K20U 1853

Reg. No. : .....

Name : .....

III Semester B.Sc. Degree CBCSS (OBE) – Regular Examination, November 2020
(2019 Admission Only)
COMPLEMENTARY ELECTIVE COURSE IN STATISTICS
3C03 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 a random experiment ?
2. Give the frequency definition of probability.
3. Give one application of Baye's theorem.
4. Write down the pmf of a binomial distribution with parameters n = 5 and p = 0.5.
5. Give the pdf of a normal random variable having mean 20 and standard deviation 3.
6. Which distribution possesses lack of memory property ?

PART – B
(Short Essay)

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

7. Discuss the axiomatic approach to probability.
8. Define conditional probability and independence of events.
9. Two dice with faces marked 1, 2, 3, 4, 5, 6 are thrown simultaneously and the points on the dice are multiplied together. Find the probability that the product is 12.

P.T.O.

10. Define distribution function of a random variable. What are its properties ?

11. Write down the mean and variance of a random variable having pmf

$$f(x) = \binom{8}{x}\left(\frac{1}{4}\right)^{x}\left(\frac{3}{4}\right)^{8-x}, \quad x = 0, 1, 2, \ldots, 8.$$

12. Give any four properties of Poisson distribution.

13. If X is a normal random variable with mean 20 and variance 64, find the probability of X lies between 12 and 28.

14. What do you mean by sampling distributions ? Give examples.

PART – C
(Essay)

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

15. State and prove addition theorem in probability for any two events.

16. A random variable X takes values 4, 5, 6, 8 with probabilities 0.1, 0.3, 0.4, 0.2 respectively. Find the expected value of X and variance.

17. The distribution function of a random variable is given by $F(x) = \begin{cases} 0, & x < 0 \\ 0.5, & 0 \le x < 1 \\ 1, & x \ge 1 \end{cases}$ obtain its pmf.

18. Define exponential distribution. Obtain its mean and variance.

19. Write short note on the properties of normal distribution.

20. Define F distribution and state its properties.

PART – D
(Long Essay)

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

21. State and prove Baye's theorem.

22. An unbiased coin is thrown three times. If X denotes the number of heads obtained, find the pmf, cdf and mean of X.

23. Five unbiased coins are tossed 3200 times. Find the expected frequencies of the distribution of heads.

24. Discuss the relations between standard normal, chi-square student's t and F distribution.

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