POKHARA UNIVERSITY

School of Engineering

INTERNAL ASSESSMENT

Level: Bachelor | Semester: Fall | Year : 2024

Programme: BE | Full Marks: 100 | Pass Marks: 45

Course: Artificial Intelligence | 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? How can you decide whether a machine is intelligent or not? Explain in detail. 8
   b) What is an intelligent agent? Discuss the difference between goal-based and untily-based agent with suitable examples. 7
2. a) The informed **greedy best first search** may stuck in a loop? What is the reason behind this? How it can be resolved? Explain with example. 7
   b) Explain the environments with single agent and the environment with multiple agents? How the agents act upon such environments? Explain with suitable examples. 8
3. a) What are the constrain satisfaction problems? How are they solved? Explain with a suitable example. 8

OR

What is Min-Conflicts heuristic? Explain how it is used to solve the 4-Queen problem.

   b) What are the drawbacks of propositional logic? How are they resolved in predicate logic? Explain in detail. 7
4. a) Why do you need to reason under uncertainty? Explain the scenario and how will you deal to reason under such scenario? Explain with a suitable example. 5
   b) Consider the following facts: 10

      1. All hounds howl at night.
      2. Anyone who has any cats will not have any mice.
      3. Light sleepers do not have anything which howls at night.
      4. John has either a cat or a hound.
      5. John is a light sleeper.

Using resolution prove that John does not have any mice.

5. a) What are the labelled and unlabelled data? Suppose you are provided with the unlabelled data to train a machine learning model. Which machine learning model will you apply to train the learning model. Explain in detail. 8

b) How does the Artificial Neural Network mimic the functioning of a biological neurons? Explain with a suitable computation of ANN. 7

6. a) What are the components of fuzzy inference system? Explain each with a simple example. 8

OR

What is Mamdani? Consider the tipping problem and explain how the mamdani is used to inference in fuzzy system to determining the correct amount to tip a waitperson at a restaurant.

b) What is the task of knowledge engineer in developing expert system? Explain the knowledge acquisition process in detail. 7

7 Write short notes on any two (2X5) 10

a) Foundations of AI

b) Hill Climbing Search

c) Hidden Markov Models

NEPAL COLLEGE OF INFORMATION TECHNOLOGY

Level: Bachelor | Semester – Fall | Year : 2025
Programme: BECE(M, D) | Full Marks : 100
Course: Artificial Intelligence | 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 Artificial Intelligence. With reference to Turing Test can we infer that machine possesses Intelligence. Justify your answer. 7

   b) Define an artificial agent. Specify the PEAS For part picking robot agent. Explain goal based agent with suitable diagram. 8

2. a) What is State space? Represent the State Space for the following problem: You are given two jugs, a 4-gallon one and a 3- gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug? 8 7

   b)How are informed search methods more efficient then uninformed search? Explain the algorithm of A star search with suitable example.

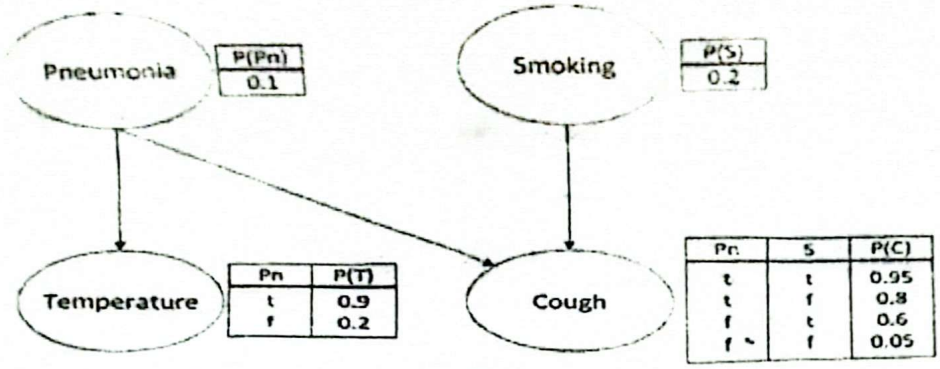
3. a) What are the limitation of Propositional Logic. Consider the following given premise: 8

   1. The humidity is high or the sky is cloudy.
   2. If the sky is cloudy then it will rain.
   3. If the humidity is high then it is hot.
   4. It is not hot.

