ROLL NO. _____

Code: AC74/AT74 Subject: ARTIFICIAL INTELLIGENCE & NEURAL NETWORKS

AMIETE – CS/IT

Time: 3 Hours **JUNE 2013** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q. 1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. What ability does a computer require in order to pass the stand Turing test?

(A) Vision **(B)** Manipulation of object
(C) Reasoning **(D)** All of these

b. Which one of the following is true about A* search?

(A) Only complete if the limit is set to below the depth of the shallowest solution.
(B) Only complete in finite spaces with repeated state detection
(C) Only complete and optimal if the heuristic used is admissible
(D) Always complete and optimal in finite search spaces

c. Heuristic h1 is dominated by heuristic h2 if

(A) h1 never overestimates the cost to reach the goal but h2 does
(B) $h2(n) \geq h1(n)$ for all n, and h2 never overestimates the cost to reach the goal
(C) h2 never overestimates the cost to reach the goal but h1 does
(D) $h2(n) \leq h1(n)$ for all n, and h1 never overestimates the cost to reach the goal

d. In the two-player search Tree below, for what values of x will the tree be pruned at b when Alpha- Beta pruning is used?

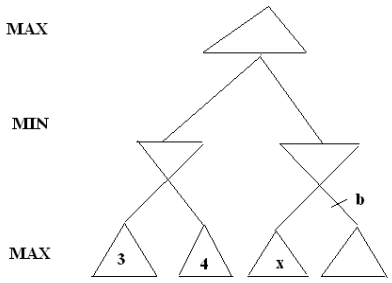

Fig.1

(A) $x > 3$ **(B)** $x \leq 3$
(C) $x > 4$ **(D)** $x \leq 4$

e. In the population 10% of people have a cold, 20% of people have a cough, and a person with a cold has a cough 30% of the time. If you hear someone with a cough, what is the probability that they have a cold?

(A) $\frac{0.1 \times 0.2}{0.3}$ **(B)** $\frac{0.1 \times 0.3}{0.2}$
(C) $\frac{0.2 \times 0.3}{0.1}$ **(D)** $\frac{0.1}{0.2 \times 0.3}$

f. What is not a property of representation of knowledge?

(A) Representational Verification **(B)** Representational Adequacy
(C) Inferential Adequacy **(D)** Inferential Efficiency

g. What are you predicating by the logic $\forall x : \in y :$ loyal to (x, y)

(A) Everyone is not loyal to someone
(B) Everyone is loyal to someone
(C) Everyone is loyal to all
(D) Everyone is loyal

h. Neural Networks are complex _____ with many parameters

(A) Linear Functions **(B)** Non Linear Function
(C) Discrete Functions **(D)** Exponential functions

i. Idempotency law is
(i) $P \vee P = P$
(ii) $P \wedge P = P$
(iii) $P + P = P$

(A) Only (i) above **(B)** Only (ii) above
(C) Only (iii) above **(D)** Both (i) and (ii) above

j. Machine learning is

(A) The autonomous acquisition of knowledge through the use of computer programs
(B) The autonomous acquisition of knowledge through the use of manual programs
(C) The selective acquisition of knowledge through the use of computer programs
(D) The selective acquisition of knowledge through the use of manual programs

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Differentiate between symbolic and non symbolic representation. **(5)**

b. In context to objects to Turing test, briefly discuss Chinese Room Test. **(6)**

c. Explain why Artificial intelligence is beneficial even though computers cannot really think. **(5)**

Q.3 a. Consider the following **(4)**
p: Today is Tuesday
q : It is raining
r: It is cold
write in simple sentences the meaning of the following:

(i) $p \Rightarrow q$
(ii) $\sim q \Rightarrow (r \wedge p)$
(iii) $\sim p \Rightarrow (q \vee r)$
(iv) $(p \vee q) \Leftrightarrow r$

b. Obtain the principal disjunctive normal norm of : $(p \wedge \sim q \wedge \sim r) \vee (q \wedge r)$ **(5)**

c. Prove the validity of the following argument " If I get the job and work hard, then I will get promoted"
If I get promoted, then I will be happy
I will not be happy, therefore, either I will not get the job or I will not work hard" **(7)**

Q.4 a. Draw semantic network to represent the following data: **(8)**

(i) Tom is a cat	(ii) Tom caught a bird
(iii) Tom is owned by John	(iv) Tom is ginger in colour
(v) Cats like cream	(vi) The cat sat on the mat
(vii) A cat is a mammal	(viii) A bird is an animal
(ix) All mammals are animals	(x) Mammals have fur

b. Explain with the help of diagram the procedure for knowledge acquisition. **(8)**

Q.5 a. Solve the problem; **(10)**
In a certain clinic 0.15 of the patients have got the HIV virus. Suppose a blood test is carried out on a patient. If the patient has got the virus the test will turn out positive with probability 0.95. If the patient does not have the virus the test will turn out positive with probability 0.02.
If the test is positive what are the probabilities that the patient
(i) has the virus
(ii) does not have the virus?
If the test is negative what are the probabilities that the patient
(iii) has the virus
(iv) does not have the virus.

b. Write short notes on; **(6)**
(i) Domain Modelling
(ii) Frame based System

Q.6 a. Explain the MINIMAX search procedure. **(8)**

b. Differentiate between Depth First Search and Breadth First Search algorithms. Illustrate them with suitable example. **(8)**

Q.7 a. Differentiate between: **(9)**
(i) Public Vs Private Knowledge
(ii) Skill Vs Knowledge
(iii) Human Vs Machine Intelligence

b. Explain and contrast between inference Procedure in Predicate and Propositional calculus. **(7)**

Q.8 a. Explain the Key features of Hop field Neural Networks. **(5)**

b. Compare and contrast between Neural Networks and Expert systems in terms of knowledge representation, acquisition and explanation. **(7)**

c. Discuss the limitation of Neural Networks. **(4)**

Q.9 a. Discuss the use of Artificial intelligence techniques in E-Commerce applications. **(8)**

b. Explain about the various uses of Artificial Intelligence in Medicine field. Justify it with proper examples. **(8)**