PROBABILITY & STATISTICS

( AI&DS , AI&ML )

**UNIT – 1(CO1)**

**1)**Consider the following distribution ☹ (12M)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x** | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| **f** | 12 | 18 | 20 | 25 | 23 |

Calculate i)Mean

ii)Median

iii)Mode

**2)**Find the semi inter-Quartile range for the following distribution. (12M)

|  |  |
| --- | --- |
| **Daily income (Rs)** | **No of families** |
| 0-75 | 14 |
| 75-100 | 52 |
| 100-150 | 200 |
| 150-200 | 239 |
| 200-250 | 334 |
| 250-350 | 443 |
| 350-550 | 218 |
| 550-800 | 225 |

**3)**Find the i) Lower Quartile

ii) Upper Quartile

for the following frequency distribution. (12M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Wages (Rs)** | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| **No of persons** | 1 | 3 | 11 | 21 | 43 | 32 | 9 |

**4)**Find out the Mean , Median and the Mode for the given data : (12M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Size below** | 5 | 10 | 15 | 20 | 25 | 30 | 35 |
| **Frequency** | 1 | 3 | 13 | 17 | 27 | 36 | 38 |

**5)**Find the mode, median, Q1, Q3, coefficient of Q.D from the following data. (12M)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Wages** | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| **No. of workers** | 22 | 38 | 46 | 35 | 20 |

**6)** Calculate the standard deviation and variance for the following data. (12M)

|  |  |
| --- | --- |
| **Marks** | **No. of students** |
| 0-10 | 5 |
| 10-20 | 7 |
| 20-30 | 14 |
| 30-40 | 12 |
| 40-50 | 9 |
| 50-60 | 6 |
| 60-70 | 2 |

**7)**Find the standard deviation and variance of the following data (12M)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age (under years)** | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| **Frequency** | 15 | 30 | 53 | 75 | 100 | 110 | 115 | 125 |

**8)** Determine the Arithmetic Mean , Median and mode of the marks from the following table (12M)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Marks (x)** | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| **No of students (f)** | 12 | 18 | 27 | 20 | 17 | 6 |

**9)**Calculate Mean deviation about mean and Standard deviation from the following table (12M)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Class interval** | 20-30 | 30-40 | 40-50 | 50-60 |
| **Frequencies** | 4 | 61 | 132 | 153 |

**10)**Calculate Mean deviation about mean and Standard deviation from the following table (12M)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Class interval** | 0-8 | 8-16 | 16-24 | 24-32 | 32-40 |
| **Frequencies** | 8 | 7 | 16 | 24 | 15 |

**UNIT – 2(CO2)**

**1)**Find the karl-pearson’s coefficient of correlation from the following data (12M)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Wages** | 100 | 101 | 102 | 102 | 100 | 99 | 97 | 98 | 96 | 95 |
| **Cost of living** | 98 | 99 | 99 | 97 | 95 | 92 | 95 | 94 | 90 | 91 |

**2)**Find the karl-pearson’s coefficient of correlation from the following data. (12M)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Height of father**  **(in inches)** | 65 | 66 | 67 | 67 | 68 | 69 | 71 | 73 |
| **Height of son**  **(in inches)** | 67 | 68 | 64 | 68 | 72 | 70 | 69 | 70 |

**3)**Calculate Spearman’s rank correlation coefficient from the following data. (12M)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Score in English** | 40 | 46 | 54 | 60 | 70 | 80 | 82 | 85 | 85 | 90 | 95 |
| **Score in Telugu** | 45 | 45 | 50 | 43 | 40 | 75 | 55 | 72 | 65 | 42 | 70 |

**4) (12M)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Heights of Father** | 65 | 66 | 67 | 67 | 68 | 69 | 71 | 73 |
| **Heights of**  **Mother** | 67 | 68 | 64 | 68 | 72 | 70 | 69 | 70 |

Form the two lines of regression .

**5)**By the method of least squares, find the straight line that best fits the following data (12M)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 1 | 2 | 3 | 4 | 5 |
| **Y** | 14 | 27 | 40 | 55 | 68 |

**6)**Fit a second degree polynomial to the following data by the method of least squares (12M)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 10 | 12 | 15 | 23 | 20 |
| **y** | 14 | 17 | 23 | 25 | 21 |

**7)**Fit a parabola of the form y= a+bx+cx2 to the following data. (12M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **y** | 2.3 | 5.2 | 9.7 | 16.5 | 29.4 | 35.5 | 54.4 |

**8)**Fit a curve of the form y=aebxto the following data: (12M)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **x** | 0 | 1 | 2 | 3 |
| **y** | 1.05 | 2.10 | 3.85 | 8.30 |

**9)**Fit a straight line to the following data (12M)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **x** | 1 | 2 | 3 | 4 | 5 | 6 |
| **y** | 14 | 33 | 40 | 63 | 76 | 85 |

**10)**Calculate correlation coefficient and also obtain the lines of regression to (12M)

the following data.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **y** | 9 | 8 | 10 | 12 | 11 | 13 | 14 | 16 | 15 |

**UNIT – 3(CO3)**

**1)** A random variable X has the following probability distribution. (6M)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **P(X)** | K | 2K | 3K | 4K | 5K | 6K | 7K | 8K |

Find the value of

i) K

ii)P(X ≤ 2)

iii)P(2 ≤ X ≤ 5)

**2)** A random variable X has the following probability distribution. (6M)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Values of X** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **P(X)** | a | 3a | 5a | 7a | 9a | 11a | 13a | 15a | 17a |

i) Determine the value of a.

ii) Find P(X < 3) and P(X ≥ 3)

iii)Find P(0 < X < 5)

**3)** The probability density function of a variate X is (6M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **P(X)** | K | 3K | 5K | 7K | 9K | 11K | 13K |

i) Find K

ii) Find P(X < 4) and P(X ≥ 5)

iii) Find P(3 < X ≤ 6)

**4)** For the discrete probability distribution. (6M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| **P(X)** | 0 | 2K | 2K | 3K | K2 | 2K2 | 7K2 + K |

Find i) K ii) Mean iii) Variance

**5)** A random variables X has the following probability function. (6M)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Xi** | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| **P(Xi)** | K | 0.1 | K | 0.2 | 2K | 0.4 | 2K |

Find i) K ii) Mean iii) Variance

**6)**A continuous random variable has the probability density function

Determine (i) value of (ii) Mean (iii) Variance (6M)

**7)**A continuous random variable has the probability density function

Determine (i) value of (ii) Mean (6M)

8) Determine the Probability distribution of the random variable which is associated with the number of heads turned up when two coins are tossed simultaneously. Also find its mean. (6M)