   Prove by Resolution that: It will rain.

   b)Represent the following using FOPL: 8

   1. Anyone whom Sophie loves is a cricket star.
   2. Any student who does not pass does not play.
   3. Paras is a student.
   4. Any student who does not study does not pass.
   5. Anyone who does not play is not a cricket star.
   6. Everyone loves Abhi.
   7. People protest the politicians they dislike.
   8. Not all staffs are loyal to their employers.



4. a) Solve the following problem of CSP: 7

LOGIC+LOGIC=PROLOG

b) Consider the above Bayseian network.and calculate

1. P(C| S^Pn)

2.P(s|c)

3.P(pn|c)

4.P(t|s)

8

5. a) What is Machine learning? Why K-nearest Neighbors Algorithm is known as non parametric lazy algorithm? Explain with example. 8

b)What is Artificial Neural Network? Explain Perceptron training Algorithm. 7

6. a)Explain the architecture of expert systems and discuss their applications in real- world scenarios. 8

b) Describe the process of fuzzification and defuzzification and their importance in fuzzy rule-based systems. 7

7. Write short notes on (**Any Two**): 2x5

a) Hill climbing Algorithm

b) Back propagation Algorithm

c) Genetic Algorithm

NEPAL ENGINEERING COLLEGE

Level: Bachelor | Semester – Fall | Full Marks: 100
Programme: BE Computer (5th Sem) | Pass Marks: 45
Course: Artificial Intelligence (New) | 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? How do different definitions of artificial intelligence reflect biases regarding thinking versus acting and modelling human behavior versus abstract rationality? Discuss with example — 3+5

   b) Define intelligent agents and rational agents. What is PEAS? Discuss PEAS for *Medical Diagnosis Agent*. — 2+5

2. a) What are the components of a state space search problem formulation? Formulate 8-Puzzle as state space search problem, discuss its production rules, and provide a solution. — 3+4

   b) State Simulated Annealing Algorithm? The following table shows three evaluations of a simulated annealing algorithm. For each evaluation calculate the probability of the next state being accepted. Assume the objective function which is being maximized. — 4+4

Current Evaluation	Neighbourhood Evaluation	Current Temperature
75	70	10
75	70	100
75	70	1000

3. a) What is a Constraint Satisfaction Problem (CSP). Formulate the following map-coloring problem as a CSP and solve it. Assume the color domain is {Red, Green, Blue}. — 3+4

8

   b) Prove the following using Resolution Refutation System:

   Premises:

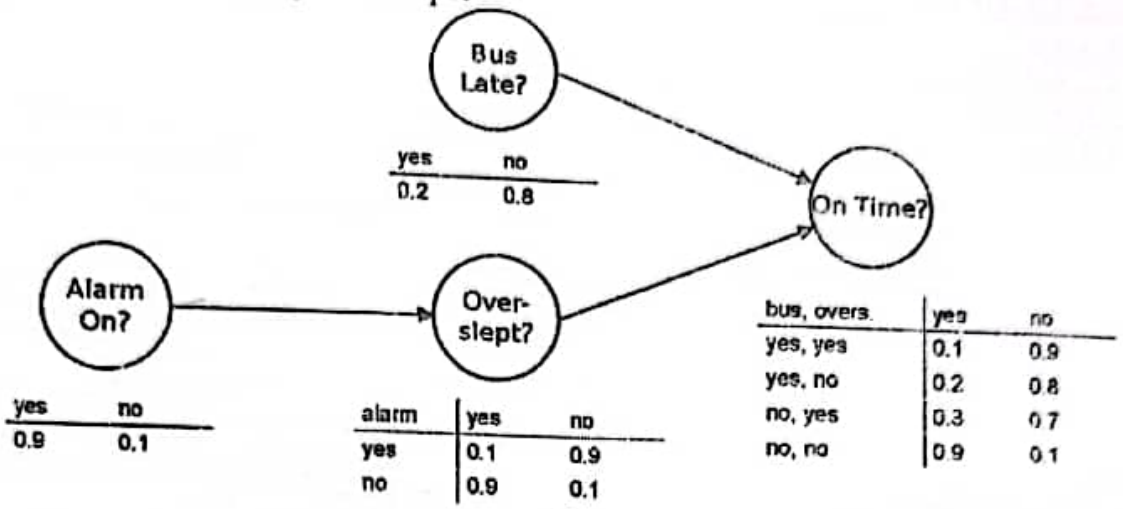
   Paras is a Cricketer.
   Cricketers are rich.
   Rich people have speedy cars.
   Fast cars take a lot of petrol.

