



Please Attempt All Questions.

Open Notes Exam (hand written not allowed)

Part-I: Theoretical Part

[35-Marks]

Q.1: Briefly explain the Following:

[10-Marks]

- What is intelligence?
- A view of the world?
- Artificial intelligence techniques?
- Machine Learning Strategies?
- Genetic Programming?
- Offspring generation operators?

Q.2: Give Details of Design Equations and Block Diagram:

[10-Marks]

- Design a 4 bits PN code, and hence check the validity of PN code properties?
- Design a Hamming code of input message $m_3m_2m_1m_0$ and output message $m_3m_2m_1m_0p_1p_2p_3$?
- Design a Huffman probability tree of the code sequence: AAAABBBBBBAAAACCD.
- Design a 2D-Parity Check for a input message 111000101010, and give possible cases of received messages?

Q.3: Explain in Details and hence compare:

[10-Marks]

- The DFT main features?
- The DCT main features?
- The DST main features?
- The STFT main features?
- The DWT main features?
- The Haar Transform main features?
- Wavelets and wave?
- Orthogonal and orthonormal?
- Digital signal and quantized signal?
- Even Parity and odd parity?

Q.4: Find Decision tree classifier.

[10-Marks]

- What Are Neural Networks? What Are The Types Of Neural Networks?
- Why Use Artificial Neural Networks? What Are Its Advantages?
- How Are Artificial Neural Networks Different From Normal Computers?
- How Human Brain Works?
- What Is Simple Artificial Neuron?
- How Artificial Neurons Learns?
- Are Neural Networks Helpful In Medicine?
- What Are The Disadvantages Of Artificial Neural Networks?
- What Learning Rate Should Be Used for Back-propagation?
- What is a training set and how is it used to train neural networks?

Part-II: Programming Part

[15-Marks]

Q.1: Find Decision tree classifier?

[5-Marks]

Days	Play	Temp	Parent	Weather
1	Tennis	Hot	Yes	Sunny
2	Tennis	Hot	No	Rain
3	Football	Hot	Yes	Sunny
4	Basketball	Mild	No	Overcast
5	Basketball	Cool	No	Sunny
6	Basketball	Mild	Yes	Rain
7	Football	Cool	Yes	Rain
8	Tennis	Mild	No	Sunny
9	Football	Cool	Yes	Overcast
10	Basketball	Hot	No	Overcast

Q.2:

[5-Marks]

- a. What is the difference between
 - i. Linear and non-linear classifier?
 - ii. Programming and machine learning?
 - iii. Supervised and unsupervised?
- b. Define
 - i. Parametric method.
 - ii. Bayesian Decision Theory.

Q.3:

[5-Marks]

If the prior probabilities are equal $p(w_1)=p(w_2)=0.5$, the means are equal 4 & 10, but the class-conditional densities have different variances of 4 & 1, Using Decision rule.

WITH ALL BEST WISHES

MOHAMED ABDEL-AZIM

- Please answer as possible as you can, try to reflect your understanding skills not your memorable skills.
- The only job for me in this course is to transfer skills and explore latent information for all of you.
- All of you and me are in the same team, so please make it win-win situation.