|  |  |  |
| --- | --- | --- |
| 1A | Prove that the VC-dimension of rectangle is exactly four. Also prove that no set of five points can be shattered by rectangle. | 3M |
| 1B | Compare feature selection methods with feature extraction methods. | 5M |
| 1C | Given the data points P (3, 2) and Q (4, 1). Evaluate the distance by using any two distance measures. | 2M |
|  |  |  |
| 2A | Consider the following dataset and predict the regression lines X on Y and Y on X.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 2 | 3 | 4 | 5 | 6 | | Y | 3 | 1 | 7 | 8 | 9 | | 4M |
| 2B | Given the data in the table, discuss the different steps of principal component analysis and compute the covariance matrix and first principal component.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | X | 4 | 8 | 13 | 7 | | Y | 11 | 4 | 5 | 14 | | 6M |
|  |  |  |
| 3A | We have an agent and a reward, with many hurdles in between to pass. Choose a suitable machine learning technique for the above situation and discuss the steps with neat diagram. | 2M |
| 3B | Elaborate PCA and LDA mathematically. | 5M |
| 3C | Discuss the advantages and disadvantages of Simple Linear Regression and Multiple Linear Regression models for different types of data analysis tasks. | 3M |

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**PE-I Advanced Machine Learning (CSE5401)**

**Time: 120 minutes Test I- (20/3/2024) Max. Marks:30**

**Note:** Mathematical equations and notations are to be properly explained.