**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **3BC5163** | Roll No. | Total Printed Pages: 2 |
| **3BC5163** |  |
| BCA III Year V-Semester (Main/Back) End Semester Examination, November 2022  **(DS)** | |
| **BCD05103 : Dimension Reduction and Model Validation** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | What do you understand by dimensions? Explain Dimensionality Reduction. How this is important in real work application? | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | What is the linearity of a variable? Explain. | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | According to you which two techniques are most useful for dimensionality reduction and how? | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | What is the difference between forward feature Elimination and backward feature elimination? | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | How Eigen value is being used for determining the Principal Components? | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | Variable Rotation is important for Dimensionality Reduction. When we need to use Rotation? Explain | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** | **(a)** | Given the data in Table, Calculate the co-variance Matrix.   |  |  |  |  |  | | --- | --- | --- | --- | --- | | *Feature* | *Ex1* | *Ex2* | *Ex3* | *Ex4* | | *X1* | *4* | *8* | *13* | *7* | | *X2* | *11* | *4* | *5* | *14* | | **(6)** | **Solve** |
|  |  |  |  |  |
|  | **(b)** | Explain any two types of method for determining the principal components. | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **UNIT-III (CO3)** |  |  |
|  |  |  |  |  |
| **Q.5** | **(a)** | Tell the difference between orthogonal and oblique rotation. Explain with diagram. | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | In Factor Analysis number of factors is important to be analysed write the techniques to determine number of factors in factor analysis. | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Why Random Forest is important for dimensionality reduction how this algorithm reduce dimensionality? | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | When non-Linear dimensionality reduction is used? Tell the steps of Isomap technique. | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | Write the formula of calculating p-value and also write the significance level criteria of p-value. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | What is the reason of using adjusted R square at the place of R square? | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | Write the stepwise regression formula. Explain step wise regression with example. | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | Cross Validation is very important for machine learning models? Which techniques are used for cross validation in machine learning? | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** | **(a)** | What is Accuracy performance measure? How it is calculated from Confusion matrix. | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | Suppose 10000 patients get tested for flu; out of them, 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For the healthy people, the same test was positive for 180 and negative for 8820. Construct a confusion matrix for the data. | **(6)** | **Solve** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | Calculate accuracy precision recall and f-measures for the problem given in question 9 b. | **(6)** | **Solve** |
|  |  |  |  |  |
|  | **(b)** | What is k-fold cross validation? Explain in detail. | **(6)** | **Remember** |