



QUESTION I.1: Choose the correct answer (10 Marks)

1. The evolution of Artificial Intelligence (AI), particularly Deep Learning, is because of:

Huge computational and storage capabilities becomes available,
Big data become available,
a & b,
none of above.

2. Machine learning can be loosely interpreted

to mean the broader concept that consists of everything from Good Old-Fashioned AI all the way to futuristic technologies.
to mean empowering computer with the ability to “learn”.
a & b,
none of above.

3. TPU

is a fine-tuned processing unit designed for deep-learning	is designed to be general purpose processing unit	Includes few CPU and do processes sequentially.
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4. While..... can automatically discover the features to be used for classification,.....requires these features to be provided manually.

Deep Learning	Machine Learning	Regression	Clustering
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5. The general AI level is when a machine is

better than human in specific tasks
like us in any intellectual tasks
is better than us in many tasks
none of above.

6. Many of real-world Machine-learning problems are classified as

Supervised Learning	Un-Supervised Learning
Semi-Supervised Learning	None of the above

7. The singularity

is the hypothetical future creation of super-intelligent machines.
can occur in semi-supervised learning only
cannot be experienced in the deep-learning
none of the above

8. L1 regularization suits while L2 regularization suits.....

The situation that want to reduce # of weights & end up with a small set
The situation we need to maintain all weights to be homogenously small
all of the above

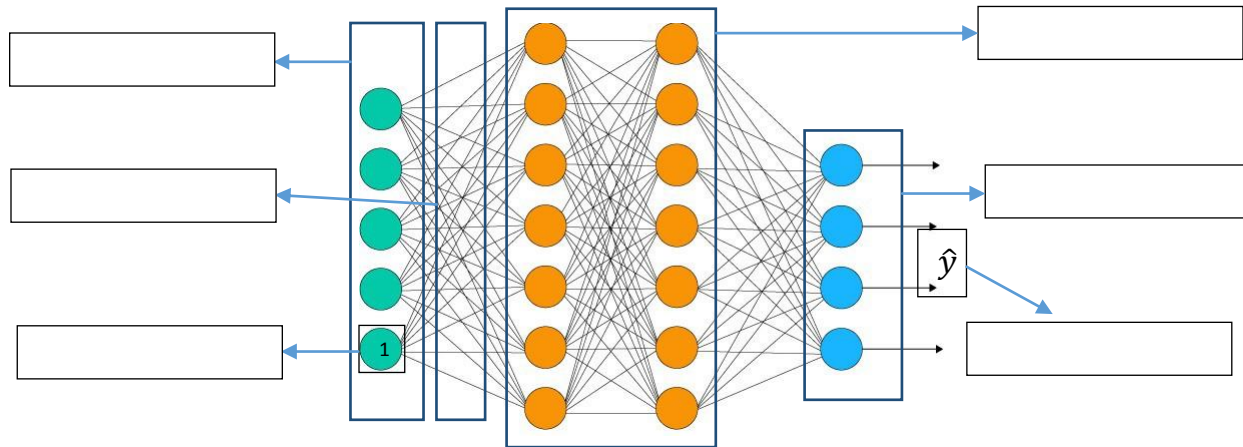
none of the above

9. Overfitting problem can be avoided by

- Early Stopping
- Dropout
- random start
- none of the above

QUESTION II: Artificial Neural Networks Fundamental(5 Marks)

Label the components of ANN shown below:

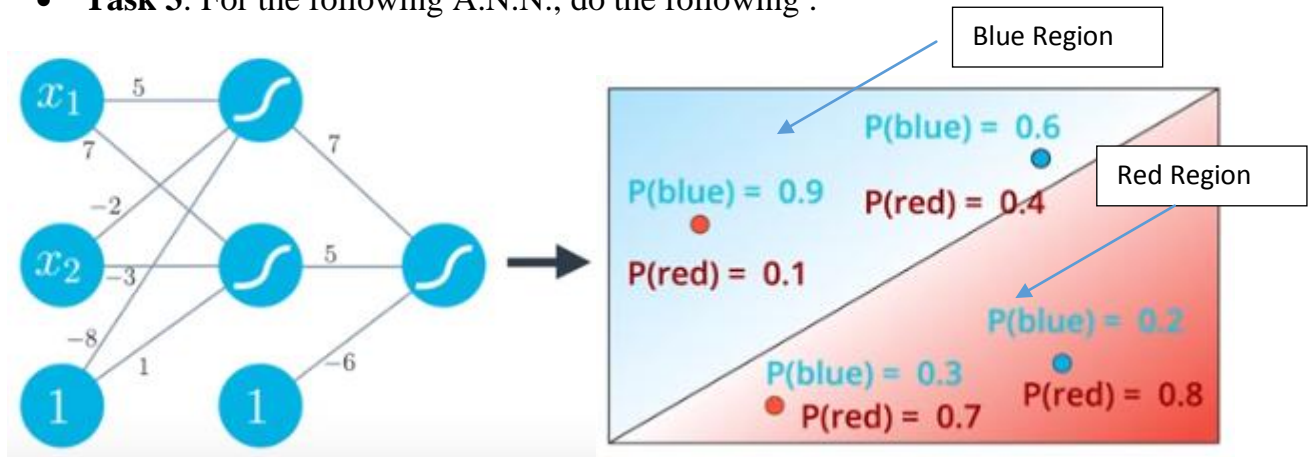


QUESTION III: Design (15 Marks)

Suppose that you have a chance to work on Deep-Learning (DL) project from www.upwork.com. However, the client need to check your experience, before submitting your proposal. **Your client is ungovernable guy, He always need justifications.**

- ☒ **Task 1:** Given that your problem is to design a “handwritten English-letter classifier” based on 13200 images, each is with a resolution of 30×15.
 - What is your suggestions for the dimension DL Neural Network’s input layer and output layer?
 - Do you recommend the usage of step function, sigmoid function, or softmax functionfor activation? Why?
 - Assume you need to increase the accuracy of classifier (complex-boundary shape isneeded), what is your suggestion?

- **Task 3:** For the following A.N.N., do the following :



- Given $x_1 = 1$ and $x_2 = 1$, compute the expectation using sigmoid function modeled by $\sigma(x) = \frac{1}{1+e^{-x}}$?
- Compute the cross-entropy for the shown classification-model?
- Given $y = 1$ (label) for point (1,1), determine the new values of weights and bias after updating, given that ∇E

☺ GOOD LUCK ☺