TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
2013

Full Marks: 40
Time: 2 hrs

BIM / Fifth Semester / ITC 223: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. ***Brief Answer Questions:*** *[10 × 1 = 10]*
   a. Define agents.
   b. What are the various components of problem definition in searching?
   c. Write the limitation of propositional logic over predicate logic.
   d. State Modus Tollens inference rule with suitable example.
   e. What is meant by logical equivalence?
   f. Define reinforcement learning.
   g. Why pragmatic analysis is required in NLP?
   h. What is meant by expert system shell?
   i. Is it possible to develop expert system if the domain expert does not have the computer programming knowledge? Give reason.
   j. What is the nature of output for a neuron with threshold activation function?

Group "B"

Short Answer Questions: *[5 × 3 = 15]*

2. Define agent function? Give some agent functions for robot which can cross the road as humans do.
3. What are heuristic search? Write A* search algorithm.
4. State and explain the resolution principle for propositional logic.
5. Define logical consequence. Prove (P OR Q) is logical consequence of (P&Q), but (P&Q) is not logical consequence of (P OR Q).
6. Solve the cryptarithmetic problem.

```
  CROSS
+ ROADS
---------
 DANGER
```

Group "C"

Long Answer Questions: *[3 × 5 = 15]*

7. Define Mini Max Search procedure with suitable figures.
8. Define genetic algorithm. Explain how system learns.
9. Explain neural network. Write back propagation training algorithm for feed forward neural network.

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TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
2014

Full Marks: 40
Time: 2 hrs

BIM / Fifth Semester / ITC 223: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

7. Define Mini Max Search procedure with suitable figures.
8. Define genetic algorithm. Explain how system learns.
9. Explain neural network. Write back propagation training algorithm for feed forward neural network.

✡✡✡✡

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
2014

Full Marks: 40
Time: 2 hrs

BIM / Fifth Semester / ITC 223: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. Brief Answer Questions: *[10 × 1 = 10]*

a. What does cognitive approach resemble in AI?
b. What is rational agent?
c. What are the problems in hill climbing search?
d. Write Modus Ponens rule.
e. Differentiate omniscience and artificial intelligence.
f. List the parameters of NLP.
g. What do you mean by dynamic environment?
h. What is the use of sensor?
i. Define Disjunctive Normal Form (DNF).
j. What is the theme of monkey banana problem?

Group "B"

Short Answer Questions: *[5 × 3 = 15]*

2. Describe the concept of Hebbian learning.
3. Consider the following statements
   i. Everyone who loves all animals is loved by someone.
   ii. Jack loves all animals.

   Convert the above statements into first order predicate logic and using different inferences rules prove that Jack is loved by someone.
4. What is the concept behind Turing Test? Explain artificial intelligence from Acting Humanly perspective?
5. Define constraint satisfaction problem? Solve the following using crypto-arithmetic.

```
  WRONG
+ WRONG
---------
  RIGHT
```

6. What do you mean by machine vision? Explain its application areas and Machine vision stages briefly.

Group "C"

Long Answer Questions: *[3 × 5 = 15]*

7. What is Artificial Neural Network? Point out some practical difficulties associated with ANN to implement it on an agent easily. Explain Mc-Colloch-Pit neuron model and realize AND and OR with ANN.
8. What are the differences between game search and other search techniques? Explain MIN Max search algorithm with the concept of alpha-beta pruning.
9. Why understanding of environment is necessary of an agent to perform well? Give the PEAS description for the agents for a medical diagnosis system that can diagnosis a patient as an expert doctor.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
2015

Full Marks: 40
Time: 2 hrs

BIM / Fifth Semester / ITC 223: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

Brief Answer Questions: *[10 × 1 = 10]*

1. What is Artificial Intelligence?
2. Define omniscience.
3. How is performance of search algorithm measured?
4. What is cryptarithmetic?
5. What is the limitation of propositional logic over predicate logic?
6. State Modus Ponens inference rule with suitable example.
7. Define conjunctive normal form with suitable example.
8. Define mutation in genetic algorithm.
9. Define rule based expert system.
10. What is meant by machine translation in NLP?

Group "B"

Short Answer Questions: *[5 × 3 = 15]*

11. Make a comparison between breadth first search and depth first search.
12. List operators used in propositional logic and explain any two of them with example.
13. Differentiate between universal and existential quantifiers.
14. Explain the different components of an expert system.
15. What is meant by Natural Language processing? Parse the sentence "He hit the man with the hammer" using top down parsing.

