Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Sc (Non Medical)   (Sem.–5)
THEORY OF PROBABILITY
Subject Code : BSNM-505-18
M.Code : 78619
Date of Examination : 02-01-23

Time : 3 Hrs.   Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

    a) If a sample space $X = A \cup B$, $P(A) = \dfrac{1}{2}$, $P(B) = \dfrac{3}{4}$, Find $A \cap B$.

    b) State Baye's Theorem.

    c) State axioms of probability.

    d) State additive property of Gamma distribution.

    e) State any two property of distribution function.

    f) If $f(x) = \begin{cases} \dfrac{x}{15} & x = 1, 2, 3, 4, 5 \\ 0 & \text{elsewhere} \end{cases}$ Find P $\{X = 1$ or $2\}$

    g) Two unbiased dice are thrown. Find the expected values of the sum of numbers of points n them.

    h) Define continuous distribution function.

    i) Find the binomial distribution whose mean is 3 and variance 2.

    j) State properties of normal distributions.

SECTION-B

2. Two persons A and B throw a die alternatively till one of them gets three and wins the game. Find their respective probabilities of winning.

3. Show the function defined under is a density function.

$$f(x) = \begin{cases} e^x & for\ x \geq 0 \\ 0 & x < 0 \end{cases}$$

Determine the probability that the variate having this density function will fall in interval (1, 2).

4. A box contains 2^n tickets among which ^nc_i tickets bear the number I : I = 0; 1, 2, 3………. n. A group of m tickets is drawn. What is the expectation of the sum of their numbers?

5. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find mean and standard deviation of the distribution.

6. In a binomial distribution consisting of 5 independent trials, probabilities of 1 and 2 successes are 0.24576 and 0.08192. Find the parameter 'p' of the distribution.

SECTION-C

7. Find all the constants of β distribution of first kind.

8. Derive Cumulants of negative binomial distribution.

9. A random ariable X has the density function $f(x) = \dfrac{c}{(x^2+1)}$, $-\infty < x < \infty$.

   a) Find the value of constant c

   b) Find the probability that X^2 lies between 1/3 and 1.

   c) Find the distribution function.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.