

Enrollment No.....



Faculty of Engineering  
End Sem Examination May-2023

EC3ET01 Artificial Intelligence

Programme: B.Tech.

Branch/Specialisation: EC

**Duration: 3 Hrs.****Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

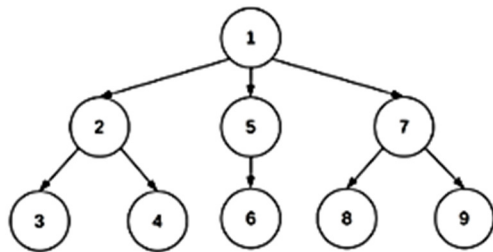
- Q.1 i. Who is known as the “Father of Artificial Intelligence”? **1**  
 (a) Charles Babbage (c) John McCarthy  
 (c) Alan Turing (d) None of these
- ii. Which of the following is the most common language used for Artificial Intelligence? **1**  
 (a) Java (b) Python (c) PHP (d) Lisp
- iii. Heuristic method gives- **1**  
 (a) Exact and optimal solution  
 (b) Inexact and optimal solution  
 (c) Exact and near optimal solution  
 (d) Inexact and near optimal
- iv. Goals of optimization is- **1**  
 (a) To minimize the effort required  
 (b) To minimize the desired benefit  
 (c) Both (a) and (b)  
 (d) None of these
- v. Among the following which is not an issue in knowledge representation **1**  
 (a) Granularity (b) Perception  
 (c) Attributes of object (d) Set of objects
- vi. Procedural Knowledge is also known as \_\_\_\_\_. **1**  
 (a) Imperative Knowledge (b) Production Rules  
 (c) Reasoning (d) Frame

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- vii. Bayes' theorem is not known as- **1**  
 (a) Bayes' rule (b) Bayes' law  
 (c) Bayesian reasoning (d) Bayesian inference
- viii. Probabilistic techniques now widely used in **1**  
 (a) Robotics (b) speech recognition  
 (c) Game-playing (d) All of these
- ix. The Blocks World Problem in Artificial Intelligence is normally discussed to explain a \_\_\_\_\_. **1**  
 (a) Planning system (b) Constraint satisfaction system  
 (c) Search technique (d) Knowledge base system
- x. A game can be formally defined as a kind of search problem with the following components. **1**  
 (a) Successor Function (b) Terminal Test  
 (c) Initial State (d) All of these

- Q.2 i. Define a production system and its major components. **3**  
 ii. Explain water jug problem using state space search. **7**
- OR iii. Find out optimal path for reaching goal state using DFS and BFS algorithm. **7**



- Q.3 i. Define heuristic search and heuristic function. **2**  
 ii. Write AO\* algorithm. Explain with the help of suitable example how AO\* based algorithm can be used for problem reduction. **8**
- OR iii. Explain the following: **8**  
 (a) Hill climbing Algorithm and its limitations  
 (b) Constraint Satisfaction Problem with example

- Q.4 i. Convert the following sentences into wff of predicate logic (First order logic). **3**  
 (a) Ruma dislikes children who drink tea.  
 (b) Any person who is respected by every person is a king.

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- ii. What is a script? Construct a script for going to a bank to withdraw money. **7**
- OR iii. Consider the following set of axioms. **7**  
 (a) Sham like easy courses.  
 (b) All courses in Arts department are easy  
 (c) All courses in Science department are not easy  
 (d) Physics is a science course.  
 (e) Sketching is an Arts course.  
 Find using resolution “Which course does Sham like?”

- Q.5 i. Explain with examples ‘Decision Trees’. **4**  
 ii. Explain the difference between- **6**  
 (a) Forward and Backward reasoning  
 (b) Monotonic and Nonmonotonic reasoning
- OR iii. Name at least five types of planning techniques which can be used in artificial intelligence and explain any two? **6**

- Q.6 Attempt any two: **5**  
 i. Explain block world problem using heuristic function in hill climbing search strategy. **5**  
 ii. How is AI useful in game playing techniques? **5**  
 iii. Explain MINIMAX search technique/algorithm with an example. **5**

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## Marking Scheme

### EC3ET01 Artificial Intelligence

Q.1	i)	Who is known as The “Father of Artificial Intelligence”?	1
		c) John McCarthy	
	ii)	Which of the following is the most common language used for Artificial Intelligence?	1
		b) Python	
	iii)	Heuristic method gives	1
		d) Inexact and near optimal	
	iv)	Goals of optimization is	1
		a) To minimize the effort required	
	v)	Among the following which is not an issue in knowledge representation	1
		b) Perception	
	vi)	Procedural Knowledge is also known as_____	1
		a) Imperative Knowledge	
	vii)	Bayes' theorem is not known as	1
		d) Bayesian inference	
	viii)	Probabilistic techniques now widely used in	1
		d) All of the mentioned	
	ix)	The Blocks World Problem in Artificial Intelligence is normally discussed to explain a.....	1
		a) Planning system	
	x)	A game can be formally defined as a kind of search problem with the following components.	1
		d) All of the mentioned	
Q.2	i.	Define a Production system and its major components.	3
		Definition -1 Mark	
		Major components -2 Marks	
	ii.	Explain Water Jug Problem using state space search.	7
		Complete explanation using said conditions -7 Marks	
	OR iii.	Find out optimal path for reaching goal state using DFS and BFS algorithm.	7
		Using DFS - 3.5 Marks	
		Using BFS - 3.5 Marks	

Q.3	i.	Define Heuristic search and heuristic function.	2
		Heuristic search -1 Mark	
		Heuristic function -1 Mark	
	ii.	Write AO* algorithm. Explain with the help of suitable example how AO* based algorithm can be used for problem reduction.	8
		AO* Algorithm -4 Marks	
		Explanation with example -4 Marks	
OR	iii.	Explain the following:	8
		a. Hill climbing Algorithm and its limitations -4 Marks	
		b. Constraint Satisfaction Problem with example -4 Marks	
Q.4	i.	Convert the following sentences into wff of Predicate Logic (First order logic).	3
		a) Ruma dislikes children who drink tea. -1.5 Marks	
		b) Any person who is respected by every person is a king. -1.5 Marks	
	ii.	What is a script? Construct a script for going to a bank to withdraw money.	7
		What is a script? -2 Marks	
		Construction of script for given situation -5 Marks	
OR	iii.	Consider the following set of axioms.	7
		1. Sham like easy courses.	
		2.All courses in Arts department are easy	
		3.All courses in Science department are not easy	
		4. Physics is a science course.	
		5. Sketching is an Arts course.	
		Find using resolution “Which course does Sham like?”	
		Solution using above axioms -7 Marks	
Q.5	i.	Explain with examples ‘Decision Trees’.	4
		Explanation -2 Marks	
		Examples -2 Marks	
	ii.	Explain the difference between:	6
		a)Forward and Backward reasoning -3 Marks	
		b) Monotonic and Nonmonotonic reasoning -3 Marks	
OR	iii.	Name at least five types of planning techniques which can be used in artificial intelligence and explain any two?	6
		Name of the techniques -2 Marks	
		Explanation of any 2 techniques (2*2=4 Marks)	

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Q.6

Attempt any two:

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|------|--|----------|
| i.   | Explain Block World problem using heuristic function in Hill Climbing Search strategy. | <b>5</b> |
|      | Explanation using said conditions  | -5 Marks |
| ii.  | How is AI useful in game playing techniques?   | <b>5</b> |
|      | Explanation with justification   | -5 Marks |
| iii. | Explain MINIMAX search technique/algorithm with an example.                            | <b>5</b> |
|      | Explanation with example   | -5 Marks |

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