4.

PURBANCHAL UNIVERSITY
2010

B.E. (Computer)/Seventh Semester/Final
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG471CO: Artificial Intelligence

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions.

1. Given these premises:
   (a) If x is on top of y, y supports x.
   (b) If x is above and they are touching each other, x is on top of y.
   (c) Everything is on top of another thing.
   (d) A cup is above a book.
   (e) A cup is touching a book.

   Express them in FOPL, put them in clause form, and use resolution to answer the question: Is the book supporting the cup? 5+5

2. Solve the following crypto-arithmetic problem, where different letters denote different integers and identical letters denote same integer: EAT + THAT = APPLE.

   Show all steps how you advance through constraint satisfaction. 10

3(a) Compare artificial intelligence and natural intelligence. 3

(b) State the inference theorems with examples. 7

4(a) What is heuristic? How does it help in searching algorithms? 5

(b) With a suitable example, discuss importance and uses of Bayes network in reasoning. 5

5(a) Explain the use of frame systems in knowledge representation. 5

(b) Explain planning. How does it differ from searching? 5

6(a) Explain explanation based learning and learning by analogy. 5

Contd. ...

5 of 6

(b) What is neural network? How does an artificial neural network learn? 5

7(a) What is expert system? How does knowledge acquisition and explanation is being carried out in this system? Explain. 5

(b) What are the issues to be addressed in the syntactic and semantic processing of natural language processing? Explain with examples. 5

8(a) Explain CBR with appropriate flow-diagram.

(b) How does a hopfield network works? Explain with example. 5

9. Write short notes on any TWO: 5+5
   (a) Machine Vision
   (b) Genetic algorithms
   (c) Game Playing

PURBANCHAL UNIVERSITY

2011

B.E. (Computer)/Seventh Semester/Final

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence

Candidates are required to give their answers in their own words as far as practicable.

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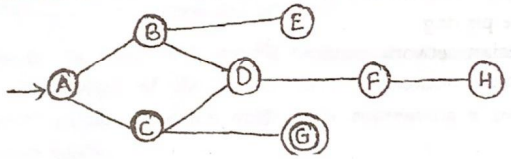
Answer EIGHT questions.

1(a) What are different approaches in defining artificial intelligence? How does it differ with natural intelligence? 5

(b) Define learning agent. Discuss the agent environments in brief. 5

2(a) Consider the following graph:



Starting from state A, execute DFS. The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller node is expanded first to break ties. 4

(b) Explain best-first algorithm with its algorithm and example. 6

3(a) What is means ends analysis? Discuss. 3

(b) Stating necessary assumptions and conditions prove the following constraint satisfaction problem. 7

```
  NINA
+ SING
-------
 AGAIN
```

4. Consider the following set of axioms:
   (a) Everyone who loves someone who loves them back is happy.
   (b) Mary loves everyone.
   (c) There is someone who loves Mary.

Contd. ...

1 of 6

From above statements, using resolution proof technique, conclude:
"Mary is happy" 10

5. Define Machine learning. Explain working principle of Genetic algorithm with example. 2+8

6(a) Define ANN. Explain how Hopfield network works? 5

(b) Explain the expert system development process. 5

7(a) Explain different levels of NLP. 5

(b) Explain Explanation based learning with example. 5

8(a) Explain briefly the line and edge detection method. 5

(b) Compare forward and backward chaining method. 5

9. Write short notes on any TWO: 5+5
   (a) Game playing
   (b) Bayesian network
   (c) Semantic network

PURBANCHAL UNIVERSITY
2011

B.E. (Computer)/Seventh Semester/*Chance*
Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32
BEG471CO: Artificial Intelligence

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions.

1(a) Discuss various definitions of artificial intelligence (AI). Explain why AI programs try to model human performance. 5

(b) In the context of user identification system, based on voice, what would be the consideration of an AI systems in terms of Agent, Environment, Actuators and Sensor? 5

2(a) What is the best first search technique? Explain the various operating steps of the A* (A star) algorithm by searching a directed graph in which each node represents a point in the problem space. 2+4

(b) Compare depth first search and breadth first search methods. 4

3(a) What is predicate logic? Differentiate it with propositional logic. 1+3

(b) Explain principal of resolution. Explain the formal steps in Resolution with example. 6

4(a) Differentiate between forward and backward chaining with example. 5

(b) Discuss with suitable example how problem is solved using goal stack planning. 5

5(a) What is Rote Learning? 2

(b) Discuss genetic algorithm with example. 8

6(a) Draw a schematic diagram showing the various functional elements of an expert system. Explain the function of each of them. 6

Contd. ...