   Conclusion to be drawn:

   Paras's car takes a lot of petrol.

4. a) What are semantic networks and partitioned semantic networks? Discuss their key features and provide examples. 7

b) What is Bayesian networks? What is the probability that a person is not on time, given that they overslept? 2+6



Or

What are the key challenges of knowledge representation in AI? How do logic-based approaches differ from probabilistic approaches in knowledge representation?

5. a) State the k-Mean Clustering algorithm and provide a solution for the following. Assume k=2 if your last digit of CRN is even, and k=3 if odd. 2+6

Feature 1	Feature 2
1	2
1.5	1.8
5	8
6	7
1	0.6
8	8

b) Discuss the mathematical model of Neuron and also state the backpropagation algorithm. 7

Or

Discuss the Linear Regression Algorithm with an example

6. a) Differentiate Classical vs Fuzzy Logic? Discuss Fuzzy Operations with examples. 3+4

b) What is an expert system? Discuss its key features. What are the main components of an expert system? Explain their roles. 4+4

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

a) Environment Type

b) Linguistic Hazing in Fuzzy Logic

c) Forward Chaining and Backward Chaining

Madan Bhandari College of Engineering
Urlabari-3, Morang
Final Internal Examination

Level: Bachelor — Full Marks: 100
Programme: B.E. (Computer) — Pass Marks: 45
Year/Part: III/I — Time: 3 hrs.

Subject: - Artificial Intelligence

- ✓ *Candidates are required to give their answers in their own words as far as possible.*
- ✓ *Attempt all questions*

1. a). What is Artificial Intelligence? Explain the current trends of AI and its impact on Society.
   b). Define agent function? Differentiate goal-based and utility-based agents with examples. 7

2. a). What are the constraints Satisfaction Problems? Solve the following Crypt-arithmetic Problem.

```
    B  A  S  E
+   B  A  L  L
G   A  M  E  S
```

   7
   b). Explain with an Example how A* search can find the optimal solution when there is more than one solution? 8

3. a). What are the problems of depth first search and breadth first search? How are these problems resolved? Explain with a suitable example? 7
   b). Represent the following facts in predicate logic: 8
   i) John likes all kind of food.
   ii). Apple and vegetable are food.
   iii). Anything anyone eats and not killed is food.
   iv). Anil eats peanuts and still alive.
   v). Harry eats everything that Anil eats.

4. a). Consider the facts given in Q.3 b) using resolution prove that John likes peanuts. 7
   b). What is machine learning? Discuss the difference between regression, classification and clustering in machine learning. 8

5. a). Explain the k-means clustering algorithm with step-by-step demonstration on a small dataset, showing how the 7
   b). How does support vector machine work? Illustrate with a suitable example? 8

6. a). Define the role of bias in a perceptron. How are weights updated in a single layer perceptron? Explain with example 7
   b). what is Expert System? Explain the architecture of expert system in detail 8

7. Write short notes on [Any Two]
   a. fuzzy logic
   b. Semantic nets
   c. Learning by analogy

NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY

(Affiliated to Pokhara University)

Dhangadhi, Kailali

Pre-University Examination

Level: Bachelor
Programme: B.E. Computer
Course: Artificial Intelligence

Semester: V_Fall

Year : 2024
F.M. : 100
P.M. : 45
Time : 3hrs

Candidates are required to give their answer in their own words as for as practicable. The figures in the margin indicate full marks.

