POKHARA UNIVERSITY

Level: Bachelor | Semester – Fall | Year : 2012
Programme: BE | Full Marks: 100
Course: Artificial Intelligence | Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) Explain Turing test. Machine can be made intelligent artificially but ultimately human make the machines. So who is more intelligent – the artificial machine or the person? Discuss. 4+4

b) In a crypto-arithmetic puzzle, the variable A, B, C, D, E and F can take values from 1 to 7. The variables must all be different and, when taken as digits, they must satisfy the following sum. Solve the following problem as CSP. 7

```
  AB
+ CD
----
  EF.
```

a) Explain production systems with the help of 8-puzzle example. 8

b) What are the problems that may arise in hill climbing searching? How they can be handled? Explain. 4+3

OR

a) You are given two jugs, a 4 liters gallon one and a 3 liters gallon one. Neither have 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 liters of water into the 4 liters gallon jug? Solve this problem with state space representation. 8

b) Explain Min-Max search strategy with example. 7

a) What is meaning of word ***heuristics*** in the context of search strategies? What conditions on A* search is required to guarantee completeness and optimality. 3+4

b) What are the different dimensions of search strategy? Compare the 4+4

POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2013
Programme: BE | Full Marks: 100
Course: Artificial Intelligence | Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) Do you consider a mobile phone (smartphone) to be intelligent? Justify your answer. 8

b) What is 8-puzzle problem? How can you solve a problem using production system? 8

a) Trace the constraint satisfaction procedure for solving the following cryptarithmatic problem.
SEND+MORE=MONEY

b) Compare Depth limited search and breadth first search in terms of time and space complexity, completeness and optimality. 8

a) Using a suitable example, illustrate steps of A* search. Why A* search is better than Best first search. 7

b) What are the properties possessed by a good knowledge representation systems? 8

Give P and Q, prove that
$((P \rightarrow Q) \rightarrow P) \rightarrow P$ is tautologous.

a) Convert $A \leftrightarrow B \leftrightarrow C$ into Conjunctive Normal Form. 7

b) Represent the following sentences in first order logic: 8

i. A person with a dust allergy sneezes
ii. Every flower likes water.
iii. You can fool all of the people some of the time.
iv. No cake lover throws a cake.

a) Contrast and compare Semantic Nets and Frames for knowledge representation. List limitations of these representations. 8

b) State and explain in brief about EBL-system. What are its advantages. 7

BFS and DFS with different dimension.

4. a) The logical operator "$\leftrightarrow$" is read "if and only if". $P \leftrightarrow Q$ is defined as being equivalent to $(P \rightarrow Q) \wedge (Q \rightarrow P)$. Based on this definition, show that $P \leftrightarrow Q$ is logically equivalent to $(P \vee Q) \rightarrow (P \wedge Q)$ using truth table. 7

b) Represent the following using first order Logic. 2+6

i) Prasant likes easy courses.
ii) Science courses are hard.
iii) All the courses in the computer departments are easy.
iv) AI is a computer course.

Also, use **resolution** to answer the question, "What course would Prasant like?"

OR

a) Prove that " jeevan is happy" with the help of following facts expressed in CNF. 8

i. $\neg$pass(X,history) $\vee$ $\neg$win(X,lottery) $\vee$ happy(X)
ii. $\neg$study(X) $\vee$ pass(Y,Z)
$\neg$lucky(W) $\vee$ pass(W,U)
iii. $\neg$study(jeevan)
lucky(jeevan)
iv. $\neg$lucky(U) $\vee$ win(U,lottery)

b) Explain with Example, how first order logic sentences are converted into conjunctive normal form (CNF). 7

5. a) How can you say FOPL extend the expressiveness of PL? 5

b) Explain the forward and backward representational mapping with diagram. 5

c) Explain Semantic Network with suitable example. 5

6. a) Explain the basic components of expert system. How can we make expert system knowledge base reusable? 4+4

b) What do you mean by learning by analogy? Explain derivational analogy. 3+4

7. Write short notes on any two: 2×5

a) Bayesian Network
b) Frames

8
7
2×5

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2013
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) Argue against the "Turbine test" as providing a true test of intelligence. 7

b) A farmer has a goat, a wolf & a cabbage on the west side of a river. He wants to get all of his animals & his cabbage across the river onto the east side. The farmer has a row boat but he only has enough room for himself & one other thing. The wolf will eat the goat if they are left together alone. The goat will eat the cabbage if they are left together alone. How can the farmer get everything on the east side? 8

i. Formulate this puzzle as search

ii. Find a solution for this problem.

