Q1) Consider the search graph below, where S is the start node and G1, G2, and G3 are goal states. Arcs are labeled with the cost of traversing them and the heuristic cost to a goal is shown inside the nodes. For each of the two search strategies below, indicate which of the goal states is reached first:

1-Using Depth First Search.
2-Using A* Search.

Q2) Choose only one branch to solve:

(A) Write only the parts of the two programs of the Depth and Breadth First Search (prolog program) that distinguish the major difference between them.

(B) Draw the space state search of your university problem, where it consist of (University name, Departments names, Branches names, Stages names, ..., etc.) then find the path from start state to your stage name.

Q3) Suggest an appropriate heuristic function for the following problems and give an example for each one:

1- Tie Tac Toe problem. 2- 8-puzzle 3- min-max

Q4) Represent the following knowledge base using Semantic Network:

Tom is a cat. Tom caught a bird. Tom is owned by John. The cat sat on the mat. A cat is a mammal. A bird is an animal. All mammals are animals.
Q5) Represent the following knowledge base using Predicate Logic (Calculus):

John likes all kinds of games. Football is a game. Chess is a game too. Anything anyone plays and is not harmful is game. Tom plays tennis. Tom likes anything that John likes.

(10 Marks)

Q6) (A) Write the joint probability function \( P(A, S, H, E, C) \) as it factorizes according to the graph below:

(B) What are problems of hill climbing algorithm? Give an example for each one.

(10 Marks)

BEST WISHES