Attempt all questions.

1 a. What are the different approaches to AI. Mention different types of Intelligence. 8

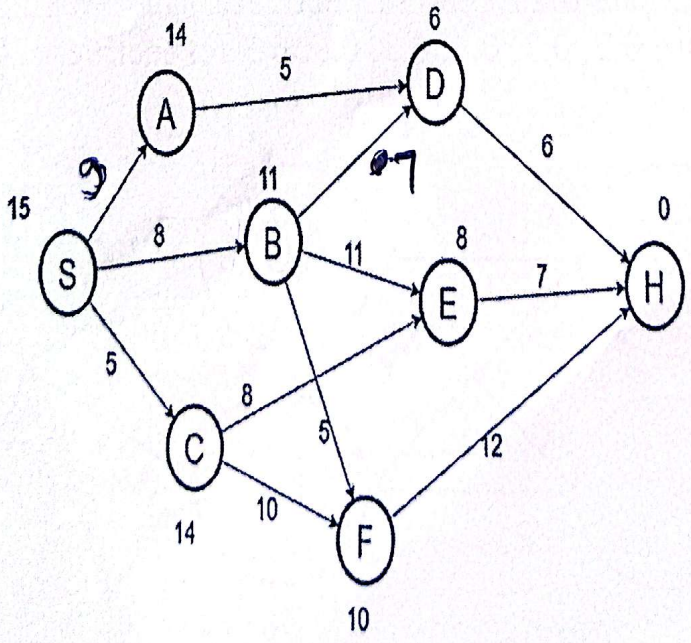
b. Do you think AI should be bound under ethics? What are the different Governance and regulations used for AI? 7

2 a. What are different types of Agents. Explain intelligent Agent in contrast to evolution of any relevant example. 7

b. What is a well-defined and ill-defined problem. Explain Learning agent with its block diagram. 8

3 a. What do you understand by CSP? What are its components, illustrate it with a relevant example. 7

b. Find the best path and its cost using A* search for the below graph. 8

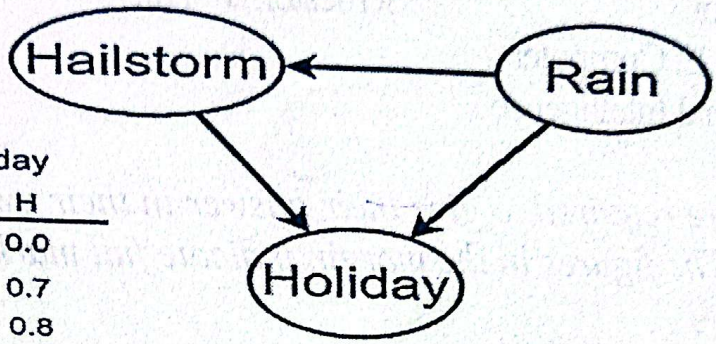


4 a. What do you understand by Ontological Based Representation? Analyze the given graph and find the probability of holiday given that there is rain, and hailstorm. 7

