

TE SEM-VI EXTC C-scheme May 12026
Date: 18/05/2026

(Time: 3 Hours)

[Total Marks: 80]

N.B: 1. Question No 1 is Compulsory

2. Answer any 3 questions from the remaining questions

Q1 Answer any four questions

- What are the types of neural network architectures? 05
- Implement AND Gate using MP Neuron 05
- Discuss the applications of neural networks. 05
- List the various stopping criterion in neural network training. 05
- What are the various steps involved in K-Means algorithm? 05
- What do you mean by unsupervised learning? Give applications of unsupervised learning networks.

- Q2 a. With neat flow diagram, describe the training steps of Error back propagation Algorithm. 10
- b. Given three fuzzy sets
 $A = \{\frac{0.5}{20} + \frac{0.3}{40} + \frac{0.7}{60} + \frac{0.2}{80} + \frac{0.9}{100}\}$ $B = \{\frac{0.4}{10} + \frac{0.2}{20} + \frac{0.65}{30} + \frac{0.91}{50}\}$ $C = \{\frac{0.8}{100} + \frac{0.7}{150} + \frac{0.1}{200}\}$ 10
 Find Max Min composition of R and S if $R = A \times B$ and $S = B \times C$

- Q3 a. Design OR gate using Perceptron. Assume initial weights and bias to be zero. Consider bipolar inputs and outputs and the learning rate as 0.5. 10
- b. What do you mean by competitive learning? Explain Self organizing feature Map in detail. 10

- Q4 a. Construct a discrete Hopfield network to store the patterns $x_1 = [1 \ -1 \ 1 \ -1]$, $x_2 = [1 \ 1 \ 1 \ -1]$ $x_3 = [1 \ 1 \ 1 \ 1]$. Calculate the energy of each pattern. 10
- b. Explain SVM algorithm. What is the use of SVM algorithm? 10

- Q5 a. Explain image classification using CNN. 10
- b. Design a fuzzy controller to decide the brake power of a train approaching a station. Distance from the station and speed of the train are inputs. Assume three descriptors for inputs and output. Test the performance for one input condition. 10

- Q6 a. With neat diagram, explain the working of fuzzy inference system. 10
- b. Define the following terms with respect to CNN architecture 10
- Strided Convolution
 - Pooling
 - Padding
 - ReLU