a) Solve the following crypto arithmetic problem. 7

```
 FORTY
   TEN
  +TEN
 -----
 SIXTY
```

b) "Breadth first search is an implementation of queue whereas Depth first search is an implementation of stack". Verify this statement with suitable example. 8

a) What is hill climbing search? Explain the problem associated with this search techniques. 8

b) Explain Alpha-Beta Pruning search. What are the advantages of Alpha-Beta Pruning over Min-max search? 7

a) Briefly explain the limited expressive capabilities of propositional logic. How does the first order logic extend propositional logic to overcome these limitations? 8

6. a) Define a perceptron. Describe a mechanism to train a perceptron. 8

b) Describe with examples how understanding a natural language is difficult at syntactic and semantic levels. 7

7. Write short notes on: (Any two) 2×

a) Informed search Vs Uninformed search.

b) Learning by Analogy.

c) Baye's theorem.

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Fall

Year : 2014
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

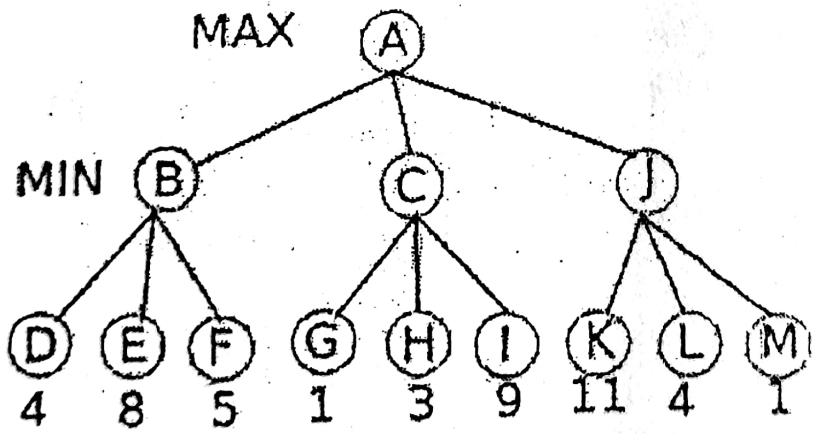
a) Define and describe the difference between knowledge, belief, hypothesis and data. 8

b) What is the goal of a constraint solver? How are constraints propagated in a constraint satisfaction search? 7

a) Model the tic-tac-toe problem as a production system. 8

b) What is A* search? Explain with its algorithms. 7

a) In the figure below, use minimax search with alpha-beta pruning to decide the next move (node) by the MAX player from node A. The numbers indicate utility values. 8



b) Compare Breadth First Search and Depth First Search in terms of time and space complexity, completeness and optimality.

a) Convert (((A AND B) OR (C AND D)) OR E) into Conjunctive Normal Form. Here, OR and AND denote the usual propositional logic operators.

b) Assume the following facts:

- Steve only likes easy courses
- Science courses are hard

b) Assume the following facts: 7

i. Ram likes all kinds of food.

ii. Orange are food.

iii. Rice is food.

iv. Anything anyone eats and is not killed by is food.

v. Krishna eats popcorn and is still alive.

vi. Radha eats anything Krishna eats.

Prove that Ram likes popcorn using resolution.

5. a) Define Bayes rule for probabilistic problem. If probability of symptoms on patients is 1/20 and probability of disease known by doctor is 1/45000. Also the probability of symptoms condition to disease is 50%. Now, calculate the probability of disease condition to symptoms using Bayes theorem. 7

b) What is semantic network? Explain with suitable example. 8

6. a) What is machine learning? Explain about learning from examples. 8

b) Construct the parse tree for given sentence:

"Baidh Group disagreed constitution Election".

Use the following set of Grammers:

S→NP VP

NP→ART N

VP→V NP

N→Baidh/ constitution/ Election

V→ disagree

7. Write short notes on: (Any two)

a) Syntax and semantics of a natural language.

b) Procedural knowledge.

c) First order predicate logic.

P).