Hailstorm

Rain	H
F	0.6
T	0.1

Rain
0.3



Holiday

Hailstorm	Rain	H
~H	~R	0.0
~H	R	0.7
H	~R	0.8
H	R	0.99

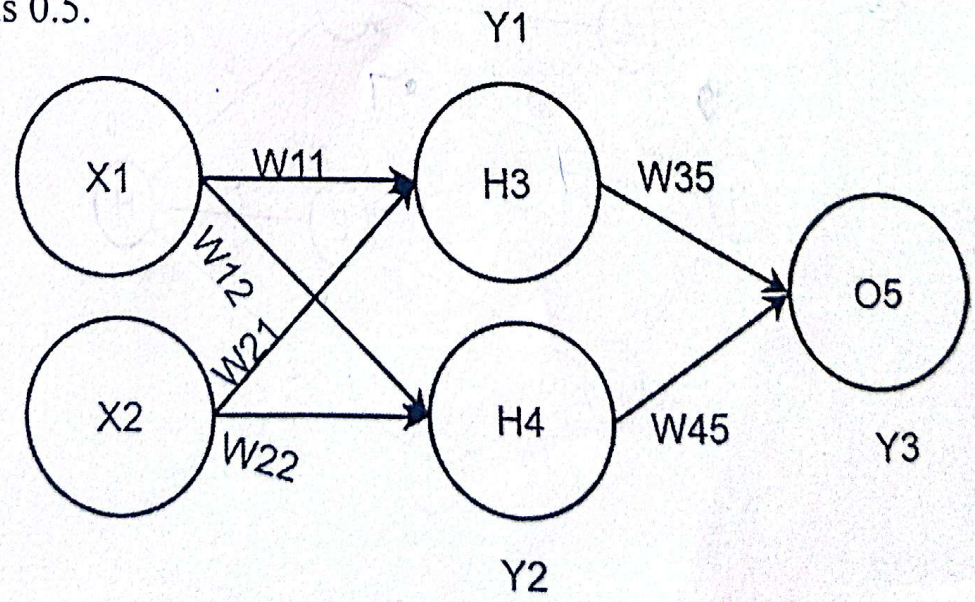
8

b. Differential between Propositional Logic and Predicate logic. Convert the following into Logic and prove "I will be holiday" using resolution.

1. There is hailstorm or it is raining,
2. If there is rain, then it will be a holiday.
3. If hailstorms are high, then the temperature is cold.
4. It is not cold

5 a. How do you differentiate K means clustering and K nearest neighbor algorithm? Using K-means Clustering, cluster the following data into clusters. Where k= 3 for data: 25, 52,14, 23, 5, 11, 10, 30, 36, 18. 7 8

b. Perform backward propagation with learning rate of 1 where inputs X1, X2, are 0.25, 0.80 respectively. W11, W12, W21, W22, W35, W45 are 0.2, 0.3, 0.4, 0.3, 0.9, 0.3 respectively. The target output is 0.5.



6 a. Explain the basic components of the Expert System. How do we update the expert system's knowledge base? 7

b. What are different Steps that are used in Mamdani. Explain different types of fuzzification methods. 8

7 Write shorts notes on (any two): 1

a. Min max algorithm.

b. Iterative Deepening Search

c. Genetic Algorithm

COSMOS COLLEGE
OF MANAGEMENT AND TECHNOLOGY

Term Test II

Date: 2081/10/25
Level: BE
Programme: BCE
Semester: V

Full Marks: 100
Time: 3 hrs

Subject: - Artificial Intelligence

- ✓ *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. Explain the concepts of **heuristic and blind search** in the context of problem-solving. Using a suitable state-space representation, demonstrate how the " *search algorithm*"* would be used to find a goal state. Compare and contrast "A*" search and "Greedy best first" search, focusing on their strengths and limitations [5+3]

2. Describe the **resolution algorithm** as a rule of inference in proposition logic. Convert the following statements into First-Order Predicate Logic (FOPL). [3+4]
   1. All over smart person's are stupid
   2. Children's of all stupid persons are naughty
   3. Roney is Children of Harry
   4. Harry is over smart

3. Explain the **Turing Test** and its significance in evaluating Artificial Intelligence. Discuss the **"Acting Humanly"** approach to AI in relation to the Turing Test and what are the potential limitations of this approach. [3+3]

4. Define **Bayesian Network and** explain how, Belief network is Constructed. Consider the probability of having cloudy is 50%. The probability that it will rain given the conditions it will be cloudy and if it is winter is 30%. The probability of being winter is 50%. The probability that it will be shiny is 70%. Now construct a belief network for this example. [2+6]

