**PROGRAM MCA**

**SEMESTER III**

**COURSE CODE &amp; NAME DCA7101 – PROBABILITY AND STATISTICS**

**SET-I**

**1. Bag I contain 3 red and 4 black balls and Bag II contain 4 red and 5 black balls. One ball is transferred from Bag I to Bag II and then a ball is drawn from Bag II. The ball so drawn is found to be red. Find the probability that the transferred ball is black.**

**Solution: Step -1: Consider all possible events for transferring balls.**

               Given that,

               Bag I contains 3 red and 4 black balls.

               Bag II contains 4 red and 5 black balls.

               Let E1, E2, E3, E, be

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**2. A random variable has the following probability distribution**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **X** | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **P(X=x)** | **0** | **a** | **2a** | **2a** | **3a** | **a^2** | **2a^2** | **7a^2 + a** |

**Find (i) the value of ‘a’**

**(ii) P [1.5<X<4.5/ X>2]**

**(iii) E(X)**

## Solution: (i) Sum of all probabilities must be equal to 1

## So we get a+2a+2a+3a+a^2+2a^2+7a^2 +a =1

## ⇒10a^2 + 9a =1

## ⇒a = −1,

**3. The daily earning of a vendor for a period of 43 days are given below**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Daily earning (Rs.)** | **118-**  **126** | **127-**  **135** | **136-**  **144** | **145-**  **153** | **154-**  **162** | **163-**  **171** | **172-**  **180** |
| **No. of days** | **3** | **8** | **9** | **12** | **5** | **4** | **2** |

**Calculate Standard Deviation and coefficient of variation.**

**Solution:**

**SET-II**

**4. Suppose that a manufactured product has 2 defects per unit of product inspected. Using Poisson’s distribution, calculate the probabilities of finding a product without any defect, 3 defects, and 4 defects. (Given)**

**Solution:**

**Given:**

A manufactured product has 2 defects per unit of product inspected

**To find:**

The probabilities of finding a product with

* out any defect
* 3 defects

**5. Compute the regression equation of Y on X and regression equation of X on Y on the basis of the following information**

|  |  |  |
| --- | --- | --- |
|  | **X** | **Y** |
| **Mean** | **40** | **45** |
| **Standard Deviation** | **10** | **9** |

**The correlation coefficient between X and Y is 0.50. Also estimate the value of Y for X = 48, using the appropriate regression equation.**

**Answer:**

Given that,

**6. The following data relate to the prices and quantities of 4 commodities in the years 1982 and 1983. Construct the following index numbers of price for the year 1983 by using 1982 as base year.**

**(i) Laspeyre’s Index**

**(ii) Paasche’s Index**

**(iii) Fisher’s Index**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Commodit Y** | **1982** | | | **1983** | | |
| **Price** | **Quantity** | | **Price** | | **Quantity** |
| **A** | **5** | | **100** | **6** | **150** | |
| **B** | **4** | | **80** | **5** | **100** | |
| **C** | **2.5** | | **60** | **5** | **72** | |
| **D** | **12** | | **30** | **9** | **33** | |

**Solution:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Commodit Y** | **1982** | | **1983** | | **P1q0** | **P0q0** | **P1q1** | **P0q1** |
| **Price(P0)** | **Quantity(Q0)** | **Price(P1)** | **Quantity(Q1)** |
| A | 5 | 100 | 6 | 150 | 600 | 500 | 900 | 750 |
| B | 4 | 80 | 5 | 100 | 400 | 320 | 500 | 400 |
| C | 2.5 | 60 | 5 | 72 | 300 | 150 | 360 | 180 |