

**THE KAVERY ENGINEERING COLLEGE***(An Autonomous Institution)***UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026***Fifth Semester***Artificial Intelligence and Data Science****AD3501 - DEEP LEARNING***Regulations - 2021**Duration : 3 Hrs**Maximum : 100 Marks**PART - A (ANSWER ALL QUESTIONS) (Marks 10\*2=20)*

| <i>Q.No</i> | <i>Questions</i>                                           | <i>BTL</i> | <i>CO</i> | <i>Marks</i> |
|-------------|------------------------------------------------------------|------------|-----------|--------------|
| 1.          | Define overfitting.                                        | L1         | 1         | 2            |
| 2.          | State the role of a validation set in machine learning.    | L2         | 1         | 2            |
| 3.          | Mention the role of pooling layers in CNN.                 | L1         | 2         | 2            |
| 4.          | Name one common loss function used in CNN training.        | L2         | 2         | 2            |
| 5.          | List three RNN design patterns.                            | L1         | 3         | 2            |
| 6.          | What is the vanishing gradient problem in RNN?             | L2         | 3         | 2            |
| 7.          | Define baseline model in machine learning.                 | L1         | 4         | 2            |
| 8.          | State the purpose of a validation set in model evaluation. | L2         | 4         | 2            |
| 9.          | Define variational autoencoder (VAE).                      | L1         | 5         | 2            |
| 10.         | What is the reconstruction loss in autoencoders?           | L2         | 5         | 2            |

*PART - B (ANSWER ALL QUESTIONS) (Marks 5\*16 = 80)*

| <i>Q.No</i> | <i>Questions</i>                                                                                                                                                       | <i>BLT</i> | <i>CO</i> | <i>Marks</i> |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|--------------|
| 11.         | a i Discuss methods used to control overfitting, including regularization and validation techniques.                                                                   | L2         | 1         | 8            |
|             | ii Explain the architecture of deep feedforward networks.                                                                                                              | L2         | 1         | 8            |
|             | Or                                                                                                                                                                     |            |           |              |
|             | b i Write a procedure by applying stochastic gradient descent technique for predicting the mail is spam or not by considering 100 observations. (assume the features). | L2         | 1         | 8            |
|             | ii Explain how regularization techniques like dropout and weight decay can help for a given model with high variance?                                                  | L2         | 1         | 8            |
| 12.         | a Illustrate the architecture of a CNN for image classification.                                                                                                       | L3         | 2         | 16           |
|             | Or                                                                                                                                                                     |            |           |              |
|             | b Outline the difference between transposed convolution and dilated convolution with an example.                                                                       | L3         | 2         | 16           |

13. a Describe sequence-to-sequence models built using RNNs. L2 3 16
- Or
- b Explain in detail about the components of LSTM network with neat sketch. L2 3 16

14. a Consider a binary classification problem with the following confusion matrix: L3 4 16

|                 | Predicted Positive | Predicted Negative |
|-----------------|--------------------|--------------------|
| Actual Positive | 50                 | 10                 |
| Actual Negative | 5                  | 35                 |

Calculate Accuracy, Precision, Recall, and F1-score for this model.

Or

- b Illustrate a random search procedure for tuning hyper parameters of a deep neural network. L3 4 16
15. a Examine in detail about the role of sparse auto encoders with an example. L4 5 16
- Or
- b Analyze in detail about Generative adversarial Networks with a neat diagram. L4 5 16