Group "C"

Long Answer Questions: *[3 × 5 = 15]*

16. Define agent. Explain any three types of environment for an agent.
17. Define Mini Max Search procedure with suitable example.
18. What is activation function in neural network? Explain different types of activation functions.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
March - April 2017

Full Marks: 40
Time: 2 hrs.

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. *Brief Answer Questions:* *[10 × 1 = 10]*

i. When machine is termed intelligent in Turing Test?
ii. Define agent function.
Why pragmatic analysis is necessary in NLP?
In what type of situation fuzzy logic can be used?

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
March - April 2017

Full Marks: 40
Time: 2 hrs.

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. ***Brief Answer Questions:*** *[10 × 1 = 10]*

   i. When machine is termed intelligent in Turing Test?
   ii. Define agent function.
   iii. Why pragmatic analysis is necessary in NLP?
   iv. In what type of situation fuzzy logic can be used?
   v. "Every husband loves his wife", convert the above statement in FOPL.
   vi. What is unsupervised learning?
   vii. Write any two conflict resolution strategies in production system.
   viii. What is skolemization?
   ix. What do you mean by Admissible heuristics?
   x. What is alpha-beta purning?

Group "B"

Short Answer Questions: *[5 × 4 = 20]*

2. How Goal based agent works? Explain.
3. Differentiate between forward chaining and backward chaining with suitable example.
4. Explain any two Activation function.
5. Why genetic algorithm is important? Explain different operators of genetic algorithm with suitable example.
6. Explain learning agent with block diagram.

Group "C"

Comprehensive Questions: *[2 × 5 = 10]*

7. Define game playing search. Why alpha beta pruning is better than min-max algorithm? Justify with suitable game tree.
8. Ram is a boy. Sita is a girl. Ram is husband of Sita. If girls has husband then she is married. Write above knowledge base in predicate logic and show that "Sita is married" using Resolution algorithm.

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TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
March - April 2018

Full Marks: 40
Time: 2 hrs.

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

Brief Answer Questions: *[10 × 1 = 10]*

Write above knowledge base in predicate logic and show that "Sita is married" usin
algorithm.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean

Full Marks: 40
Time: 2 hrs.

March - April 2018

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. ***Brief Answer Questions:*** *[10 × 1 = 10]*

   i. What is learning agent?
   ii. What is alpha beta pruning?
   iii. Define inference engine.
   iv. List the components of problem definition.
   v. What is meant by logical consequence?
   vi. In which situation fuzzy logic can be used?
   vii. What is meant by expert system shell?
   viii. With suitable example write on crossover operator in genetic algorithm.
   ix. What is pragmatic analysis?
   x. What is DENDRAL?

Group "B"

Short Answer Questions: *[5 × 4 = 20]*

2 In which situation hill climbing search will be more appropriate? Explain.
3 Explain benefits of Reinforcement learning.
4 Provide example to illustrate working of forward chaining method in production system.
5 Write algorithm for Depth first search.
6 Consider the following statements. "Jack owns a dog. Every dog owner is an animal lover. No animal lover kills an animal. Either Jack or Curiosity killed the cat, who is named Tuna" Using resolution principle prove that, Curiosity kill the cat.

Group "C"

Comprehensive Questions: *[2 × 5 = 10]*

7. What do you mean by testing of neural network? Explain with example.
8. Differentiate between first order predicate language and propositional logic. How will you use first order predicate language? Provide example.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean

Full Marks: 40
Pass Marks: 18
Time: 2 hrs.

April 2019

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. ***Brief Answer Questions:*** *[10 × 1 = 10]*

   i. Define Omniscience.
   ii. Define sequential environment.
   iii. Write Modus Ponen Rule.
   iv. In NLP, why semantic analysis is used?
   v. What does a Production Rule Consist Of?
   vi. Define fuzzy set and crisp set.

first order predicate language? Provide example.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean

Full Marks: 40
Pass Marks: 18
Time: 2 hrs.

