UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

COURSE NAME	:	ARTIFICIAL INTELLIGENCE
COURSE CODE	:	BIT 20903
PROGRAMME CODE	:	BIT
EXAMINATION DATE	:	JULY 2024
DURATION	:	3 HOURS
INSTRUCTIONS	:	1. ANSWER ALL QUESTIONS
		2. THIS FINAL EXAMINATION IS CONDUCTED VIA
		☐ Open book
		☒ Closed book
		3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

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

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Q1   Differentiate between deductive reasoning and abductive reasoning.

(4 marks)

Q2   Explain **THREE (3)** types of Inference Techniques.

(6 marks)

Q3   Answer the following questions:

(a)   Complete the following arguments using modus ponens.

```
If it is raining today, I will take my umbrella.
It is raining today.
```

(3 marks)

(b)   Complete the following arguments using modus tollens.

```
If the cake is made with sugar, then the cake is sweet.
The cake is not sweet.
```

(3 marks)

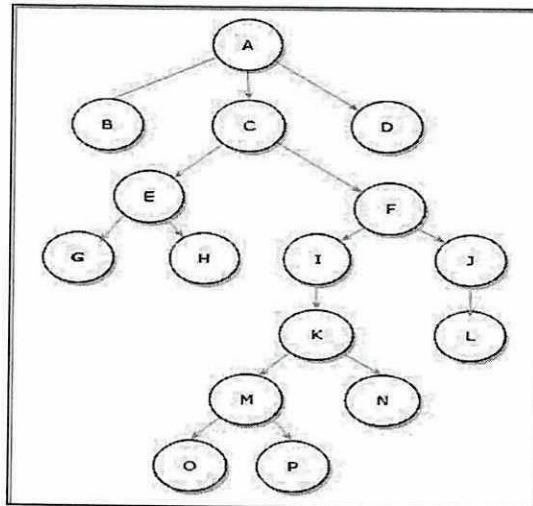**Q4**   Based on **Figure Q4.1**, traverse the tree to reach **node N** using the following techniques.

FIGURE Q4.1

(a)   Breadth-first Search

(10 marks)

(b)   Depth-first Search

(10 marks)

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Q5 You are given an expert system with seven rules pertaining to the interpersonal skills of job applicant. Solve the following independent cases:

```
Rule 1: IF A THEN B
Rule 2: IF C THEN A
Rule 3: IF D THEN E ELSE C
Rule 4: IF F THEN C
Rule 5: IF G AND B THEN H
Rule 6: IF H THEN I
Rule 7: IF I THEN J

where;

A = the applicant answers questions in a straightforward manner
B = she is easy to converse with
C = the applicant seems honest
D = the applicant has items on her resume that are found to be
    untrue
E = she does not seem honest
F = the applicant is able to arrange an appointment with the
    executive assistant
G = the applicant is able to strike up a conversation with the
    executive assistant
H = she is amiable
I = has adequate interpersonal skills
J = will offer the job

Assume that the applicant does not have any items on her resume
that are found to be untrue and she is able to arrange an
appointment with the executive assistant.
```

Perform each of the following analysis to determine if the applicant will be offered the job or otherwise:

(a) Forward chaining

(15 marks)

(b) Backward chaining

(15 marks)

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Q6   Prove the statement in **Figure Q6.1** using the resolution method.

```
              GOAL: Prove that "Fido will die"
1. All dogs are animals.
2. Fido is a dog.
3. All animals will die.
```

FIGURE Q6.1

(a)   Write the statements in propositional logic.

(4 marks)

(b)   Write the statements in Conjunctive Normal Form (CNF).

(4 marks)

(c)   Draw resolution refutation tree.

(6 marks)

- END OF QUESTIONS -