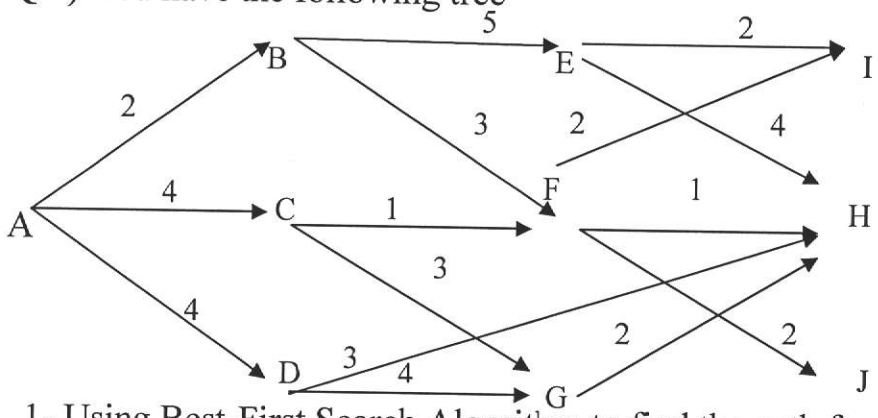
University of Technology
Computer Science Department
Class: Second class
Branch: **Artificial Intelligence**

Subject: **A.I Strategies & algorithms**
Examiner: **Msc. Nuha J.Ibrahim**
Time: 3 hours
Date of Exam.: 19/6/2011

Final Exam./1st Trail/2010 -2011

Note: (Answer Five questions only for each question (10 Degree)))

Q.1) You have the following tree



1- Using Best-First Search Algorithm to find the path from (A to I).

2- Write a complete prolog program for (A-algorithm)

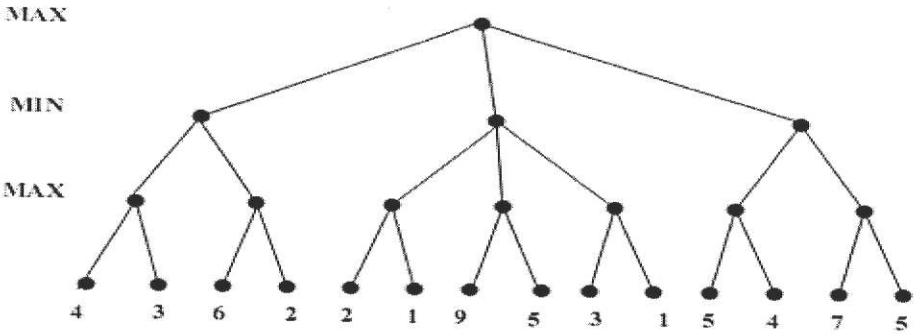
Q.2) a) Show how means-ends analysis could be used to solve the problem of carrying a box from room B to room A. Assume that the available operators are : *move, Carry, door-open, door-closed.*

b) Using knowledge representation for the following:

1- The student bought a new computer in June **(using semantic net)**
2- John gave the book to Mary **(using conceptual graph)**

Q.3) a) Compare between minimax search & Alpha-Beta search algorithm.

b) perform minimax, alpha-beta prune on the following tree:



Q.4) a) Use constraint satisfaction to solve the following cryptarithmetic problem:

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  DONALD
+ GERALD
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  ROBERT
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b) Write complete prolog program to represent the state space search of 2-jug problem, the first with 4- gallon and the second with 3- gallon, trying to get 2- gallon in the first jug.

Q.5) a) Convert to Predicate logic (CHOOSE TWO):

1. Some computers have mouses connected on the USB.
2. All courses in Sociology are easy.
3. Anyone who is lucky or he is study can pass the exam.

b) Solve with resolution by refutation algorithm the following sentences:
Marcus was a man. Marcus was a Pompeian. All Pompeian were Romans. Caeser was ruler. All Romans were either loyal to Caeser or hated him. Everyone is loyal to someone but not assassinate to someone. Prove that, People not try to assassinate Caeser.

Q.6) a) For the following hypothesis and evidence:
H—there is a bug in the code
E—a bug is detected in the test
E|H—a bug is detected in the test given that there is a bug in the code
H|E—there is a bug in the code given that a bug is detected in the test
Where $P(H) = 0.1$, $P(E|H) = 0.9$
Use the probability to find P(E) ,P(H|E)

b) In a medical diagnosis in which we have four mutually exclusive hypothesis: C(Common cold), F(Flu), M(Meningitis) and N(No problem) thus Θ={ C,F,M,N}. Use dempstar-shafer theory to find Belief(Bel) and Plausibility(Pl), where:

M1= { C, F }	(0.5)	M2 ={ C,F,N }	(0.7)
Θ	(0.3)	Θ	(0.3)
{M}	(0.2)		