Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

CS3EA01 / IT3EA01 Artificial Intelligence

Programme: B.Tech. Branch/Specialisation: CSE/IT

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.

Q.1 i. Which is not the commonly used programming language for AI? **1**

(a) PROLOG (b) Java (c) LISP (d) Perl

ii. Which search method takes less memory? **1**

(a) Depth-First Search (b) Breadth-First Search

(c) Optimal Search (d) Linear Search

iii. A heuristic is a way of trying- **1**

(a) To discover something or an idea embedded in a program

(b) To search and measure how far a node in a search tree seems to be from a goal

(c) To compare two nodes in a search tree to see if one is better than the other

(d) All of these

iv. A* algorithm is based on- **1**

(a) Breadth-First Search (b) Depth-First Search

(c) Best-First Search (d) Hill Climbing

v. Which is not a property of representation of knowledge? **1**

(a) Representational Verification

(b) Representational Adequacy

(c) Inferential Adequacy

(d) Inferential Efficiency

vi. What are Semantic Networks? **1**

(a) A way of representing knowledge

(b) Data Structure

(c) Data Type

(d) None of these

P.T.O.

vii. Which is true for Decision theory? **1**
(a) Decision Theory = Probability theory + utility theory
(b) Decision Theory = Inference theory + utility theory
(c) Decision Theory = Uncertainty + utility theory
(d) Decision Theory = Probability theory + preference

viii. A Hybrid Bayesian network contains _____. **1**
(a) Both discrete and continuous variables
(b) Only Discrete variables
(c) Only Discontinuous variable
(d) Both Discrete and Discontinuous variable

ix. Which is the best way to go for Game playing problem? **1**
(a) Linear approach (b) Heuristic approach
(c) Random approach (d) Optimal approach

x. To which depth does the alpha-beta pruning can be applied? **1**
(a) 10 states (b) 8 States (c) 6 States (d) Any depth

Q.2 i. What is meant by state space search? **2**
ii. Discuss the areas of application of Artificial Intelligence. **3**
iii. Differentiate BFS and DFS. **5**
OR iv. Define Expert system? Explain in brief about applications of Expert systems. **5**

Q.3 i. What are the requirements of good control strategy? **2**
ii. Discuss the importance of heuristics in problem solving. **3**
iii. Using a suitable example, illustrate steps of A* search. Why is A* Search better than Best First Search. **5**
OR iv. Explain the problem characteristics for 8-puzzle problem and chess game. **5**

Q.4 i. Describe Semantic networks in brief. **3**
ii. Consider the following sentences: **7**
I. John like all kinds of food.
II. Apples are food.
III. Chicken is food.
IV. Anything anyone eats and isn't killed by is food.
V. Bill eats peanuts and is still alive.
VI. Sue eats everything Bill eats.

Give following answers based on above sentences.
(a) Translate these sentences into formulas in predicate logic
(b) Prove that John likes peanuts using backward chaining
(c) Convert the formulas of part (a) into clause form.
(d) Prove that John likes peanuts using resolution.
(e) Use resolution to answer the question, "What food does Sue eat?"

OR iii. Using following facts answer the questions using chaining backward method. "Did Marcus hate Caesar?" **7**
(a) Marcus was a man.
(b) Marcus was a Pompeian.
(c) All Pompeians were Romans.
(d) Caesar was a Ruler.
(e) All Romans were either loyal to Caesar or hated him.
(f) Everyone is loyal to someone.
(g) People only try to assassinate rulers they are not loyal to.
(h) Marcus tried to assassinate Caesar.

Q.5 i. Explain nonmonotonic reasoning with suitable example. **4**
ii. Discuss following problems whether the search should proceed forward or backward reasoning. **6**
(a) Natural language understanding
(b) Water jug problem
OR iii. What is intelligent agent? Describe concepts of rationality in detail. **6**

Q.6 Attempt any two:
i. Discuss block world problem in robotics. **5**
ii. Explain alpha-beta cutoffs with suitable example. **5**
iii. Write MiniMax Search algorithm and explain with tic-tac-toe example. **5**

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Marking Scheme
CS3EA01 / IT3EA01 Artificial Intelligence

Q.1	i.	Which is not the commonly used programming language for AI?		**1**
		(d) Perl		
	ii.	Which search method takes less memory?		**1**
		(a) Depth-First Search		
	iii.	A heuristic is a way of trying-		**1**
		(d) All of these		
	iv.	A* algorithm is based on-		**1**
		(c) Best-First Search		
	v.	Which is not a property of representation of knowledge?		**1**
		(a) Representational Verification		
	vi.	What are Semantic Networks?		**1**
		(a) A way of representing knowledge		
	vii.	Which is true for Decision theory?		**1**
		(a) Decision Theory = Probability theory + utility theory		
	viii.	A Hybrid Bayesian network contains _____.		**1**
		(a) Both discrete and continuous variables		
	ix.	Which is the best way to go for Game playing problem?		**1**
		(b) Heuristic approach		
	x.	To which depth does the alpha-beta pruning can be applied?		**1**
		(d) Any depth		
Q.2	i.	Definition of state space search	1 mark	**2**
		Example	1 mark	
	ii.	Three the areas of application of Artificial Intelligence		**3**
		1 mark for each	(1 mark * 3)	
	iii.	Difference BFS and DFS.		**5**
		1 mark for each difference	(1 mark * 5)	
OR	iv.	Definition of Expert system	2 marks	**5**
		Three Applications of Expert systems		
		1 mark for each (1 mark * 3)	3 marks	
Q.3	i.	Requirements of good control strategy		**2**
		1 mark for each	(1 mark * 2)	
	ii.	Importance discussion	1 mark	**3**
		Example	1 mark	
		Heuristics definition	1 mark	
	iii.	Example	2 marks	**5**
		A* Search better than Best First Search	1 mark	
		Two comparison 1 mark for each (1 mark * 2)	2 marks	
OR	iv.	Problem characteristics for 8-puzzle problem	2.5 marks	**5**
		Chess game	2.5 marks	
Q.4	i.	Semantic networks		**3**
		Description	2 marks	
		Example	1 mark	
	ii.	Give following answers based on above sentences.		**7**
		(a) Translate	2 marks	
		(b) Prove that	2 marks	
		(c) Convert	1 mark	
		(d) Prove	1 mark	
		(e) Use resolution	1 mark	
OR	iii.	Chaining backward method.		**7**
		As per the explanation		
Q.5	i.	Nonmonotonic reasoning		**4**
		Definition	2 marks	
		Example	2 marks	
	ii.	(a) Natural language understanding		**6**
		Correct Answer	1 mark	
		Justification	2 marks	
		(b) Water jug problem		
		Correct Answer	1 mark	
		Justification	2 marks	
OR	iii.	Intelligent agent	3 marks	**6**
		Concepts of rationality	3 marks	
Q.6		Attempt any two:		
	i.	Block world problem in robotics		**5**
		Discussion	3 marks	
		Example	2 marks	
	ii.	Definition of alpha-beta cutoffs	2 marks	**5**
		Example	3 marks	
	iii.	MiniMax Search algorithm	3 marks	**5**
		Tic-tac-toe example	2 marks	

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