Answer all the following questions:

1- <u>True or False [10 points]</u>

a) The searching algorithm is optimal if it is able to find the goal at the optimal path with respect to the frontiers selection criteria. ( )

b) Breadth first search is an optimal algorithm. ( )

c) Depth first search is an optimal algorithm. ( )

d) Uniform-cost search is a complete searching algorithm. ( )

e) If variable B depends on variable A then $P(A|B)=1-P(A|B)$. ( )

2- <u>Choose the correct answer [10 points]</u>

1- Which instruments are used for perceiving and acting upon the environment?

  a) Sensors and Actuators   b) Sensors

  c) Perceiver   d) None of the mentioned

2- What is Artificial intelligence?

  a) Putting your intelligence into Computer   b) Programming with your own intelligence

  c) Making a Machine intelligent   d) Playing a Game

  e) Putting more memory into Computer

3- Artificial Intelligence has its expansion in the following application.

  a) Planning and Scheduling   b) Game Playing

  c) Diagnosis   d) Robotics   e) All of the above

4- Categorize Crossword puzzle in Fully Observable / Partially Observable.

  a) Fully Observable   b) partially Observable

5- What is state space?

  a) The whole problem   b) Your Definition to a problem

  c) Problem you design   d) Representing your problem with variable and parameter

  e) A space where you know the solution

3- <u>Answer the following questions [20 points]</u>

1. What are the different approaches in defining artificial intelligence?

2. Define:
   - An agent.
   - Intelligence

3. What is the advantage of using A* compared with uniform cost.

4. An economics consulting firm has created a model to predict recessions. The model predicts a recession with probability 80% when a recession is indeed coming and with probability 10% when no recession is coming. The unconditional probability of falling into a recession is 20%. If the model predicts a recession, what is the probability that a recession will indeed come?

4- Answer by explanations and drawing [20 points]

The following figure represent a map between a set of nodes where the distance between nodes are showed over the arcs

1- Use breadth first search to find the path between A and C and give its path.
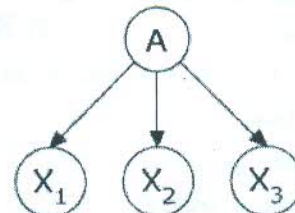2- Use A* search to find the path between A and C and give its path, and cost.
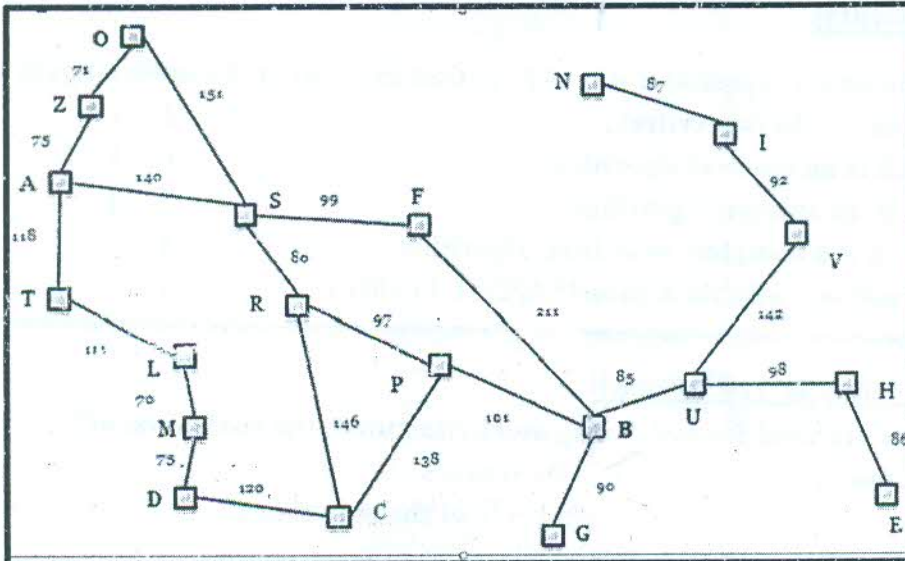
State	A	O	B	Z	T	M	C	P	R	S	F	D	L
h	340	380	190	350	310	170	0	138	146	215	210	120	200

5- Answer by explanations [15 points]

Consider the following network, where the P (A) =0.5, $\forall i\ P(X_i|A)=0.2$, $P(X_i|\neg A)=0.6$.
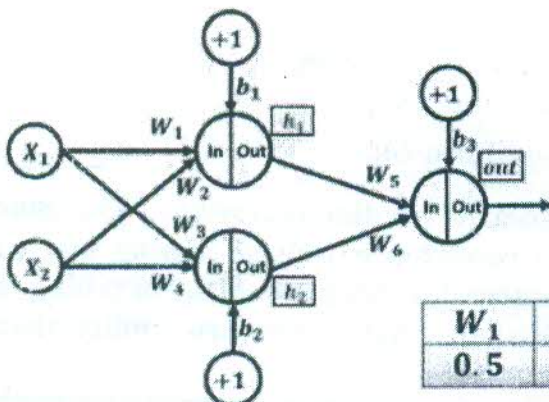Calculate

1- $P(A|X_1, X_2, X_3)$
2- $P(X_3|X_1)$

6- Answer by complete calculation [15 points]

Use backpropagation for the below neural network with one hidden layer to find the correct weights that minimize the error between the desired output and the actual output. The inputs are x1, x2, and the desired output is 0.03. Assume the initial weights as in the table:

X_1	X_2
0.1	0.3

W_1	W_2	W_3	W_4	W_5	W_6	b_1	b_2	b_3
0.5	0.1	0.62	0.2	-0.2	0.3	0.4	-0.1	1.83

مع تمنياتي لكم بالتوفيق والنجاح،،،