



K24U 3453

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/  
Improvement) Examination, November 2024  
(2019 to 2023 Admissions)

Complementary Elective Course in Statistics for B.Sc. Geography/  
Psychology

3C03STA (G&P) : PROBABILITY AND DISTRIBUTION THEORY

Time : 3 Hours

Max. Marks : 40

PART – A  
(Short Answer)

Answer **all** questions.

(6×1=6)

1. Define the term random experiment.
2. State classical definition of probability.
3. What do you mean by a discrete random variable ?
4. Name a discrete distribution with mean equal to variance.
5. What is the mean of a binomial distribution with parameters  $n = 10$  and  $p = 0.4$  ?
6. Define statistic.

PART – B  
(Short Essay)

Answer **any 6** questions.

(6×2=12)

7. Write down the sample space of the random experiment of tossing a fair coin twice and noting the face that turns up. Write the event of getting at least one tail.
8. An unbiased coin is tossed three times. Find the probability of getting
  - i) exactly one head
  - ii) at most one head.

P.T.O.



9. The number of printing mistakes per page in a book is assumed to follow poisson distribution with mean 2. What is the probability that a page selected at random contains
  - i) no mistakes at all,
  - ii) two mistakes ?
10. Explain the relationship between mean and variance of a binomial distribution.
11. Define normal distribution.
12. Define standard error. Give an example.
13. Define  $F$ -distribution.
14. Write any two applications of chi-square distribution.

PART – C  
(Essay)

Answer any 4 questions.

(4×3=12)

15. Two fair dice are rolled. Find the probability of getting a sum of 9 or an even number on the first die.
16. Define conditional probability and independence of events.
17. Define probability density function. What are its properties?
18. A discrete random variable  $X$  has the following probability mass function.

$x$	0	1	2
$P(X = x)$	0.2	0.5	0.3

Write down its distribution function.

19. A fair die is rolled. Find the expected value of the number shown.
20. A random variable  $X$  is assumed to have a normal distribution with mean 10 and variance 9. If a random sample of size 9 is drawn from this population, find the probability that :
  - i) the sample mean is greater than 11.96
  - ii) the sample mean is less than 10.



PART – D  
(Long Essay)

Answer any 2 questions.

(2×5=10)

21. There are two boxes. One box contains 5 white and 3 red balls. The other box contains 4 white and 6 red balls. One box is chosen at random and a ball is drawn from it. It is found to be red. What is the probability that it is from box 1 ?

22. The probability distribution of a random variable X is as shown below.

x	-2	-1	0	1	2
P (X = x)	k	2k	0.2	3k	2k

- i) Find the value of k
  - ii) Find  $P(X \leq 0)$
  - iii) Find  $P(-1 < X < 2)$
  - iv) Find  $P(X \geq -1)$
  - v) Find  $E(X)$
23. Write down any five properties of normal curve.
24. The marks of students in an examination is normally distributed with a mean of 40 and standard deviation 5. What is the proportion of students who score in between 33 and 42 ? What is the minimum mark of the top 10% students ?

