per day during 300 working days.

Mistakes per day	0	1	2	3	4	5	6
No.of days	143	90	42	12	9	3	1

Fit the Poisson distribution by direct method.

3. Define uniform distribution and find its mean and variance.
4. Define Hyper geometric distribution and derive its mean.
5. Derive the Probability generating function of geometric distribution and derive the mean from it.
6. Discuss the real the applications of Negative binomial distribution.
7. Define the Normal distribution and Standard normal distribution.
8. Derive the Mode of Normal distribution.
9. State the important properties of Normal distribution.
10. Define Exponential distribution. Extract its mean and variance.
11. Define Rectangular distribution and derive its mean.
12. Define Bela distribution of first kind.

Section-B

II. Answer the following questions   (4x12=48 Marks)

13.(a) Derive Recurrence relation of the moments for Binomial distribution and obtain the first four central moments from it. Find the skewness and kurtosis of Binomial distribution.

(OR)

(b) Derive the moment generating function Poisson Distribution and derive mean and variance from it.

14.(a) Define Negative Binomial distribution and Show that Poisson distribution as a limiting case of Negative Binomial distribution.

(OR)

(b) State and prove lack of memory property of Geometric distribution

15.(a) Extract the characteristics functions (c.f.) of Normal distribution. And find first four moments using c.f.

(OR)

(b) Show that Normal distribution as a limiting case of Binomial distribution.

16.(a) State and prove lack of memory property of Exponential distribution.

(OR)

(b) Define Gamna distribution. Extract its m.g.f., using m.g.f. find first four moments.

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Faculty of Science

B.Sc (Statistics) I-Year, CBCS –II Semester Regular Examinations -June, 2023

PAPER: Probability Distributions

Time: 3 Hours   Max Marks: 80

Section-A

I. Answer any *eight* of the following questions   (8x4=32 Marks)
   1. Define Poisson distribution and derive its mean and variance.
   2. Derive the moment generation function of Binomial distribution and derive the mean from it.
   3. Define Bernoulli distribution and extract mean various.
   4. Define Negative Binomial distribution and obtain mean.
   5. Fit the Geometric distribution to the following data

x	0	1	2	3	4	5
f	201	70	41	20	7	1

   6. Define Hyper geometric distribution and derive its mean.
   7. State the chief characteristics of Normal distribution.
   8. State and prove additive property of Normal distribution in case of two independent random variables.
   9. Define the Normal distribution and Standard normal distribution.
   10. Define Gamma distribution and state its additive property.
   11. Define Beta distribution of second kind.
   12. Derive moment generation function of Exponential distribution.

Section-B

II. Answer the following questions   (4x12=48 Marks)
   13.(a) Fit a Binomial distribution to the following data by Recurrence relation method.

X	0	1	2	3	4	5	6
f	7	64	140	210	132	75	12

(OR)

   (b) Derive the Recurrence relation for moments of Poisson distribution and obtain the moments from it.

   14.(a) Define Geometric distribution. Find the characteristics function of Geometric distribution and generate first two moments using c.f.

(OR)

   (b) The number of failures preceding the rth success in an experiment is recorded as follows. Fit Negative Binomial distribution.

X	0	1	2	3	4	5
f	214	125	41	16	3	1

   15.(a) Show that the ratio between standard deviation, mean deviation and quartile deviations is 15:12:10 for Normal distribution

(OR)

   (b) A normal distribution has mean 30 and standard deviation 5.
       Find the probability that
       i) $26 \leq X \leq 40$
       ii) $X \geq 45$

   16.(a) State and prove Lack of memory property of exponential distribution.

(OR)

   (b) show that " Gamma distribution tends to normal distribution as $\lambda \to \infty$ "

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