LOYOLA COLLEGE (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE
SEMESTER EXAMINATION -NOVEMBER 2014
CS 3950 – ARTIFICIAL INTELLIGENCE

Section – A (10 X 2 == 20 Marks)

Answer all Questions

1. Compare Intelligent Agent and Rational Agent.
2. Mention the properties of Task Environment.
3. How do you calculate $f(n)$ in A* algorithm? Explain each term.
4. Define CSP (Constraint Satisfaction Problem).
5. Define Ontological Engineering.
6. Skolemize the following:
   $\forall x\ [\exists y\ Animal(y) \wedge \neg Loves(x,y)] \vee [\exists z\ Loves(z,x)]$
7. Write a short note on three cases of learning
8. Define realizability and unrealizability?
9. Mention four characteristics of Information Retrieval.
10. List the seven processes of a typical communication episode.

Section – B (5 X 8 == 40 Marks)

Answer all Questions

11. a)Write about the depth first search with an example.

    Or

    b) Give brief note on any four uninformed search strategies.

12. a) Explain A* algorithm with an illustration.

    Or

    b)Illustrate Min-max Algorithm with an example.

13. a) Give resolution proof for the following: ***Curiosity killed the cat***

    a. $\forall x\ [\forall y\ Animal(y) => Loves(x,y)] => [\exists y\ Loves\ (y,x)]$
    b. $\forall x\ [\forall y\ Animal(y) \wedge Kills(x,y)] => [\exists z\ \neg Loves\ (z,x)]$
    c. $\forall x\ Animal(x) => Loves(Jack,x)$
    d. $Kills(Jack,Tuna) \vee Kills(Curiosity, Tuna)$
    e. $Cat(Tuna)$
    f. $\forall x\ Cat(x) => Animal(x)$
    g. **Goal**: $Kills(Curiosity,Tuna)$

    Or

    b) Decide whether each of the following sentences is valid, unsatisfiable, or neither. Verify your decisions using truth tables.

1) Smoke => Smoke
2) Smoke=>Fire
3) (Smoke=>Fire)=>(¬Smoke =>¬Fire)
4) Smoke ∨ Fire ∨ ¬Fire
5) ((Smoke ∧ Heat)=>Fire)<=> ((Smoke=>Fire)∨(Heat=>Fire))
6) (Smoke=>Fire)=>((Smoke ∧ Heat)=>Fire
7) Big ∨ Dumb ∨ (Big => Dumb)
8) (Big ∧ Dumb) ∨ ¬Dumb

14. a) Describe various forms of learning.

Or

b) Explain inductive learning in detail.

15. a) Give parse tree representation for "You give me gold" with an explanation.

Or

b) Give a description on information retrieval.

Section – C (2 X 20 == 40 Marks)

Answer any TWO Questions

16. a) Explain different rational agents with neat diagrams.

b) Explain alpha-beta pruning with an example.

17. a)Write the First Order Logic of the following statements and use Resolution Proof to test the question
    1. Jack owns a roomba
    2. Every roomba owner is a robot enthusiast.
    3. No robot enthusiast breaks a robot.
    4. Either Jack or SENSOR MALFUNCTION broke my Roomba

    Question: Did SENSOR MALFUNCTION break my roomba?

    b) Give an account on different types of learning.

18. a) Give parse tree representation of the following statements:
    i) The boss at soup at home and went to his office.
    ii) If x=5 then y=1 else y=2.
    iii) The cyclone hit the city and left it devastated.

    b) Illustrate CSP (Constraint Satisfaction Problem) using Missionary CannibalProblem.