| Question Paper Code: U5316 M.E. DEGREE EXAMINATION, NOV 2024 Professional Elective Computer Science and Engineering 21PCS516 – ANALYTICAL DATA SCIENCE (Regulations 2021) Duration: Three hours Maximum: 100 Marks Answer ALL Questions PART A - (5 x 20 = 100 Marks) 1. (a) Explain the role of matrix operations in machine learning algorithms. CO1-U How does linear algebra facilitate tasks such as feature extraction and dimensionality reduction? Or (b) Explain the significance of problem formulation in data science. How CO1-U (a) Develop a plan to use a histogram to analyze the distribution of exam CO2- App scores in a classroom. Include steps for data preprocessing, binning, and interpretation of results. Or (b) Apply the concept of PCA to reduce the dimensionality of a dataset CO2- App (or path) |
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| preserving important information while reducing noise and redundancy. |
| 3. (a) The features in a data set are as given below. Find the dimensionality CO2-App (of the data set. $\begin{bmatrix} 2 & 1 & -1 \\ 4 & -1 & 5 \\ -2 & 3 & 4 \end{bmatrix}$ |
| Or |

(b) Find all the distance measures for the points (1,2,3,4,5) and CO2-App (20) (5,6,7,8,9).

4. (a) (i) How do we overcome data discovery challenges? CO2- App (20) (ii) Discuss data discovery use cases.

| Or |
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- (b) (i) Sort a list of numbers in ascending order using Python
 (ii) Write a python program to convert marks obtained into grade.
 (20)
- 5. (a)

| IN T | 15 | 23 | 18 | 23 | 24 | 22 | 22 | 19 | 19 | 16 | 24 | 11 | 24 | 16 | 23 | CO2- App | (20) |
|---------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|------|
| EX T | 49 | 63 | 58 | 60 | 58 | 61 | 60 | 63 | 60 | 52 | 62 | 30 | 59 | 49 | 68 | | |

Apply k means clustering to the above data set

(b) Explain in detail about data pre-processing and preparation with CO2- App (20) python code.