# MANIPAL INSTITUTE OF TECHNOLOGY
## MANIPAL
*(A constituent unit of MAHE, Manipal)*

## III SEMESTER MCA

## END SEMESTER EXAMINATIONS, JAN. - 2021

### SUB.: PATTERN RECOGNITION TECHNIQUES AND APPLICATIONS [MCA - 5041]

### REVISED CREDIT SYSTEM
### (06/01/2021)

Time: 3 Hours                                                                 MAX. MARKS:50

**Instructions to Candidates:**
- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitable assumed.

| | | |
|---|---|---|
| 1A. | What are the different paradigms of Pattern Recognition? Explain by taking one example from each. | 5 |
| 1B. | What is pattern representation? Discuss how data structures are useful in representing a pattern. | 3 |
| 1C. | What is pattern recognition (PR)? List out few societal applications in which PR can play a role to solve them. | 2 |
| 2A. | How does the value of k affect the overall fit of the model in $k$NN algorithm? Give an example and show the results obtained as $k$ varies. What happens when $k$=N? | 5 |
| 2B. | Consider a 4 x 4 square, where each of the square is **a pixel** to represent numeric patterns, '3' & '5'. The squares are assigned an alphabet as shown below: <br><br>  <br><br> Prepare a transaction table and draw FP Tree to represent both the given patterns. | 3 |
| 2C. | What is a Minimum Spanning Tree? How does it is useful in Pattern Recognition. | 2 |
| 3A. | What is Clustering? What are the basic steps involved in clustering process? Explain one method with example. | 5 |
| 3B. | What is node impurity in Decision Tree? How do you find the perfect split? Discuss. | 3 |
| 3C. | How does weighted distance measure works? Discuss. | 2 |

| 4A. | What are the differences between 'Feature Transformation' and 'Feature Selection'. Justify your answer by taking one example. | 5 |
|---|---|---|
| 4B. | What is the kernel trick in SVM? Why SVM is used for classification? | 3 |
| 4C. | What does Conditional Probability and Joint Probability mean. | 2 |
| 5A. | What is dimensionality reduction problem, why is it necessary in pattern recognition? What is the importance of principal component analysis? Discuss. | 5 |
| 5B. | What is Artificial Neural Network? Explain its architecture. | 3 |
| 5C. | What is conditional independence in Bayesian network? Discuss. | 2 |