

A-Level Computer Science

Name: _____ Score: _____

1. Machine learning means an algorithm that:
 - ☐ only follows fixed rules
 - ☐ learns patterns from data rather than being programmed step by step
 - ☐ never needs any data
 - ☐ is written entirely in assembly
2. Supervised learning uses:
 - ☐ labelled data, learning to map input $\rightarrow$ label
 - ☐ unlabelled data, finding hidden structure
 - ☐ no data at all
 - ☐ rewards from an environment
3. The difference between regression and classification is that regression predicts:
 - ☐ nothing
 - ☐ a number, while classification predicts a category
 - ☐ a category, while classification predicts a number
 - ☐ only true/false
4. How do AI, machine learning and deep learning relate?
 - ☐ deep learning is part of machine learning, which is part of AI
 - ☐ AI is part of machine learning
 - ☐ they are three competing approaches
 - ☐ deep learning replaced AI
5. Unsupervised learning is used to:
 - ☐ map inputs to known labels
 - ☐ find structure in unlabelled data, such as clusters
 - ☐ maximise a reward signal
 - ☐ compile code
6. Regression predicts a continuous number (a price, a temperature), while classification predicts a category (cat vs dog).
 - ☐ True ☐ False

7. A road network is modelled as a graph to find the shortest route. Which statements are correct? Select **all** that apply.

- ☐ each road is an edge joining two nodes
- ☐ each town is an edge and each road a node
- ☐ each town is a node
- ☐ each edge carries a weight, the distance or travel time

Tick every correct option.

8. In reinforcement learning the agent learns a _____ that maximises its total reward over time.

9. Using a trained model to make a prediction requires only a single _____ pass.

10. A neural network is called "deep" when it has many hidden layers, and each neuron takes a weighted sum of its inputs (plus a bias) before applying an activation function.

- ☐ True ☐ False

A-Level Computer Science**1. learns patterns from data rather than being programmed step by step**

ML learns from data; deep learning is ML using multi-layer neural networks.

2. labelled data, learning to map input → label

Supervised learning trains on labelled examples (e.g. images tagged cat/dog).

3. a number, while classification predicts a category

Regression outputs a continuous number (price, temperature); classification outputs a category.

4. deep learning is part of machine learning, which is part of AI

AI is the goal, machine learning is the dominant approach to it, and deep learning is machine learning with many-layered networks.

5. find structure in unlabelled data, such as clusters

With no labels, unsupervised learning discovers patterns/clusters in the data.

6. True

Number out = regression; category out = classification – the two main kinds of supervised prediction.

7. each road is an edge joining two nodes; each town is a node; each edge carries a weight, the distance or travel time

Places are nodes and connections are edges. Saying what the weights represent is the third mark.

8. policy

It learns by trial and error from rewards, with no labelled examples at all, which is why it suits sequences of decisions.

9. forward

Training repeats forward and backward passes over a huge dataset; inference runs the fixed weights once, which is why it is instant.

10. True

Stacking many hidden layers lets the network learn richer patterns – training such a network is deep learning.