

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3164802

Date: 05/06/2026

Subject Name: ARTIFICIAL INTELLIGENCE

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a) What is artificial intelligence? Define the different task domains of artificial intelligence. **03**
- (b) Explain Simple Hill Climbing and Steepest- Ascent Hill Climbing. **04**
- (c) Given the following facts: **07**
1. John likes all kinds of food.
 2. Apples and vegetables are food.
 3. Anything anyone eats and isn't killed by is food.
 4. Anil eats peanuts and is still alive.
 5. Harry eats everything that Anil eats.
- Prove by resolution that: John likes peanuts.
- Q.2**
- (a) What are the main types of problems AI aims to solve and the underlying assumption it take? **03**
- (b) List AI Problem Characteristics. **04**
- (c) Explain Problem reduction with appropriate example. **07**
- OR
- Q.2**
- (c) Discuss the Instance and Isa relationships in knowledge representation and their importance with examples. **07**
- Q.3**
- (a) Discuss Bayesian network and its application. **03**
- (b) Define Non monotonic reasoning. **04**
- (c) Elaborate iterative deepening. **07**
- OR
- Q.3**
- (a) Define the following words in the context of AI **03**
- (i) Intelligence (ii) Knowledge (iii) Information
- (b) Explain “Morphological Analysis” and “Syntax Analysis” in Natural Language Processing. **04**
- (c) Discuss Nonlinear Planning using Constraint Posting with example. **07**
- Q.4**
- (a) Write a prolog program to find the sum of first N natural numbers. **03**
- (b) Explain following terms with reference to GAs: Population, Chromosomes, Genes, Fitness Function. **04**

(c) Explain Expert System Architecture in detail. **07**

OR

Q.4 (a) Differentiate Forward and Backward Reasoning in AI. **03**

(b) Give advantages and disadvantages of Roulette Wheel Selection and Tournament Selection. **04**

(c) Write Prolog programs to perform the following: **07**

i) Find the last element of a list,

ii) Merge two sorted integer lists L1 and L2 to generate a final sorted list L3.

Q.5 (a) Describe the production system. **03**

(b) Explain Hopfield Network. **04**

(c) Define Natural language processing and explain Discourse and Pragmatic processing. **07**

OR

Q.5 (a) Differentiate between Procedural and Declarative representation of knowledge. **03**

(b) Explain state space representation using water jug problem. **04**

(c) Explain alpha-beta cut off search with an example. State a case when to do alpha pruning. **07**
