UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	ARTIFICIAL INTELLIGENCE
COURSE CODE	:	BIT 20903
PROGRAMME	:	3 BIT
EXAMINATION DATE	:	JUNE 2015 / JULY 2015
DURATION	:	2 HOURS AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS.

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

Q1 In 1950 Alan Turing published his famous paper "Computing Machinery and Intelligence." In that paper he describes a method for humans to test Artificial Intelligence programs.

(a) List **THREE (3)** components/elements need in constructing the Turing Test.
(3 marks)

(b) Describe **TWO (2)** criteria that a computer needs to pass the Turing Test.
(4 marks)

Q2 Explain **ONE (1)** application of Artificial Intelligence in each of the following domain:

(a) Medical
(3 marks)

(b) Human personal assistant
(3 marks)

Q3 Write an English sentence corresponding to each of the following predicate calculus:

(a) $\forall X \forall Y$ father(X,Y) v mother (X,Y) $\rightarrow$ parent(X,Y)
(6 marks)

(b) $\neg$ weather(rain,monday)$\rightarrow$ go(ahmad,beach)
(6 marks)

Q4 Write predicate calculus expressions for the following English sentences:

(a) People who like cats don't like dogs.
(6 marks)

(c) If we have cheese, we will make a sandwich.
(6 marks)

Q5 Differentiate between:

(a) Forward Chaining and Backward Chaining

(4 marks)

(b) Breadth First Search and Best First Search

(4 marks)

Q6 Discuss the characteristics of Expert System as given below:

(a) High level expertise

(2 marks)

(b) Adequate response time

(2 marks)

Q7 Fuzzy Logic and Neural Networks are two popular Machine Learning approaches.

(a) Explain **TWO (2)** advantages of using Fuzzy Logic.

(6 marks)

(b) Sketch a fuzzy membership function graph for linguistic variable MEN'S HEIGHT which consists of 3 fuzzy sets, and the range for universe of discourse is [0,200] measured in cm. Please label each fuzzy set according to MEN'S HEIGHT.

(8 marks)

(c) Explain the method in determining the number of input nodes and output nodes for any problems in Neural Network design.

(6 marks)

(d) Sketch and label a structure of a Neural Network with 3 layers, 10 input nodes, and 2 output nodes.

(8 marks)

Q8 Analyze the program in Figure **Q8** and write the output when a query, `p(X,Y,Z).`, is posed.

```
a(red).
a(blue).

b(apple,melon).
b(orange,lemon).

p(X,Y,Z):-
a(X),!,
b(Y,Z).
```

FIGURE Q8

(8 marks)

Q9 Analyze the Family Relationship given in Figure **Q9**. Write the relationship into Prolog facts and rules. Include the following **FOUR (4)** rules:

- Mother
- Sister
- Wife
- Children

```
Azizah is married to Ahmad and have three children; Bakar, Baharom
and Badariah.
Bakar is married to Manisah.
Baharom is married to Monalisa.
Badariah is married to Mamat.
```

FIGURE Q9

(15 marks)

- END OF QUESTION –