5. a) Define clustering and K-means clustering. Discuss briefly about fuzzy learning and its importance. 7

b) How does rule based deduction system work. Compare it with the working of Bayes' theorem. 8

6. a) What do you understand by neural network? Explain about multilayer perception with proper diagrams. 7

b) What is neutral network? Define perceptron. How is winning node chosen in Kohonen network, illustrate with following dataset: 8

$$X = \begin{bmatrix} 0.52 \\ 0.12 \end{bmatrix} \quad W_1 = \begin{bmatrix} 0.27 \\ 0.81 \end{bmatrix} \quad W_2 = \begin{bmatrix} 0.42 \\ 0.70 \end{bmatrix} \quad W_3 = \begin{bmatrix} 0.43 \\ 0.21 \end{bmatrix}$$

Where,

X=two dimensional input vector presented in 3-dimentional Kohonen Network

$$W_i = weight\ vectors, i = 1,2,3$$

7. Write short notes on: (Any two) 2×5

a) Alpha Beta procedure.

b) Tautology.

c) Frames.

b) Assume the following facts: 7

i. Ram likes all kinds of food.

ii. Orange are food.

iii. Rice is food.

iv. Anything anyone eats and is not killed by is food.

v. Krishna eats popcorn and is still alive.

vi. Radha eats anything Krishna eats.

Prove that Ram likes popcorn using resolution.

5. a) Define Bayes rule for probabilistic problem. If probability of symptoms on patients is 1/20 and probability of disease known by doctor is 1/45000. Also the probability of symptoms condition to disease is 50%. Now, calculate the probability of disease condition to symptoms using Bayes theorem. 7

b) What is semantic network? Explain with suitable example. 8

6. a) What is machine learning? Explain about learning from examples. 8

b) Construct the parse tree for given sentence: 7

"Baidh Group disagreed constitution Election".

Use the following set of Grammers:

S→NP VP

NP→ART N

VP→V NP

N→Baidh/ constitution/ Election

V→ disagree

7. Write short notes on: (Any two)

a) Syntax and semantics of a natural language.

b) Procedural knowledge.

c) First order predicate logic.

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2015
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What do you mean by AI? Why it is important? Explain the objectives of AI with examples. 7
   b) Define rational agent? Explain the Learning agent with block diagram. 8
2. a) Define the problem as state space search. Write the various steps involved in solving water-jug problem and give the solution for it. 8
   b) Write down the searching steps. Differentiate between uninformed search and informed search. 7
3. a) Explain Minmax algorithm with an example. 7
   b) Michele is a superstar. All superstars are rich. Rich mans have fast cars. Fast cars consume a lot of petrol. Prove that Michele' car consumes a lot of petrol using resolution 8
4. a) Discuss the importance of knowledge based systems and explain the representation of knowledge. 8
   b) Explain the syntax and semantics for first order predicate logic. 7
5. a) What is Machine learning? Explain the learning by analogy and explation based learning. 8
   b) Define fuzzy learning. Explain reinforcement learning. 7
6. a) Explain about Back Propagation Algorithm in Neural network. 8

OR

Define Perceptron. Illustrate one of the neural network training example.

   b) Why Natural language understanding is difficult? And also explain its application. 7

Write short notes on: (**Any two**) 2×5

a) Adaline Network
b) Boltzmann Machine
c) Reinforcement Learning.

P).

5. a) Define clustering and K-means clustering. Discuss briefly about fuzzy learning and its importance. 7

b) How does rule based deduction system work. Compare it with the working of Bayes' theorem. 8

6. a) What do you understand by neural network? Explain about multilayer perception with proper diagrams. 7

b) What is neutral network? Define perceptron. How is winning node chosen in Kohonen network, illustrate with following dataset: 8

$$X = \begin{bmatrix} 0.52 \\ 0.12 \end{bmatrix} \quad W_1 = \begin{bmatrix} 0.27 \\ 0.81 \end{bmatrix} \quad W_2 = \begin{bmatrix} 0.42 \\ 0.70 \end{bmatrix} \quad W_3 = \begin{bmatrix} 0.43 \\ 0.21 \end{bmatrix}$$

Where,

X=two dimensional input vector presented in 3-dimentional Kohonen Network

$$W_i = weight\ vectors, i = 1,2,3$$

. Write short notes on: (Any two) 2×5

a) Alpha Beta procedure.

b) Tautology.

c) Frames.

POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2016
Programme: BE | Full Marks: 100
Course: Artificial Intelligence | Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks

Attempt all the questions.