5. Explain the **concept of a perceptron** and how a neural network can be designed to act as an **OR gate**. Also, describe the concept of **Frames and Sementic Nets** providing a suitable example. [5+3]

6. What is an **Expert System**? Discuss the main components of an expert system. Also, explain the architecture and features of a **Rule-Based Expert System.** [2+4]

7. Explain **forward chaining** with a suitable example. Define the processes of **fuzzification** and **defuzzification** in the context of fuzzy logic [3+4]

8. Define a **Genetic Algorithm, Mutation and Cross-Over.** What is Is crossover operation in genetic algorithm? Given following chromosomes show the result of one-point and two point crossover. Choose appropriate crossover points as per your own suggestions. [8]
   C1 = 01100010
   C2 = 10101100**

9. Define **Adversarial Search Technique.** How Alpha-Beta Pruning algorithm is used in game search. For the following state space, show how Alpha-Beta Pruning Algorithm finds path for the two players. [3+4]

10. Define **Rational Agent**. Construct **PEAS** framework for following intelligent agents & also, Choose their Best Agent Structure. [2+6]
    a) Autonomous Taxi
    b) Satellite Imaging System
    c) Refinery Control System

11. How **informed search are different than uniformed**? Given following state space, illustrate how depth limited search and iterative depending search works? **Use your own assumption for searching.** **[2+5]**

12. Describe **mathematical model of neural network**. What does it means to train a neural network explain in Details. [3+5]

13. How **philosophy, sociology and economics** influence the study of artificial intelligence. Look around your world and curate your answer accordingly? [7]

14. Explain how a constraint satisfaction problem (CSP) may be solved. [5]
    Input:
    B A S E
    B A L L

    G A M E S

Pokhara University

Everest Engineering College

Final Internal Assessment
Fall- 2024

Level: Bachelor — **F.M.** 100
Program: BE COMPUTER — **P.M.** 45
Faculty: Science & Technology — **Time:** 3hrs
Subject: Artificial Intelligence (5th Semester)

Attempt all the questions.

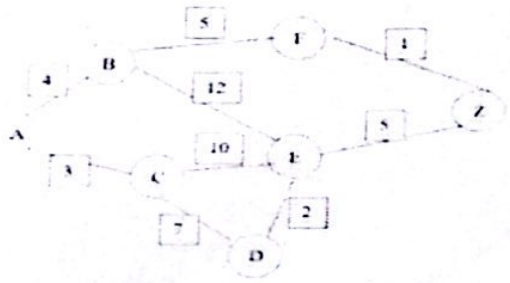
1 a) What do you mean by Total Turing Test? Discuss the approaches of Artificial Intelligence with example. **7**

b) Define agent and environment. Differentiate goal-based and utility-based agents with examples. **2+6**

2 a) What is well defined problem? Solve the following Crypto-arithmetic problems. **8**

C R O S S + R O A D S = D A N G E R

b) Discuss the properties of greedy best first search. Find the shortest path from A to Z in following graph using A-star algorithm. Given Heuristic values are: **2+5**



A	14
B	12
C	11
D	6
E	4
F	11
Z	0

3 a) Define the principle of the Min-Max Algorithm. What are its limitations? Also, justify how Alpha-Beta Pruning aids in overcoming its limitations. **8**

b) Explain the Hidden Markov Model in detail with example. **7**

4 a) Consider the following axioms: **8**

i. Marcus was a man.
ii. Marcus was a Pompeian.
iii. All Pompeian are Romans.
iv. Caesar was a ruler.
v. All Romans are either loyal to Caesar or hated him.
vi. Everyone is loyal to someone.
vii. People only try to kill rulers they are not loyal to.
viii. Marcus tried to kill Caesar.

