

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-III Semester (BT)

COURSE CODE (CREDITS): 18B11MA312 (4)

MAX. MARKS: 25

COURSE NAME: PROBABILITY AND STATISTICAL TECHNIQUES

COURSE INSTRUCTORS: MDS

MAX. TIME: 1 Hour 30 Minutes

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Scientific Calculator is allowed.

| Q.No | Question | CO | Marks | | | | | | | | | | | | |
|-----------|--|-------|-------|-------|-------|-------|-------|-----------|---|----|----|----|----|------|---|
| Q1 | <p>Estimate of the variance and standard deviation of the following data for the marks obtained in a test by 88 students.</p> <table border="1"> <tr> <td>Marks</td> <td>0-10</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> </tr> <tr> <td>Frequency</td> <td>6</td> <td>16</td> <td>24</td> <td>25</td> <td>17</td> </tr> </table> | Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | Frequency | 6 | 16 | 24 | 25 | 17 | CO-1 | 5 |
| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | | | | | | | | | | |
| Frequency | 6 | 16 | 24 | 25 | 17 | | | | | | | | | | |
| Q2 | <p>A bag contains 7 red and 3 black marbles. Another bag contains 4 red and 5 black marbles. One marbles is transferred from the first bag into the second bag and then a marble is taken out from the second bag at random. If this marble happens to be red, find the probability that a black marble was transferred.</p> | CO-2 | 4 | | | | | | | | | | | | |
| Q3 | <p>A random variable X has the following probability mass function:</p> <table border="1"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>P(X = x)</td> <td>k</td> <td>3k</td> <td>5k</td> <td>7k</td> <td>9k</td> </tr> </table> <p>Find (a) the value of k (b) $P(0 < X < 4)$ (c) Cumulative distribution function (CDF)</p> | x | 0 | 1 | 2 | 3 | 4 | P(X = x) | k | 3k | 5k | 7k | 9k | CO-2 | 4 |
| x | 0 | 1 | 2 | 3 | 4 | | | | | | | | | | |
| P(X = x) | k | 3k | 5k | 7k | 9k | | | | | | | | | | |
| Q4 | <p>If X is a continuous random variables whose probability density function (PDF) is given by</p> $f(x) = \begin{cases} c(4x - 2x^2), & 0 < x < 2, \\ 0, & \text{otherwise.} \end{cases}$ <p>Find (i) the value of c (ii) $P(X > 1)$</p> | CO-2 | 4 | | | | | | | | | | | | |
| Q5. | <p>The odds against A solving a certain problem are 4 to 3, and odds in favour of B solving the same problem are 7 to 5. What is the probability that the problem is solved if they both try independently?</p> | CO-2 | 4 | | | | | | | | | | | | |
| Q6. | <p>The mean and variance of a binomial distribution are 3 and 2 respectively. Calculate (a) $P(x = 1)$ (b) $P(X = 2)$ (c) $P(X \geq 3)$</p> | CO-2 | 4 | | | | | | | | | | | | |