1. a) Explain the "Rational Thinking" as an aspect of Artificial Intelligence. List out the various application areas of Artificial Intelligence. 8

   b) How can an agent be qualified as intelligent? Discuss various types of intelligent agents. 7

2. a) Solve the following Crypto arithmetic problems: 8

```
   TWO
 + TWO
 -----
  FOUR
```

   b) What do you mean by Heuristics? Compare the Greedy best first search and A* search in terms of their completeness with suitable example. 7

3. a) The game of NIM is played as follows: 8

   Two players alternatively remove one, two or three coin from a stack initially containing five coin. The player who picks up the last coin loses.

   i. Draw the full game tree.

   ii. Show that the player who has the second move can always win.

   iii. Execute $\alpha - \beta$ procedure on the game tree. How many terminal nodes are examined?

   b) How can you say that the predicate logic is more expressive than propositional logic? Explain with examples. 7

4. a) Why do we need to represent knowledge? Convert following sentences into FOL sentences. 8

   i. Everyone loves Ram.

सुगम स्टेसनरी सप्लायर्स एण्ड फोटोकपी सर्भिस
बालकुमारी, ललितपुर ९८४१५९९५९२
NCIT College

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2014
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) Differentiate between Intelligence and Artificial Intelligence. What are the application areas of AI? State in brief. 8

b) You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring marker 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 into the 4-gallon jug? Solve by production rule system. 7

a) What is state space search? Given any example of a game which happens to be a problem of state space search and justify your answer properly. 8

b) Explain Min-max search. Explain the advantages of Alpha-Beta Pruning over Min-max search? 7

a) Compare depth limited search and iterative deepening search in terms of time and space complexity, completeness and optimality. 8

b) Differentiate propositional and a predicate statement. How does first order predicate logic extend propositional logic to overcome its limitations? 7

a) What are the problems with hill climbing and how can they be solved? Define plateau 7

b) Represent the following sentences in first order logic: 8

i. Nabin is intelligent than all other students in his class.
ii. Neither Sabin nor Kabin is unhappy.
iii. Same cats are domestic pets
iv. Some turtles are faster than rabbits.

a) Explain how statistical reasoning aids in inference and reasoning in light of Bayes theorem. 7

- All the course in the basket weaving department are easy
- BK301 is a basket weaving course

Use resolution to answer the question," What course would Steve like?"

5. a) Define proposition and a predicate. How does first order logic extend propositional logic to overcome its limitations? 8

b) What is a semantic net? For the statement, "The dog bit the mail carrier." Now, represent this statement (Knowledge) using partitioned semantic nets. 7

6. a) What is learning? Explain rote learning and induction learning. Why the process of knowledge acquisition so tedious. 8

b) Why Natural Language understanding is difficult? And also, explain its application. 7

7. Write short notes on: (Any two) 2x

a) Statistical reasoning

b) Expert System

c) Mathematics and Artificial Intelligence.

8

7

8

×5

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Fall

Year : 20 5
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Define intelligence. With reference to Turning Test can we infer that machine possesses Intelligence, justify your answer. 7

   b) Define State Space in problem solving. Using constraint satisfaction problem, solve the following crypto-arithmetic problem. 8
   CROSS+ROADS=DANGER

2. a) What are the different types of problems? How can you say that a problem is well defined or not. 8

   b) In what condition the blind search is preferred? Explain Breadth first search with it's algorithms. 7

3. a) Compare and contrast greedy search and A* search with a suitable example. 8

   b) Define Semantic Network. Draw semantic network of following clauses: 7
   Subset_of(Human, Mammal), Subset_of(Male, Human), Subset_of(Female, Human), Has_Mother(Human, Female), Member_of(Mary, Female), Member_of(John, Male), Husband_of(John, Mary).