Find, Did Marcus hate Caesar? using resolution by refutation.

b) 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. A well-known symptom of Measles is a rash and has probability of 0.95. However, 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? **7**

5 a) How supervised learning is different from unsupervised learning? **3+**
Explain the K-Nearest Neighbors Classifiers with example. **5**

b) Train a perceptron with training set as below for epoch 1 (1 epoch is of 6 iterations). Assume that all the initial weights are 0. (Consider learning constant, $\alpha = 1$, and threshold, $\theta = 0$, also mention your assumption if needed? **7**

Input	Output
100	1
011	0
110	1
111	0
001	0
101	1

6	a)	Describe the process of defuzzification. Explain the architecture of fuzzy inference systems in detail.	4+ 4
	b)	Explain the architecture of expert system with examples.	7
7		Write short notes on: (Any two)	2* 5= 10
		a) Inference Method	
		b) K-Means Clustering	
		c) Ethical Implications of AI	

Best Wishes

POKHARA ENGINEERING COLLEGE
INTERNAL ASSESSMENT

Level: Bachelor | Semester – Fall | Year : 2025
Programme: B.E. | Full Marks: 100
Course: Artificial Intelligence (V Sem) | Time : 3 hrs.

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 ethics in AI? Explain about the ethical implications of AI? 8

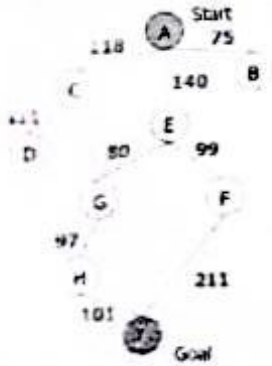
b Define Intelligent agent. Differentiate between Model Based Reflex agent and Goal based agent with necessary examples. 7

2 a Solve the following cryptographic problem: 7

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

b What is informed and uninformed search? How DLS overcomes the limitations of DFS, explain with appropriate diagram. 8

3 a Calculate the path cost using greedy first search and A* search. 8



State	Heuristic: h(n)
A	366
B	374
C	329
D	244
E	253
F	178
G	193
H	98
I	0

b Why do we need backpropagation algorithm? Explain its working principle with necessary diagrams. 7

4 a Define Genetic Algorithm. Explain the operators in Genetic Algorithms. 8

b Given the following statistics, what is the probability that a woman has cancer id she has a positive mammogram result? 7
i. One percent of women over 50 have breast cancer.
ii. Ninety percent of women who have breast cancer test positive on mammograms.
iii. Eight percent of women will have false positives.

5 a What is Expert system. Explain case Based Reasoning with necessary diagram. 8

b Tom is cat. Tom caught bird. Tom is owned by John. Tom is ginger in color. Cats like cream. The cat sat on the mat. A cat is a mammal. A bird is an animal. All mammals are animals. Mammal have fur. Draw a semantic graph. 7

6 a Represent the following statements into predicate logic: 8
i. Some boys play cricket.
ii. Not all students like both Mathematics and Science
iii. Every apple is either green or yellow.
iv. If an apple is green then it is tasty.

b What is fuzzy logic? Explain the architecture of fuzzy logic system. 7

7 Write short notes on: (Any Two): 5x2 =10
a. Alpha Beta Pruning
b. SVM
c. Fuzzy Inference System

The End

Lumbini Engineering College

Final Internal Exam

Level: Bachelor
Programme: BE (Computer)
Course: AI (Artificial Intelligence)
Semester: V (Fifth)

Year : 2081
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) Artificial Intelligence brings both opportunities and challenges. Discuss the risks and benefits of AI in modern society. Provide examples to support your answer. [8]

b) Why is goal formulation essential before problem formulation in AI problem-solving? Using constraint satisfaction problem, solve the following crypto-arithmetic problem. [8]

BASE + BALL = GAMES

2 a) What is the role of heuristics in improving the efficiency of search algorithms? Compare informed and uninformed search strategies with examples. [7]

b) Explain the significance of pruning in game playing algorithms. How does alpha-beta pruning work, and how does it improve the efficiency of the search process in minimax algorithms? [7]

3 a) Describe the syntax and semantics of propositional logic. Use truth tables to prove the validity of the following logical expressions: $(P \wedge Q) \rightarrow R$, $\neg(P \vee Q)$, $P \leftrightarrow Q$. [8]

b) Explain the concept of frames in knowledge representation. Create a frame-based representation for a specific domain, such as "vehicles and their attributes." [7]

