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**Assignment – 2**

**(Based on Unit III)**

**MCA-III Semester**

**Course Code: MCA 203**

**Course Name: Artificial Intelligence and Machine Learning**

| 1.        | Differentiate between supervised and unsupervised machine learning techniques.  | CO5         | BTL4 |    |     |    |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
|-----------|---|-------------|------|----|-----|----|-----|----|-----|-----|----|----|-----|----|-----|-------------|------|-----|----|-----|----|----|-----|-----|----|----|----|---|----|----|----|----|----|----|---------------------|------|
| 2.        | Elaborate Multiple Linear Regression (MLR) with equations.  | CO6         | BTL6 |    |     |    |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| 3.        | Consider the points: (1, 1), (–2, –1) and (3, 2).<br>In graph, plot these points and generate the least-squares regression line.  | CO3,<br>CO6 | BTL6 |    |     |    |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| 4.        | Explain Confusion Matrix. Why do we need confusion matrix in machine learning?  | CO3         | BTL4 |    |     |    |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| 5.        | A market trader sells ball-point pens on his stall. He sells the pen for a different fixed price, $x$ , in each of the six weeks. He notes the number of pens, $y$ that he sells in each of these six weeks. The results are shown in the following table.<br><br><table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td><math>x</math></td> <td>10</td> <td>15</td> <td>20</td> <td>25</td> <td>30</td> <td>35</td> </tr> <tr> <td><math>y</math></td> <td>68</td> <td>60</td> <td>55</td> <td>48</td> <td>38</td> <td>32</td> </tr> </tbody> </table><br>Calculate the equation of the least squares regression line of $y$ on $x$ .  | $x$         | 10   | 15 | 20  | 25 | 30  | 35 | $y$ | 68  | 60 | 55 | 48  | 38 | 32  | CO5,<br>CO6 | BTL6 |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| $x$       | 10  | 15          | 20   | 25 | 30  | 35 |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| $y$       | 68  | 60          | 55   | 48 | 38  | 32 |     |    |     |     |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| 6.        | Students organize a street collection for a mental health charity. The collection takes place in a large city on a particular Saturday. Students, with collecting tins, stand in busy places and ask passers-by for donations. The following table shows, for ten volunteers, the times, $x$ minutes, they spent collecting together with the amounts, to the nearest pound, $y$ , they collected.<br><br><table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Collector</th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>E</th> <th>F</th> <th>G</th> <th>H</th> <th>I</th> <th>J</th> </tr> </thead> <tbody> <tr> <td><math>x</math></td> <td>65</td> <td>187</td> <td>126</td> <td>52</td> <td>143</td> <td>90</td> <td>157</td> <td>74</td> <td>88</td> <td>195</td> </tr> <tr> <td><math>y</math></td> <td>21</td> <td>55</td> <td>23</td> <td>8</td> <td>28</td> <td>27</td> <td>44</td> <td>19</td> <td>17</td> <td>47</td> </tr> </tbody> </table><br>Calculate the equation of the regression line | Collector   | A    | B  | C   | D  | E   | F  | G   | H   | I  | J  | $x$ | 65 | 187 | 126         | 52   | 143 | 90 | 157 | 74 | 88 | 195 | $y$ | 21 | 55 | 23 | 8 | 28 | 27 | 44 | 19 | 17 | 47 | CO3,<br>CO5,<br>CO6 | BTL6 |
| Collector | A   | B           | C    | D  | E   | F  | G   | H  | I   | J   |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| $x$       | 65  | 187         | 126  | 52 | 143 | 90 | 157 | 74 | 88  | 195 |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |
| $y$       | 21  | 55          | 23   | 8  | 28  | 27 | 44  | 19 | 17  | 47  |    |    |     |    |     |             |      |     |    |     |    |    |     |     |    |    |    |   |    |    |    |    |    |    |                     |      |

|    |   |             |      |
|----|---|-------------|------|
| 7. | Elaborate Coefficient of determination, correlation and confusion matrix with equation and proper notation. | CO3         | BTL6 |
| 8. | Compare Total Sum of Squares, Sum of Squares of Residuals, Sum of Square of Regression.                     | CO3,<br>CO5 | BTL5 |