36F TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Artificial Intelligence *(Elective III) (CT78506)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
- ✓ *The figures in the margin indicate **Full Marks**.*
- ✓ *Assume suitable data if necessary.*

1. What are intelligent agents and how can we design intelligent agent? Explain with examples with relevance to PEAS framework? [4+3]

2. What do understand by Constraint satisfaction problem? Solve the following Crypt-arithmetic problem. [8]

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3. Compare breadth first search and depth first search along with examples. [8]

4. State the approach for learning using ID3 and Select the root attribute of the decision-tree from given sample data. [2+7]

Outlook	Temperature	Humidity	Windy	Play golf (Target variable)
Rainy	Hot	High	False	No
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	False	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	Yes
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No

5. Assume the following facts: [8]
   a) Horses, cows, pigs are mammals.
   b) An offspring of a horse is a horse.
   c) Bluebeard is a horse.
   d) Bluebeard is Charlie's parent.
   e) Offspring and parent are inverse relations.
   f) Every mammal has a parent.

   Prove Charlie is a horse using resolution refutation

6. "Learning is an essential characteristic for intelligent agents." Comment on this statement. Differentiate between Supervised and Unsupervised Learning. [4+4]

7. Define a NLU and a NLG. Listdown the different steps involved in the natural language processing (NLP) with suitable examples. [2+6]

8. What do you understand by Perceptron? How can we design a neural network that acts as an XOR gate. [1+8]

9 What are frames and semantic networks? Compare them will suitable examples. [4+3]

10 Write short notes on the following: - [2*4]
   a) Minmax algorithm
   b) Genetic algorithm

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36F TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Magh

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	IV / II	Time	3 hrs.

Subject: - Artificial Intelligence *(Elective III) (CT78506)*

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- ✓ *Attempt **All** questions.*
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- ✓ *Assume suitable data if necessary.*

1. If the Turing Test is passed, does this show that computers exhibit intelligence? State your reasons. [7]

2. What do understand by Constraint satisfaction problem? Solve the following Crypt-arithmetic problem. [8]

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  FORTY
    TEN
+ TEN
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  SIXTY
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3. Searching is an important part of AI, justify it. Explain about A* search along with a simple example. [8]

4. List down the rules for inference. Prove Charlie is a horse using resolution refutation based on following statements [9]
   i. Horses, cows, pigs are mammals.
   ii. An offspring of a horse is a horse.
   iii. Bluebeard is a horse.
   iv. Bluebeard is Charlie's parent.
   v. Offspring and parent are inverse relations.
   vi. Every mammal has a parent

5. Explain about Propositional logic and First order logic with examples. [8]

6. What is Backpropagation? How can we design a neural network that acts as an XOR gate. [2+6]

7. Explain the different steps involved in the natural language processing (NLP) with suitable block diagram and examples. [8]

8. State the approach for learning using ID3 and Select the root attribute of the decision-tree from given sample data. [8]

Outlook	Temperature	Humidity	Windy	Play cricket (Target variable)
Rainy	Hot	High	False	Yes
Rainy	Hot	High	True	No
Overcast	Hot	High	False	Yes
Sunny	Mild	High	False	Yes
Sunny	Cool	Normal	False	Yes
Sunny	Cool	Normal	True	No
Overcast	Cool	Normal	True	Yes
Rainy	Mild	High	True	No
Rainy	Cool	Normal	False	Yes
Sunny	Mild	Normal	False	Yes
Rainy	Mild	Normal	True	No
Overcast	Mild	High	True	Yes
Overcast	Hot	Normal	False	Yes
Sunny	Mild	High	True	No

9. A doctor is called to see a sick child. The doctor has prior information that 90% of sick children in that neighborhood have the flu, while the other 10% are sick with measles. Let F stand for an event of a child being sick with flu and M stand for an event of a child being sick with measles. Assume for simplicity that there no other maladies in that neighborhood. [8]
A well-known (and common) symptom of measles is a rash and has probability of .95.
However, very occasionally, children with flu also develop rash and has probability of 0.08.
Upon examining the child, the doctor finds a rash. What is the probability that the child has measles?

10. Write short notes on the following: - [2*4]
a) Well defined Problem
b) Semantic Network and Frames

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