2022

ARTIFICIAL INTELLIGENCE

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Explain each term briefly:	2 x 5=10
		i) Propositional logic	
		ii) Knowledge representation	
		iii) First order predicate logic	
		iv) Artificial intelligence (AI)	
		v) Contradiction	
	b)	Differentiate between:	2x5=10
		i) Existential and Universal quantifier	
		ii) Breadth first search and Depth first search	
		iii) Plateau and Local maximum	
		iv) CNF and DNF	
		v) Inductive and Deductive inference	
2.	a)	What is your perception about knowledge based agent (KBA)? Briefly describe about inheritable knowledge.	5+5=10
	b)	Briefly explain the importance of AI systems in context of present situation.	5
	c)	Express in predicate logic: "Some humans are intelligent".	5
3.	a)	Which properties make a system a good knowledge representation system? Explain the functions of the intelligent components of AI knowledge cycle with the help of a suitable diagram.	4+6=10
	b)	Prove that P <--> Q is not a tautology?	5
	c)	Express in predicate logic: "All man drink coffee".	5

4.	a)	What is the purpose of a heuristic function? What is pure heuristic function?	3+2=5
	b)	Briefly describe best first search. What is the heuristic function best first search?	3+2=5
	c)	Given that S and G are the source and goal nodes whereas H(n) is the heuristic function estimating the distance of a node from the goal node as follows: Note that, S is the parent of A&B, A is the parent of C&D, B is the parent of E&F, F is the parent of H&I and I is the parent of G. Apply best first search algorithm and show the iterative steps of the closed and the open lists to find the path of the solution.	10

Node	A	B	C	D	E	F	H	I	S	G
H(n)	12	10	8	6	5	4	6	3	14	0

5.	Write short notes on any four of the following		5x4=20
	a)	Hill climbing	
	b)	Tautology	
	c)	Resolution	
	d)	A* algorithm	
	e)	Inference	
	f)	Modus ponens	

6.	a)	Express the sentence "The sun rises in the east and sets in the west" in propositional logic.	4
	b)	"If it rains, the road becomes wet". How would you express it in propositional logic?	4
	c)	What is an expert system? Mention the characteristics of an expert system. Briefly explain the function of each of the components of an expert system.	2+2+8=12