TT#01   Course: Machine Learning (**SWE 427**) (*QT-A*)
Marks: 20   Time: **30 mins**

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1. Does gradient descent require a convex cost function to converge? Can we use Mean Squared Error for calculating gradient descent of Logistic Regression to converge to the global optima?
   If not, why?   **05**
2. Explain the role of the learning rate in gradient descent. What are the potential consequences of setting it too high or too low?   **05**
3. Create a fictional case study where the improper use of regularization leads to significant model failures. What lessons can be learned from this scenario?   **05**
4. How do filters extract features and how does pooling simplify them in a CNN? Explain in brief.   **05**

TT#01   Course: Machine Learning (**SWE 427**) (*QT-B*)
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1. How does logistic regression differ from linear regression in terms of the nature of the dependent variable and the type of problems it solves?   **05**
2. Explain the role of the learning rate in gradient descent. What are the potential consequences of setting it too high or too low?   **05**
3. Create a fictional case study where the improper use of regularization leads to significant model failures. What lessons can be learned from this scenario?   **05**
4. Provide a detailed mathematical breakdown of the forward propagation process in a simple neural network.
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1. How can you visualize the decision boundary for a simple linear classifier? Discuss in brief.   **05**
2. Explain the role of the learning rate in gradient descent. What are the potential consequences of setting it too high or too low?   **05**
3. Create a fictional case study where the improper use of regularization leads to significant model failures. What lessons can be learned from this scenario?   **05**
4. Evaluate the effectiveness of CNNs in image classification tasks. What problem it solved in deep learning.
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