Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

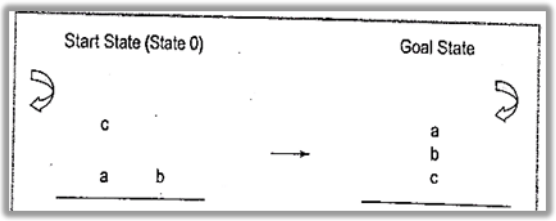
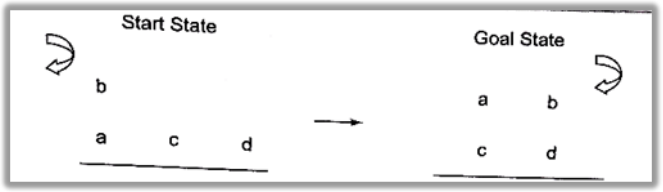
Fifth Semester B.E. Degree Examination

Principles of Artificial Intelligence

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module – 1	
Q.1	**(a)**	**Define** Artificial Intelligence. **Explain** the techniques of A.I. Also describe the characteristics of Artificial Intelligence.	**10M**
	(b)	**Show** at-least two points of difference between: a. Systems that thinks like human and systems that acts like human. b. Systems that thinks rationally and systems that acts rationally.	**04M**
	(c)	**Why** did earlier AI programs like ELIZA failed to prove their intelligence?	**06M**
		OR	
Q.2	**(a)**	**Explain** the state space representation of Water – Jug problem.	**07M**
	(b)	**Solve** the crypt arithmetic puzzle. Write Constraint equations and fond one solution using DFS. Show the steps involved in finding the solution. CROSS + ROADS DANGER	**06M**
	(c)	The heuristic path algorithm is a best-first search in which the objective function is f(n) = (2 − w)g(n) + wh(n). For what values of w is this algorithm guaranteed to be optimal. **What** kind of search does this perform when w = 0? Name of When w = 1? When w = 2?	**07M**
		Module – 2	
Q.3	**(a)**	**Explain** AO* algorithm. Give one example where AO* is suitable to apply	**10M**
	(b)	**Explain** the Minimax Procedure with example.	**10M**
		OR	
Q.4	**(a)**	**Develop** a Game tree with the steps involved for the depth 3 and branching factor 3 using Alpha-Beta Pruning algorithm..	**10M**
	(b)	**Construct** an AND - OR graph algorithm for a generic problem using labelling procedure.	**10M**
		Module – 3	
Q.5	**(a)**	**What** is predicate logic? **Explain** the predicate logic representation with reference to suitable example.	**07M**

	(b)	**Prove** the theorem infer $[(A \rightarrow B) \wedge (B \rightarrow C)] \rightarrow (A \rightarrow C)$ using Natural Deduction system.	**07M**
	(c)	**Establish** that $(A \rightarrow C)$ is a deductive consequence of $\{(A \rightarrow B, B \rightarrow C)$ i.e. $\{A \rightarrow B, B \rightarrow C\} \vdash (A \rightarrow C)$	**06M**
		OR	
Q.6	**(a)**	Anything any one eats is called food. Mita likes all kinds of food. Burger is a food. Mango is a food. John eats pizza. John eats everything Mita eats " **Construct** these sentences into formulae in predicate logic and then to program clauses. Use resolution algorithm to answer the following. i. What food does John eat? ii.Does Mita like pizza? iii.Which food does John Like? iv.Who likes what foods? v. Prove the statement "Mita likes pizza and burger" using resolution.	**10M**
	(b)	Consider a set $S = \{\sim(A\ V\ B), (C \rightarrow B), (A\ V\ C)\}$ of formulae. **Show** that S is unsatisfiable using the tableau method	**06M**
	(c)	Using resolution refutation principle **show** that C **V** D is alogical consequence of S = {A **V** B , ~A **V** D, C **V**~B}	**04M**
		Module – 4	
Q.7	**(a)**	**Evaluate** and prove the transition's involved in the given Start and Goal states using the Sussman Anomaly problem. 	**10M**
	(b)	Consider the block world Problem given below, **construct** and **evaluate** it by using the **GOAL STACK** method. 	**10M**
		OR	
Q.8	**(a)**	**Contrast** the features of Non-Linear Planning Strategies. Illustrate with an example the working of Goal Set Method.	**10M**
	(b)	"Means-Ends Analysis approach is a technique used to solve problems in Artificial intelligence", Provide the **conclusion** with an example.	**10M**
		Module – 5	
Q.9	**(a)**	**Design** a network of frames(NOF) with aki, a_part_of and inst links with the following characteristics: a. Insert a frame in NOF with all slot values filled up. b. Delete a frame from NOF. c. Update the values of the slot of a given frame. d. Query module to ask questions using FBS.	**10M**

	(b)	**Design** and **illustrate** inferencing methods using ESNet representation for the following problem which is denoted in casual form. $$isa(X, living\_Thing) \leftarrow isa(X, animate)$$ $$isa(X, animate) \leftarrow isa(X, human)$$ $$isa(X, human) \leftarrow isa(X, man)$$ $$isa(john, man)$$	**10M**
		OR	
Q.10	**(a)**	**Contrast** how an expert system different from a traditional program and production system different from an expert system? Explain the knowledge acquisition component of ES.	**10M**
	(b)	**Design** a complete Frame Based System for Hospital Application using PROLOG.	**10M**

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Programme Outcome**
Q.1	(a)	L2	CO1	PO1
	(b)	L2	CO1	PO1
	(c)	L1	CO1	
Q.2	(a)	L2	CO1	PO2
	(b)	L3	CO1	PO1
	(c)	L1	CO1	PO1
Q.3	(a)	L2	CO2	PO1
	(b)	L2	CO2	PO3
Q.4	(a)	L3	CO2	PO2
	(b)	L3	CO2	PO1
Q.5	(a)	L2	CO3	PO2
	(b)	L3	CO3	PO1
	(c)	L3	CO3	PO1
Q.6	(a)	L3	CO3	PO8
	(b)	L2	CO3	PO8
	(c)	L2	CO3	PO1
Q.7	(a)	L4	CO4	PO8
	(b)	L4	CO4	PO4,PO8
Q.8	(a)	L4	CO4	PO2
	(b)	L4	CO4	PO1
Q.9	(a)	L4	CO4	PO1
	(b)	L4	CO4	PO1
Q.10	(a)	L4	CO4	PO1
	(b)	L4	CO4	PO1

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6