# ◆ Part A: 2-Mark Questions

1. Differentiate between ML, and DL.
2. What is Symbolic AI? Give one example.
3. State two limitations of Symbolic AI.
4. What is feature engineering?
5. Define a tensor. Write the key attributes of a tensor.
6. Differentiate between vector, and matrix tensors.
7. Define batch size in deep learning.
8. What does "rank" of a tensor represent?
9. Write the difference between element-wise operation and dot product.
10. Define ReLU activation function mathematically.
11. What is the role of loss function in deep learning?
12. Mention any two optimizers used in training neural networks.
13. Define gradient descent.
14. State the difference between local minimum and global minimum.
15. What is the main idea of backpropagation?
16. Mention two differences between CPU and GPU for deep learning.
17. What is TensorFlow?
18. What is Keras?
19. Mention two advantages of Keras.
20. Define overfitting with an example.
21. What does "compile()" do in Keras?
22. What does "fit()" do in Keras?
23. What is stochastic gradient descent (SGD)?
24. Write the difference between batch gradient descent and mini-batch gradient descent.
25. Define activation function with an example.

◆ Part B: 5-Mark Questions

1. Discuss the importance of loss functions with suitable examples.
2. Differentiate between shallow learning and deep learning.
3. Explain the role of optimizers in training neural networks.
4. Write short notes on **tensors with rank 3 and rank 4** along with examples.
5. Explain the significance of activation functions in deep learning.
6. With an example, explain dot product in tensors.
7. Show mathematically how affine transformation is implemented in a Dense layer.
8. Describe the role of GPU/TPU in deep learning progress.
9. Discuss the advantages and disadvantages of deep learning compared to traditional ML.
10. Write short notes on **momentum in gradient descent**.
11. Explain why learning rate is important in optimization.
12. Differentiate between training accuracy and testing accuracy with an example of overfitting.
13. Explain with steps the training loop of a deep learning model.
14. Discuss the role of chain rule in backpropagation.
15. Explain with an example how a computation graph works.

◆ Part C: 10-Mark Questions

1. Explain with diagrams the relationship between AI, ML, and DL.
2. Explain the core principle of a deep learning model. Use the provided image of a digit classification network to illustrate how data is transformed through successive layers to produce a final output.
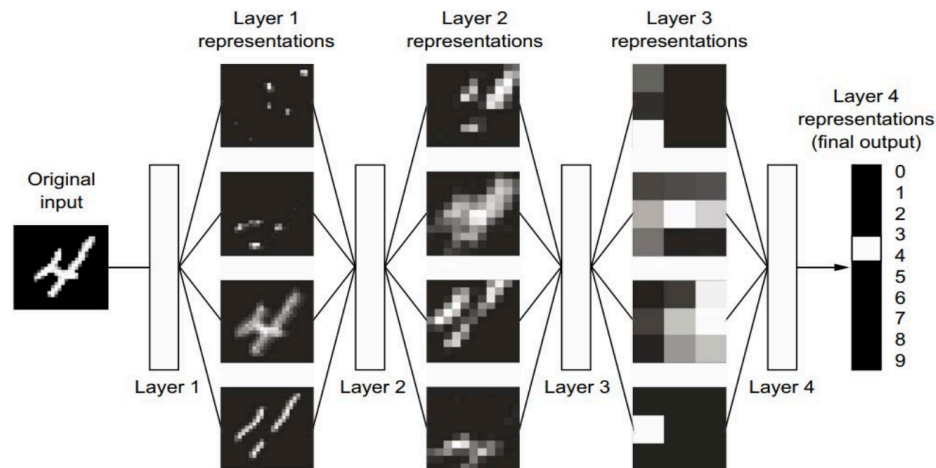
3. With diagrams, explain different tensor operations (element-wise, dot product, reshaping, broadcasting).
4. Derive mathematically how gradient descent updates model parameters.
5. Explain in detail the backpropagation algorithm using chain rule and computation graph.
6. Discuss in detail the key factors behind the success of deep learning: hardware, datasets, algorithms.
7. Compare L1 and L2 regularization.
8. Explain the concept of **K-fold** cross-validation. Why is this technique particularly important when dealing with datasets that have very few data points?
9. Explain the steps involved in preparing your data for a machine learning model. Include details on vectorization, value normalization, and handling missing values.
10. Discuss the different types of tensors based on their rank (0 to 5), providing a real-world data example for each. Include the typical shape for each example.