4. a) Assume the following facts: 8

   - Steve only likes easy courses
   - Science courses are hard
   - All the course in the basket weaving department are easy
   - BK301 is a basket weaving course

   Use resolution to answer the question," What course would Steve like?"

   b) Using Truth Table, Prove the P ↔ Q is equivalent to (P → Q) ^ (Q → 7

b) Differentiate semantic nets and frame based knowledge representation. 8

a) State and explain in brief about EBL-system. What are its advantages 7

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

Write short notes on: *(Any two)* 2×5

a) Turing test

b) Conceptual dependencies

c) Expert System

POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2017
Programme: BE | Full Marks: 100
Course: Artificial Intelligence | Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is Turing test? Explain in detail. 7

   b) Explain about the importance and applications of Artificial Intelligence. 8

2. a) Discuss Crypto Arithmetic Problem. Solve the following Constraint Satisfaction Problem. 7

   SEVEN + EIGHT = TWELVE

   b) Informed search is different from uniformed search? Compare and contrast Breadth First Search with Depth First Search. 8

3. a) Explain the limitations of hill climbing and its solution with appropriate examples. 7

   b) Assume the following facts: 8

   Lionel Messi is a footballer.
   Lionel Messi plays for Barcelona.
   Barcelona is an' A 'Division Spanish Club.
   All the 'A' Division Spanish Clubs play La Liga.
   Use Resolution to prove that "Lionel Messi Plays La Liga"

4. a) Differentiate between Semantic Network and Frames. Draw semantic network of following clauses 8

   Subset_of(People, Mammal), Subset_of(Male, People), Subset of(Female, People), Has_Father(People, Male), Member_of(Ram, Male), Member_of(Sita, Female), Wife_of(Sita, Ram)

   b) What is machine learning? Explain in detail the concept of learning by induction with an example. 7

5. a) How does a supervised learning differ from an unsupervised learning? Explain, Nearest Neighbor learning method with example. 8

ii. Not everyone loves Ravana.

iii. People protest the politicians they dislike.

iv. Politicians can fool some of the people all of the time, all of the people some of the time.

v. Not all citizens are loyal to their employers.

b) When is it useful to use clustering? The following data set contains the scores of two variables on each of seven individuals. Taking 1 and 4 as initial cluster center, apply k-means clustering to group the given data. 7

Subject	A	B
1	1.0	1.0
2	1.5	2.0
3	3.0	4.0
4	5.0	7.0
5	3.5	5.0
6	4.5	5.0
7	3.5	4.5

5. a) What is machine learning? Explain the learning approach used by Naive Bayes. How is it different from the approach used by neural network? 8

b) What do you mean by supervised learning? Explain how support vector machine (SVM) is useful for the classification in non-linearly separable data space. 7

6. a) Why is Natural Language understanding is difficult? Explain about Morphological Analysis with relevant example. 8

b) Explain the basic components of expert system. How can we make expert system knowledge base reusable? 7

7. Write short notes on: (**Any two**) 2×5

a) Inference and reasoning

b) Deep learning

c) Adaline network.

7
8
7
2x5

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2017
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

शुभम् स्टेशनरी सप्लायर्स एण्ड फोटोकपी सेन्टर
बालकुमारी, ललितपुर ९८०१५२९५२२
NCIT College

1. a) "If computer passes Turing Test, Computer acts like human". Do you agree? State your answer with reason. 7

   b) Define rational agent? Explain the Learning agent with block diagram. 8

2. a) Solve the following problem as CSP. 7

   LOGIC + LOGIC= PROLOG

   b) Differentiate informed and blind search. How DFS is different from BFS? Compare it with evaluation parameters. 8

3. a) Write down the disadvantages of hill climbing search procedure. When does simulated annealing algorithm behave like hill climbing? 7

   b) Prove 'Vinod buys a ticket' using resolution considering following premises - Everyone who enters in a theatre has to buy a ticket. Person who doesn't have money can't buy a ticket. Vinod enter a theatre. 8

4. a) Convert the following statement to clause form and discuss the steps. 8

   $\forall x[B(x) \rightarrow (\exists y [Q(x,y) \wedge \neg P(y)]$

   b) What do you mean by learning by analogy? Explain derivational analogy. 7

5. a) "Describe briefly about Nearest Neighbour and Support Vector Machine Learning methods. 8

   b) What is machine learning? In computers, in many cases, rote learning is used. Give five such examples of rote learning. 7

6. a) What is Artificial Neural Network? Implement a simple logical OR using the perceptron model. What are the different possible threshold values? 8

   b) Explain the steps involved in Natural Language Processing. 7

7. Write short notes on: **(Any two)** 2×5

b) Explain the reinforcement learning with example. 7

6. a) How does the perceptron learn its classification tasks? Explain. 8

b) Explain the steps involved in Natural Language Processing. 7

7. Write short notes on: **(Any two)** 2×

a) Application of Baysian networks for reasoning

b) MYCIN

c) Hopfield network

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Fall

Year : 2018
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) What is Artificial Intelligence? Mention the advantages of Artificial Intelligence. 8

b) What are the criteria for the evaluation of search algorithm? Compare DFS and BFS. 7

a) Solve the following problem : 8
SEND+MORE=MONEY

b) Write algorithm for A*. How we can optimize the A* algorithm? 7

a) Represent following statements into predicate logic. 8

i) All Hindu are either loyal to Krishna or Shiva.