6 of 6.

(b) Give an example of expert system and give basic characteristics of Expert system. 4

7. Discuss major advantage of artificial neural networks. Describe briefly back propagation training algorithm. Give different possible application of neural networks. 10

8(a) What do you mean by natural language processing? Discuss in detail the components involved in the natural language understanding process. 5

(b) Briefly explain the edge detection methods 5

9. Write short notes on any TWO: 5+5
   (a) Bayesian Network
   (b) Inductive bias learning
   (c) Frames

PURBANCHAL UNIVERSITY
2012

B.E. (Computer)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions.

1. What is AI? Explain acting humanly and rationally. Explain Turing test. 3+4+3

2. Compare depth first search and breadth first search. Explain A* search. 5+5

3. Explain the problem solving using planning. Describe the methods of representing knowledge in AI. 4+6

4. What is probabilistic reasoning? Explain uncertain with the help of Bayes Theorem and Bayesian Network, with example. 10

5. Convert the following sentences into FOPL: 2+8

   (a) Everyone who loves all animals is loved by someone.

   (b) Anyone who kills an animal is loved by no one.

   (c) Jack loves all animals.

   (d) Either Jack or Curiosity killed the cat. Prove that Curiosity killed the cat.

6. What is perceptron? Explain back propagation. What is Hopfield neural network? 4+3+3

7. What is intelligent agent and agent program? Explain the types of agent programs with example. 2+8

Contd. ...

8. Solve the following cryptatrithmetic puzzle, where different letters denote different integers. State all the assumptions that you make and show all the steps how you advance through constraint satisfaction:

   LONG
   + LIVE
   NEPAL

9. Write short notes on any TWO: 5+5

   (a) Expert System

   (b) Case based reasoning

   (c) Means-end analysis

PURBANCHAL UNIVERSITY
2014

B.E. (Computer)/Seventh Semester/*Chance*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions. **8×10=80**

1(a) Define Artificial Intelligence. Explain Turing Test. 5

(b) What do you mean by Heuristic search? Explain Best-First search. 5

2(a) Explain Bayesian Network. How this network is used? 5

(b) Solve the following cryptarithmentic problem. 5

```
  NINA
+ SING
------
 AGAIN
```

3(a) What do you mean by machine learning? Explain Explanation based learning. 5

(b) Explain genetic algorithm. 5

4(a) Define neural network. Explain its network structure. 5

(b) Explain Hopfield network illustrating how it works. 5

5(a) What is an Expert System? Describe the structure of expert system 5

(b) What do you mean by Natural Language Processing? Explain basic steps in Natural Language Processing. 5

6(a) Why Machine Vision is required? Describe Edge extraction techniques. 5

Contd. ...

(b) How knowledge can be represented using Semantic Network? Explain with suitable example. 5

7(a) Using resolution in propositional logic prove that: 5

"Jasmine is skiing or it is not snowing" and "It is snowing or Bart is playing hockey" imply that "Jasmine is skiing or Bart is playing hockey".

(b) List the inference rules in Predicate logic? 5

8(a) What is planning? Compare linear and non-linear planning. 5

(b) Describe PEAS in reference with any agent. 5

9. Write short notes on any FOUR: 4×2.5=10

(a) Game Playing

(b) Depth First Search

(c) Case- based reasoning

(d) Declarative and Procedural Knowledge

(e) Back propagation

PURBANCHAL UNIVERSITY

2015

B.E. (Computer)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions. **8×10=80**

1(a) Explain with suitable examples intelligence, artificial intelligence and agent. 1+2+3

(b) Compare DFS and BFS. 4

2) Describe the structure of an expert system. Briefly describe the various the steps involved in the development of an expert system. 4+6

3(a) Discuss game tree with an example. 5

(b) Explain Alpha-Beta pruning algorithm. 5

4. Express the following sentences into FOPL. 5×2=10

(a) Lipton is a tea.

