Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14CS2013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MACHINE LEARNING PRINCIPLES AND APPLICATIONS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Questions | | Course  Outcome | Marks |
| 1. | Explain the k-mean clustering algorithm with any classical example using the equations to minimize the total reconstruction error. | | CO3 | 20 |
| (OR) | | | | |
| 2. | s1 = red, s2 = blue and s3 = green represent different states of a HMM with the initial probabilities of 0.5, 0.2 and 0.3 for s1, s2 and s3 respectively. Below is the transition matrix of the HMM. | | CO3 |  |
| a. | Draw the HMM structure representing the different transition probabilities. | 7 |
| b. | What will be the probability of the following transition “red, red, green, green”? | 13 |
| 3. | Derive the maximum likelihood estimation for | | CO1 |  |
|  | a. | Bernoulli density | 7 |
|  | b. | Multinomial density | 6 |
|  | c. | Gaussian (Normal) density | 7 |
| (OR) | | | | |
| 4. | Consider a database D (figure). Suppose the minimum support count required is two. Find out the frequent item set using Apriori algorithm. | | CO1 | 20 |
| 5. | Perform a comparative study on the working of human brain and neural networks with neat labelled diagram. | | CO1 | 20 |
| (OR) | | | | |
| 6. | Represent the following HMM model in terms of graphical model and state the order of each HMM model | | CO1 |  |
|  | a. | Input output HMM | 5 |
|  | b. | Factorial HMM | 5 |
|  | c. | Coupled HMM | 5 |
|  | d. | Switching HMM | 5 |
| 7. | What are the applications of machine learning in different fields? | | CO2 | 20 |
| (OR) | | | | |
| 8. | Perform a multidimensional scaling for the following data | | CO2 | 20 |
| Compulsory: | | |  |  |
| 9. | Consider the following data | | CO2 |  |
|  | a. | On a graph sheet plot the data and find the best hyperplane separating the two classes. | 10 |
|  | b. | What will be the minimum number of support vectors for the best hyperplane? | 10 |

ALL THE BEST