ii) Every gardener like sun.

iii) There is exactly two red mushrooms.

iv) Every parents are older than their childs.

b) Define Bayes rule for probabilistic problem. If probability of symptoms on patients is 1/20 and probability of disease known by doctor is 1/45000. Also the probability of symptoms condition to disease is 50%. Now, calculate the probability of disease condition to symptoms using Bayes theorem. 7

a) Define deep learning. Explain genetic algorithm. 7

b) Define PCA. Compare Brain and computer in terms of intelligence, memory etc. 8

a) What is an expert system? Explain about its knowledge. 7

b) Solve the AND function using Hebb network. 8

a) Why natural language understanding is difficult? Justify your answer. 7

b) What do you mean by machine learning? Explain learning by anology. 8

2×5

7. Write short notes on: **(Any two)**

a) Kohonen Network 8

b) Turing Test 7

c) Informed search Vs Uninformed search 8

7

8

7

8

7

7

8

7

8

7

8

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Fall

Year : 2018
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

a) What is Artificial Intelligence? Mention the advantages of Artificial Intelligence. 8

b) What are the criteria for the evaluation of search algorithm? Compare DFS and BFS. 7

a) Solve the following problem : 8
SEND+MORE=MONEY

b) Write algorithm for A*. How we can optimize the A* algorithm? 7

a) Represent following statements into predicate logic. 8

i) All Hindu are either loyal to Krishna or Shiva.

ii) Every gardener like sun.

iii) There is exactly two red mushrooms.

iv) Every parents are older than their childs.

b) Define Bayes rule for probabilistic problem. If probability of symptoms on patients is 1/20 and probability of disease known by doctor is 1/45000. Also the probability of symptoms condition to disease is 50%. Now, calculate the probability of disease condition to symptoms using Bayes theorem. 7

a) Define deep learning. Explain genetic algorithm. 7

b) Define PCA. Compare Brain and computer in terms of intelligence, memory etc. 8

a) What is an expert system? Explain about its knowledge. 7

b) Solve the AND function using Hebb network. 8

a) Why natural language understanding is difficult? Justify your answer. 7

b) What do you mean by machine learning? Explain learning by anology. 8

7. Write short notes on: (**Any two**) 2×5

a) Kohonen Network

b) Turing Test

c) Informed search Vs Uninformed search

POKHARA UNIVERSITY

4.

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2018
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

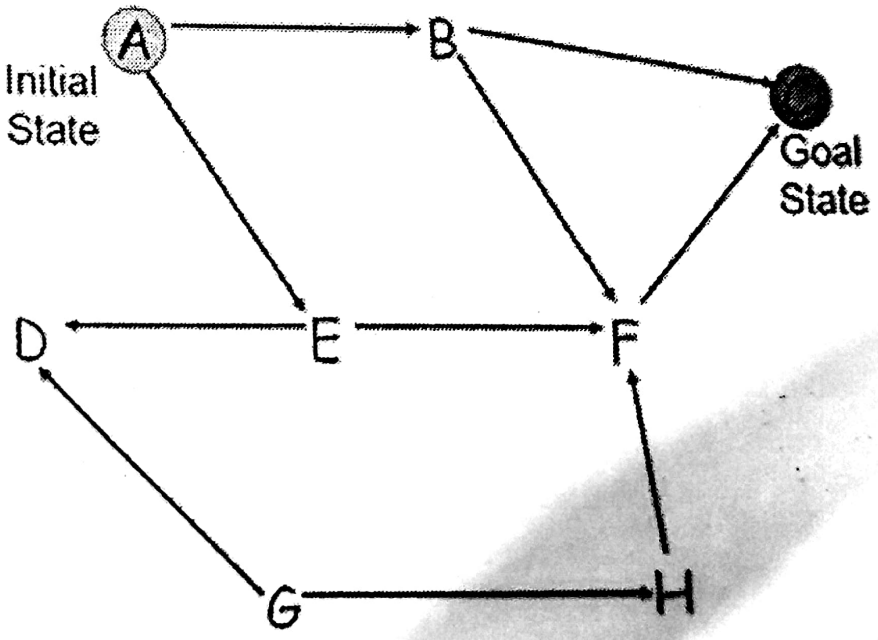
The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is Artificial Intelligence? Mention the advantages of Artificial Intelligence. 7

   b) Define an artificial agent. Specify the task environment: - performance measure, environment, actuators and sensor for a taxi driver agent and a part-picking robot agent. 8

