

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – WINTER 2023****Subject Code:3161608****Date:11-12-2023****Subject Name:Artificial Intelligence****Time:02:30 PM TO 05:00 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.

		MARKS	
Q.1	(a) Discuss the various application areas for artificial intelligence.	03	
	(b) Explain state space search representation using the water-jug problem.	04	
	(c) Explain any two heuristic functions for an 8-tile puzzle problem with an appropriate example.	07	
Q.2	(a) Explain the advantages of first-order predicate logic over propositional logic with an appropriate example.	03	
	(b) Explain the means-ends analysis with an appropriate example.	04	
	(c) Explain the best-first search algorithm using an appropriate example.	07	
OR			
Q.3	(c) Explain the A* search algorithm using an appropriate example.	07	
	(a) Discuss the Wampus World problem in brief.	03	
	(b) Explain the universal and existential quantifiers with an appropriate example.	04	
Q.3	(c) Explain Modes Ponens and Modes Tollens inference rules with an appropriate example.	07	
	OR		
	(a) Discuss various logical connectives in propositional logic.	03	
Q.4	(b) Explain the backward search procedure with an example.	04	
	(c) Explain the use of resolution in first order predicate logic using an appropriate example.	07	
	(a) Explain the concepts of tautology and contradiction in propositional logic with an appropriate example.	03	
Q.4	(b) Explain the expectation-maximization (EM) algorithm with an appropriate example.	04	
	(c) Explain inference in Bayesian networks using an appropriate example.	07	
	OR		
Q.4	(a) Explain the concept of unification in first order predicate logic with an appropriate example.	03	
	(b) Explain inference using full joint distribution in uncertainty using an appropriate example.	04	
	(c) Explain the alpha-beta pruning algorithm in game-playing using an appropriate example.	07	
Q.5	(a) Explain unconditional and conditional probability with	03	

appropriate examples.

- (b) Write a program in prolog to find the Fibonacci series up to the given number. **04**
- (c) Explain the fail and cut predicate in prolog programming with an example. **07**

OR

- Q.5**
- (a) Explain the MiniMax procedure in a two-player game with an appropriate example. **03**
 - (b) Write a program in prolog to find a length of a list. **04**
 - (c) Write a program in prolog to find the GCD (greatest common divisor) and LCM (least common multiple) of two numbers. **07**
