K21U 1854

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree CBCSS (OBE) Reg./Sup./Imp. Examination, November 2021
(2019-2020 Admission)
COMPLEMENTARY ELECTIVE COURSE IN STATISTICS
For B.Sc. Geography/Psychology
3C 03 STA (G & P) : Probability and Distribution Theory

Time : 3 Hours Max. Marks : 40

Instruction *: Use of calculators and statistical tables are* ***permitted.***

PART – A
(Short Answer)

Answer **all 6** questions. **(6×1=6)**

1. What do you mean by sample space ?
2. Define mutually exclusive events.
3. Define independence of events.
4. Write down the pdf of standard normal distribution.
5. A Poisson distribution has mean 2. Write down its pmf.
6. A binomial distribution has mean 4 and variance 2. Obtain its parameters.

PART – B
(Short Essay)

Answer **any 6** questions. **(6×2=12)**

7. Discuss the frequency approach to probability.
8. There are two groups of students consisting of 4 boys and 2 girls; 3 boys and 1 girl. Calculate the probability of selecting one boy and one girl.
9. Distinguish between continuous and discrete random variables with suitable examples.
10. A discrete random variable X takes values 0, 1, 2, 3 with respective probabilities k, 2k, 3k, 4k. Find the value of k and expected value of X.

P.T.O.

11. Define Poisson distribution and give example of random variable following Poisson distribution.

12. If X is a normal random variable with mean 40 and variance 25, find $P[|X - 40| > 5]$.

13. Discuss the features of binomial distribution.

14. Give the pdf of a Student's distribution with n degrees of freedom.

PART – C
(Essay)

Answer **any 4** questions. **(4×3=12)**

15. If two events are independent, show that their complements are also independent.

16. Define distribution function of a random variable. Give its properties.

17. Define mathematical expectation of a random variable. Show that $E(cX) = c\,E(X)$, where c is a real constant.

18. Define binomial distribution. Obtain its mean.

19. Discuss the importance of normal distribution.

20. Define chi square distribution and state its properties.

PART – D
(Long Essay)

Answer **any 2** questions. **(2×5=10)**

21. State and prove Baye's theorem.

22. A discrete random variable X has pmf $f(x) = \frac{1}{5k}$, x = 1, 2, 3, 4, 5. Obtain the value of k. Also find the mean and variance of X.

23. Three unbiased coins are tossed 100 times and the following results were obtained.

Number of Heads	0	1	2	3
Frequency	36	40	22	2

Fit a binomial distribution and estimate the expected frequencies.

24. Describe the important characteristics of t and F distributions.