2. a) What is a state space of a problem? For the given problem represented in graph, where initial state is "*A*" and goal state is "*C*", find all the possible state space. 8



   b) Define Un-informed search. Explain Iterative deepening search with an example. 7

3. a) How are informed search methods more efficient than uninformed search? Explain the algorithm of A* search with a suitable example. 8

   b) What is knowledge? Describe the different approached of knowledge representation in brief. 7

4. a) Consider the following facts: 8

i. Lucy is a professor
ii. All professors are people.
iii. John is the dean.
iv. Deans are professors.
v. All professors consider the dean a friend or don't know him.
vi. Everyone is a friend of someone.
vii. People only criticize people that are not their friends.
viii. Lucy criticized John.

Now, using resolution find the answer of "Is John no friend of Lucy?"

b) What is inductive learning? Explain with example. 7

5. a) Contrast between supervised and unsupervised learning. Describe the K-means learning method with example. 8

b) What is deep learning? Explain in detail. 7

6. a) Explain a rule based expert system architecture? Mention its advantages and disadvantages. 8

b) Why NLP is Difficult? Explain steps in the process of NLP. 7

7. Write short notes on: (Any Two) 2×5

a) Clustering
b) Machine vision
c) Resolution refutation system

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Semester: Spring

Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is 'Turing Test' in Artificial Intelligence (AI)? Criticise the performance of the 'Turing Test' to measure the intelligence of the machine. 2+5

b) Define AI agents. Explain learning agent with block diagram. 3+5

2. a) There are three pegs, labelled A,B and C. There are 3 disks on peg. The top disk has a diameter of 1, the middle disk has a diameter of 2, and the bottom disk has a diameter of 3. There are no disks on peg C. You must move one disk at time and you cannot place a larger disk on top of smaller disk. The problem is to get all of the disks on peg C. 8

   i. Find a representation for the states of this problem.
   ii. Describe all of the operators that might be applied to a state.

b) You are given two jugs, a 4- gallon one and a 3 gallon one. Neither has any measuring marker 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 into the 4-gallon jug? Solve by production rule system. 7

3. a) Describe the following features of Genetic Algorithms (GA) – Encoding, Fitness Function, Selection, Crossover and Mutation. Discuss how would you encode TSP problem in GA. 7

b) Describe the behaviour of iterative deepening search in terms of optimality, completeness, time and space complexity. How does it overcome the drawback of BFS. 8

4. a) Prove "You are not doing strawberry picking" using resolution: 8

If it is sunny and warm day you will enjoy.
If it is warm and pleasant day you will do strawberry picking
If it is raining then no strawberry picking.

If it is raining you will get wet.
It is warm day
It is raining
It is sunny.

b) What is semantic Net? Represent the following fact using partitioned semantic Nets. "Every teacher has taught a student." 7

5. a) What is Machine Learning and why is machine learning important? Discuss K-Mean Clustering for following dataset with k=2 7

Staff ID	Age	Nos. of Leaves
1	21	3
2	39	7
3	43	6
4	58	12
5	32	15

b) Assume that the following facts are already entered into the PROLOG database: 8

father(dasharath,ram). *// Dasharath is the father of Ram*
father(ram,luv).
father(ram,kush).
mother(kaushalya, ram). *// Kaushalya is the mother of Ram*
male(dasharath). *// Dasharath is a male*
female(kaushalya). *// Kaushalya is a female*
parent(X,Y):-
father(X,Y);
mother(X,Y). *// X is a parent of Y*

6. a) What is Artificial Neural Network? State and discuss backpropagation training algorithm to realize two input XOR gate. 7

b) What do you mean by NLP? Construct a parse tree for the sentence "The burglar robbed the apartment". 8

7. Write short notes on: **(Any two)** 2×5

a) Reinforcement Learning
b) Deep Learning
c) Expert System