4 a) Construct a Bayesian network for a medical diagnosis system where the presence of a disease (D) depends on two symptoms (S1 and S2), and each symptom depends on certain test results (T1 and T2). Assign conditional probabilities and explain how the network can be used to infer the probability of the disease given the test results. [7]

b) Explain the basic operations on fuzzy sets: union, intersection, and complement. Given two fuzzy sets A and B with membership values $\mu A(x) = \{0.2, 0.5, 0.8\}$ and $\mu B(x) = \{0.4, 0.6, 0.3\}$, compute the union, intersection, and complement of these sets [8]

5 a) Compare classical logic and fuzzy logic in terms of their principles and applications. Explain how fuzzy logic handles uncertainty and imprecision, and provide an example where fuzzy logic is more suitable than classical logic. [8]

b) Explain the working of the k-means clustering algorithm. Using K-Means cluster the following data into two cluster show each step. {12, 10, 2, 4, 11, 20, 25, 30} [8]

6 a) Explain how a single layer perceptron learn logical **OR** operation. Assume weight W_1=0.3 and W_2=0.4 and learning rate **alpha** = 0.17. [7]

b) Draw the architecture of Expert System. How forward chaining and backward chaining assist the inference engine of Expert System? [7]

[2 x 5=10]

7 Write short notes on: (Any two)

a) Genetic Algorithm
b) Hidden Markov Mode.
c) Ethical Implications of AI

UNITED TECHNICAL COLLEGE

Semester-Fall

evel: Bachelor
Programme: BE
Course: Artificial Intelligence

Year : 2024
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. 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. Solve given cryptarithmetic problem. 7

ODD + ODD = EVEN

2. a. Explain Constraint Satisfaction Problems (CSPs). Solve given map colouring problem as a CSP. 8

b. Explain A* algorithm with example. 7

3 a. Explain Alpha-Beta Pruning search. What are the advantages of Alpha-Beta Pruning over Min-max search? 4+3

b. What are the problems that may arise in hill climbing searching? How they can be handled? Explain. 8

4 a. 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.

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).

a. What is Machine learning? Explain how SVM classifies the non-liner data. 8

. Explain K-Means Clustering with a suitable example. 7

. Explain Back Propagation Algorithm in ANN. Also explain the importance of activation function. 5+2

. Train a perceptron to work as an AND logic gate. 8

(Attempt Any Two) 10

a. Types of Agents
b. Boltzmann Machine
c. Reinforcement Learning.

UNITED TECHNICAL COLLEGE

Semester-Fall

Level: Bachelor
Programme: BE
Course: Artificial Intelligence

Year : 2024
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 Artificial Intelligence (AI). Explain its application with suitable examples. 7

b. Explain the concept of rationality in intelligent agents. What are task environments and their properties? 8

2 a. Discuss and compare the uninformed search techniques: BFS, DFS, and Iterative Deepening Search. 7

b. Explain the A* search algorithm with an example. 8

3 a. Explain the working of genetic algorithms. 7

b. Explain the Minimax algorithm with an example of game-playing. 8

4 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. The library has the following books: 7

- The Hobbit by J.R.R. Tolkien (Fantasy genre).
- Pride and Prejudice by Jane Austen (Romance genre).
- 1984 by George Orwell (Dystopian genre).
- Sapiens by Yuval Noah Harari (Non-Fiction genre).

Represent these facts in Prolog.

5 a. Define machine learning. Explain the K-Nearest Neighbour (KNN) algorithm with an example. 7

b. Explain backpropagation in neural networks. Why is the activation function important? 8

6 a. Explain the steps of fuzzification and defuzzification with examples. 7

b. Define expert systems. Explain their architecture and components with a diagram. 8

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7 (Attempt Any Two)

a. Impact of AI on employment, privacy, and security

b. Linear Regression

c. CSP