Name: Sec./B.N.:

Benha University
Faculty of Engineering (at Shoubra)
Electrical Engineering Department
M.Sc. (Computer Systems Engineering**)**

Midterm Exam
Subject: Artificial Intelligence Theories - CES 510
Date: Tue 29/04/2017
Duration: 1 hour

Attempt the following questions.

№ of Questions: 4 in 1 page(s)
Total Points: 20 (10 **Marks**)

Question 1: **(05** pts**)**

a) What is AI? (01 pt)
b) State five applications of AI. (02 pts)
c) Define a *rational agent*. (02 pts)

Question 2: **(05** pts**)**

a) Define the problem of solving *8-queens* formally. (02 pt)
b) Derive time and space complexities of *iterative deepening search*. (03 pt)

Question 3: **(05** pts**)**

a) Give the name of the algorithm that results from simulated annealing with T = 0 at all times (and omitting the termination test). **(**01 pt**)**
b) For *taxi driving* activity, give a PEAS description and properties of the task environment. **(**02 pts**)**
c) Consider the sensorless version of the erratic vacuum world. Draw the belief-state space reachable from the initial belief state {1, 2, 3, 4, 5, 6, 7, 8}, and explain why the problem is unsolvable. **(**02 pts**)**

Question 4: **(05** pts**)**

a) Which of the following are correct? $False \models True$, $A \Leftrightarrow B \models \neg A \vee B$. **(**01 pt**)**
b) How many models are there for the sentence $(A \Rightarrow B) \wedge A \wedge \neg B \wedge C \wedge D$? **(**02 pts**)**
c) Two clauses are semantically distinct if they are not logically equivalent.
How many semantically distinct 2-CNF clauses can be constructed from *n* proposition symbols? **(**02 pts**)**

Good Luck
Dr. Islam ElShaarawy