

POKHARA UNIVERSITY

Level: Bachelor

Semester: Spring

Year : 2025

Programme: BE

Full Marks : 100

Course: Artificial Intelligence (New)

Pass Marks : 45

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) Define Artificial Intelligence. “AI can change the future of the technology”. Give your opinion on this statement. 7
- b) Define the term Agent. Explain the concept of a learning agent with the help of a block 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? 7

OR

What are the constraint satisfaction problems? Solve the following crypt arithmetic problem **BASE+BALL=GAMES**.

- b) Describe the behavior of iterative deepening search in terms of optimality, completeness, time and space complexity. How does it overcome the drawback of BFS. 8
3. a) What are the main drawbacks of the Greedy Best-First Search algorithm? How does the A-star search algorithm overcome these drawbacks? Explain your answer with the help of a suitable example. 7
- b) Given the following facts, use the resolution method to find, did Marcus hate Caesar? 8
 - i. All Pompeian are Romans.
 - ii. All Romans were either loyal to Caesar or hated him.
 - iii. Everyone is loyal to someone
 - iv. People only try to assassinate rulers they not loyal to.
 - v. Marcus tried to assassinate Caesar.

- vi. Marcus was Pompeian.
4. a) Demonstrate the steps involved in conversion of statements in predicate logic into conjunctive normal form (CNF) with an example. 7
- b) Represent the following sentences in FOPL. 8
- Every gardener likes the sun.
 - You can fool some of the people all of the time.
 - You can fool all of the people some of the time.
 - All purple mushrooms are poisonous.
 - No purple mushroom is poisonous
 - Motu is not tall
5. a) What is machine learning? How supervised learning differs from unsupervised learning? 7

OR

Describe the K-means Clustering with example.

- b) Define Artificial Neural Network (ANN). Discuss about the back-propagation algorithm with example. 8
6. a) Explain the concept of fuzzy sets and the role of membership functions in fuzzy logic. 7
- b) Explain the architecture of expert systems in detail. 8
7. Write short notes on: (**Any two**) 2×5
- a) Alpha-beta pruning
 - b) Semantic Nets
 - c) Explanation based learning