PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2022
(Third Semester)

Branch – STATISTICS

PROBABILITY DISTRIBUTIONS

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 x 2 = 20)

1. State the Weak Law of Large Numbers.
2. Define Moment Generating function.
3. Define independence of two random variables.
4. Define conditional variance.
5. Define Poisson distribution.
6. Define multinomial distribution.
7. Define beta first kind.
8. Define exponential distribution.
9. Define- F distribution.
10. Write any two applications of χ^2 – distribution.

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks (5 x 5 = 25)

5. a) State and prove the Bernoulli's law of large numbers.
(Or)
   b) State the Central Limit Theorem for i.i.d random variables.

6. a) Explain the marginal and conditional distributions.
(Or)
   b) Write the marginal and Conditional expectation.

7. a) Derive the Moment Generating function of binomial distribution.
(Or)
   b) Derive the mean and variance of Hypergeometric distribution.

14 a) State the properties of normal distribution.
(Or)
   b) Derive the mean and variance of Gamma distribution.

15. a) State the applications of t – distribution.
(Or)
   b) Derive the Moment Generating function of χ^2 – distribution.

SECTION - C (30 Marks)
Answer any THREE Questions
ALL Questions Carry EQUAL Marks   (3 x 10 = 30)

16. State and prove Tchebychev's inequality.

17. For the joint distribution $f(x) = \begin{cases} \frac{9}{4}-x-y, & 0 \le x \le 2, 0 \le y \le 2 \\ 0, & \text{Otherwise} \end{cases}$

Obtain marginal and conditional distribution.

18. In usual notations, Derive recurrence relation for Poisson distribution.

19. Derive the Moment Generating function of Normal distribution.

20. Derive the relationship between t and F distributions.

Z-Z-Z   END