

Department of Data Science
IIT Palakkad

DS5007 : Deep Learning
Test I (12 February, 2026)

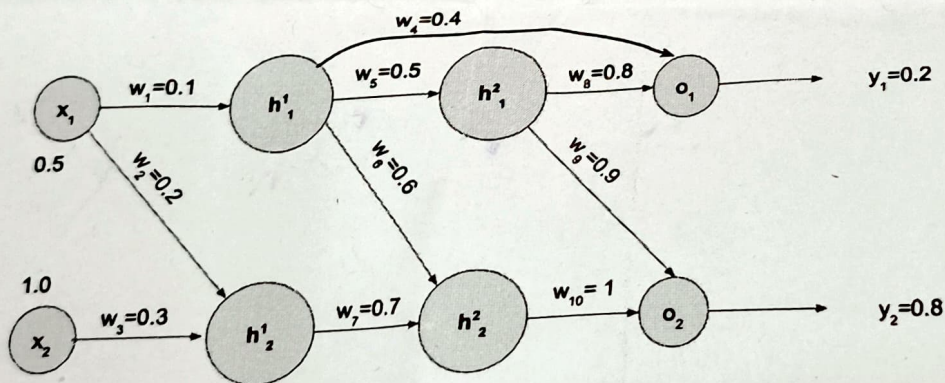
08:00-08:50 am

Marks : 10

Instructions

1. Write your answers neatly in Blue/ Black ink. Do not use pencil / Red ink. If your answer is not legible, you will not get any marks for that.
2. Doubts and questions will not be answered during the exam. If you have to make any assumption about unspecified things, write the assumption clearly with justification.
3. Answer all parts of a question together. If the parts of a single question are not together, then only the first part will be evaluated. Other parts will not get any marks.
4. No materials or electronic gadgets, except a scientific calculator, are permitted in the examination hall.

1. (2 points) Write update step according to Adaptive Moment (ADAM) Optimizer to minimize $\sigma(\theta^T x)$ with respect to θ .
2. Consider the following neural network. The output function and the activation functions in the hidden layers is sigmoid.



- (a) (2 points) Write the forward pass expression and the loss function assuming sum of squared loss.
 - (b) (3 points) Compute the update equation for weights for the parameter w_1 considering learning rate 0.5.
3. (a) (2 points) How are CNNs adapted for object detection?
(b) (1 point) What are Class Activation Maps (CAM) and Grad-CAM?