



JK Lakshmipat University, Jaipur  
Department of Computer Science and Engineering

**Deep Learning (CS-1218)**

Mid-Term I, Date: September 01, 2025

2023 Batch 066

Time: 1 hour

Semester V B.Tech. CSE, ECE

Max marks: 15

Please read the following instructions carefully.

- There are 4 questions.
- **No marks** for providing just expressions/answers unless accompanied with correct justification and/or derivation.
- In case of any doubt, make your assumption, write it clearly and continue.  
**Do not call your instructor.**

1. (2 points) You are supposed to compute the HCF (highest common factor) of any two given positive integers. Should you use machine learning to solve this problem? (CO3)

2. (a) (1 point) Clearly write the four steps involved in the training of a machine learning algorithm.

(b) (1 point) What happens if learning rate  $\alpha$  is chosen to be 0?

(c) (2 points) Why do we use gradient descent instead of double derivative methods in deep learning? (CO2)

3. You are provided cost function as  $J(w, b) = w^2 + b^2$ . (CO2, CO4)

(a) (1 point) Draw the contour of the above cost function at point (1,1).

(b) (2 points) Compute the gradient at the point in part (a).

(c) (2 points) Prove that the gradient vector passes through the minima.

4. You are given a neural network with 10 features in the input layer, 6 neurons in the first hidden layer, 3 neurons in the second hidden layer and 1 neuron in the output layer. (CO4)

(a) (1 point) Draw the neural network, including the input and output layers.

(b) (3 points) Provide the dimensions of  $W^{[1]}$ ,  $b^{[2]}$  and  $W^{[3]}$ .