April 2019

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

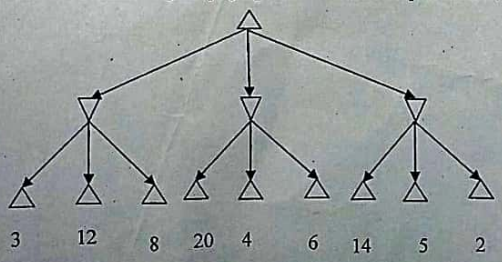
1. ***Brief Answer Questions:*** *[10 × 1 = 10]*

   i. Define Omniscience.
   ii. Define sequential environment.
   iii. Write Modus Ponen Rule.
   iv. In NLP, why semantic analysis is used?
   v. What does a Production Rule Consist Of?
   vi. Define fuzzy set and crisp set.
   vii. Compare expert system and human expert.
   viii. Define disjunctive normal form.
   ix. Write any one importance of artificial intelligence.
   x. What do you mean by fringe nodes?

Group "B"

Short Answer Questions: *[5 × 4 = 20]*

2. With suitable example write on crossover operator and mutation in Genetic Algorithm.
3. Explain Mc-Colloch-Pits model of neuron.
4. Write the steps used in Searching. Justify the statement "the alpha beta pruning game playing search is better than mini max game playing search" with the help of following game tree.



5. Define resolution. Consider the following Knowledge Base "It is raining or it is snowing or it is dry. It is warm. It is not raining. It is not snowing. If the weather is nice, then it is good to walk. If the weather is dry and warm, the weather is nice." Prove that "It is good to walk" by using inference rule.

6. There are two jugs, a 4-gallon one and a 3-gallon one. Neither jug has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water in 4 gallon jug? Represent the above problem in production rule system.

Group "C"

Comprehensive Questions: *[2 × 5 = 10]*

7. In which situation Case Base Reasoning is appropriate? Explain.
8. Why is learning important for agent? How it learns? Explain.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
January - February 2020
(Make up)

Full Marks: 40
Pass Marks: 18
Time: 2 hrs.

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

I. Brief Answer Questions: *[10 × 1 = 10]*

i. What are the requirements to pass the Turing Test?
ii. What is agent function?
iii. Convert given statement into predicate logic "Every teacher is liked by some student".
iv. Define triggering in production system.
v. Compare fuzzy logic with binary logic.
vi. What do you mean by machine learning?
vii. Differentiate between universal and existential quantifiers.
viii. Define plateau problem.
ix. Why natural language processing is a difficult task?
x. Define knowledge engineering in expert system.

157086

Group "B"

Short Answer Questions: *[5 × 4 = 20]*

2. Explain any two types of TASK environment.
3. Why activation function is used in neural network? Explain unit and sigmoid activation function.
4. Explain R4 cycle in CBR.
5. List the operators of Genetic Algorithm. Explain with suitable example.
6. You are given the following production system:
   i. Y ^ D → Z
   ii. X ^ B ^ E → Y
   iii. A → X
   iv. C → L

8. Why is learning important for agent? How it learns? Explain.

TRIBHUVAN UNIVERSITY
FACULTY OF MANAGEMENT
Office of the Dean
January - February 2020
(Make up)

Full Marks: 40
Pass Marks: 18
Time: 2 hrs.

BIM / Seventh Semester / IT 228: Artificial Intelligence

Candidates are required to answer all the questions in their own words as far as practicable.

Group "A"

1. *Brief Answer Questions:* *[10 × 1 = 10]*

i. What are the requirements to pass the Turing Test?
ii. What is agent function?
iii. Convert given statement into predicate logic "Every teacher is liked by some student".
iv. Define triggering in production system.
v. Compare fuzzy logic with binary logic.
vi. What do you mean by machine learning?
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x. Define knowledge engineering in expert system.

157086

Group "B"

Short Answer Questions: *[5 × 4 = 20]*

2. Explain any two types of TASK environment.
3. Why activation function is used in neural network? Explain unit and sigmoid activation function.
4. Explain R4 cycle in CBR.
5. List the operators of Genetic Algorithm. Explain with suitable example.
6. You are given the following production system:
   i. Y ^ D → Z
   ii. X ^ B ^ E → Y
   iii. A → X
   iv. C → L
   v. L^ M → N

   The initial contents of working memory is {A, B, C, D, E} and the goal is Z. When there are conflicts, the lowest numbered rule should fire.

   Apply (a) Forward Chaining and (b) Backward Chaining

Group "C"

omprehensive Questions: *[2 × 5 = 10]*

7. Write the algorithm for resolution and CNF. Let us consider there are two restaurant A and B. A has a signboard with information "Good food is not cheap" and B has a signboard with information "cheap food is not good".
   i. Represent the two statement in propositional logic.
   ii. Are they saying same thing? Justify.
8. Compare informed search with uninformed search. How A* search searches state space, explain with suitable example.