(b) Lata is a child who drinks tea.

(c) Ruma dislikes children who drink tea.

(d) Ruma disliked Lata.

(e) Anything anyone eats and isn't killed by is food.

5. Define constraint satisfaction problem. Stating necessary conditions and assumptions, solve the following crypto-arithmetic problem. 2+8

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

Contd. ...

6. Define ANN and its components. Explain back propagation learning mechanism in ANN. 5+5

7(a) What are the different types of learning? Explain rote learning and induction learning with suitable examples. 2+2+2

(b) How does semantic network represent knowledge? Explain with suitable example. 4

8. Differentiate between forward chaining and backward chaining. Use truth table approach to reach the goal for the following: 5×2=10

(a) if it rain, roads are wet

(b) if roads are wet and driving is careless, vehicles are slippery

(c) if vehicles are slippery, accident occurs

(d) It is raining

(e) Driving is careless

Prove the goal that accident occurs.

9. Write short notes on any TWO: 5+5

(a) Genetic Algorithm

(b) Inference Engine

(c) Components of NLP

PURBANCHAL UNIVERSITY
2016

B.E. (Computer)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions. **8×10=80**

1(a) What is an artificial intelligence. Explain with suitable example about the importance of artificial intelligence. 2+4

(b) Compare Blind search and Heuristic search. 4

2. Why do you need an expert system? Briefly describe the various steps involved in the development of an expert system. 2+8

3(a) What is natural language? Describe the various levels of analysis used in natural language processing. 2+8

4. Express the following sentences into FOPL: 5×2=10
   (a) Steve only likes easy course.
   (b) Science courses are hard.
   (c) All courses in the basket weaving department are easy.
   (d) Bill eats peanuts and is still alive.
   (e) Rita eats everything Bill eats.

5. What is constraint satisfaction problem? Stating necessary conditions and assumptions solve the following crypto-arithmetic problem. 2+8

```
  CROSS
+ROAD
------
DANGER
```

6. What is neural network? How does back propagation work for learning in multilayer network? 2+4+4

7(a) Why learning is important in artificial intelligence? Explain he induction learning with suitable examples. 2+4

Contd. ...

(b) How does semantic network represent knowledge? Explain with suitable example. 4

8. What do you mean by Case-based Reasoning? Explain forward and backward chaining with example. 4+4

9. Write short notes on any TWO: 5+5
   (a) Genetic Algorithm
   (b) Propositional Logic
   (c) Reasoning
   (d) Frame System

PURBANCHAL UNIVERSITY
2019

B.E. (Computer)/Seventh Semester/*Final*

Time: 03:00 hrs. Full Marks: 80 /Pass Marks: 32

BEG471CO: Artificial Intelligence *(New Course)*

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks. The marks allotted for each sub-question is specified along its side. Assume suitable data if necessary.

Answer EIGHT questions. **8×10=80**

1(a) What is an artificial intelligence? Explain about PEAS any artificial intelligence agent. 2+4

(b) Compare Blind search and Heuristic search. 4

2. What is an expert system and what are its applications? Briefly describe the various steps involved in the development of an expert system. 4+6

3. Describe the various levels of analysis used in natural language processing. 10

4. Express the following sentences into FOPL. 5×2=10
   (a) Steve only likes easy course.
   (b) Science courses are hard.
   (c) All apples in the basket are rotten
   (d) Bill eats peanuts and is still alive.
   (e) Rita eats everything Bill eats.

5. Define constraint satisfaction problem. Stating necessary conditions and assumptions solve the following crypto-arithmetic problem. SEND+MORE=MONEY. 2+8

6(a) What is neural network? How back propagation works for learning in multilayer network? 2+4

(b) What is hill climbing and its problems? 4

7(a) What are the different types of learning. Explain the induction learning with suitable examples. 2+4

Contd. ...

(b) How does semantic network represent knowledge? Explain with suitable example. 4

8. Write the algorithm of depth-first search and explain with suitable example. 5+5

9. Write short notes on any TWO: 5+5
   (a) Genetic Algorithm
   (b) Bayesian network
   (c) Reinforcement learning