Computer Sciences
University of Technology

Date: 24 / 5/ 2016 | ***Final Exam* 2015-2016** | **Subject: *Machine Learning***
Time: 3 hours | **Class: Third**
Lecturer: *Dr. Ayad R. Abbas* | **Branch: *Artificial Intelligence***

ملاحظة:

1- بإمكانك الاجابة على خمسة أسئلة فقط
2- يسمح باستخدام الحاسبة.
3-الاسئلة متكونة من صفحتين.

Q1) Draw the **Decision Tree** for the following candy information table where **Color** and **Flavor** are condition attributes and **Edibility** is a decision attribute.

Color	Flavor	Edibility
Red	Grape	Yes
Red	Cherry	Yes
Green	Grape	Yes
Green	Cherry	No
Blue	Grape	No
Blue	Cherry	No

(10 Marks)

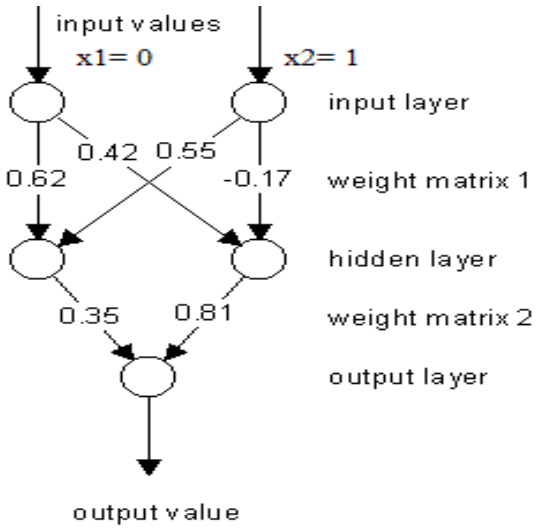
Q2) (A) What are the advantages and disadvantages of BAM .
(B) Write the **FIND-S** algorithm that finds the most specific hypothesis.

(10 Marks)

Q3) A **perceptron Neural Network** has **2** inputs **AND** function, **X1** and **X2**, and one output, **Y** with bias (**b=1**). Train this Neural Network and assume that the initial weights (**W0= -0.8, W1=0.5** and **W2=0.5**) **with threshold** value equal **0.**

(10 Marks)

Q4) Consider the simple **Back-Propagation Network** below:



Perform the forward phase for an input pattern and calculate the output error where **desired output d= 0**.

(10 Marks)

Q5) (A) find the thresholds for a **Hopfield network** to store two patterns:
X1= (-1 -1 1) and X2=(-1 1 1).

(B) There are special techniques should be used to get out of local minima, **Explain these techniques.**

(10 Marks)

Q6) (A) List and explain the most commonly applied genetic operators.

(B) By using **Genetic Algorithm**, fill in the rest of the following table using a **roulette wheel algorithm** to generate a mating pool. The fitness function is to find the maximum number of 1s.

String No.	Initial population	X value	Fitness f(x)=2X	Probability	Expected count	Actual count
1	1 0 1 1 1	4				
2	0 0 0 1 1					
3	0 1 0 0 1					
4	0 1 1 1 1					
Sum						
Average						
Maximum						

(10 Marks)

BEST WISHES