Total number of printed pages: 3 **Programme(D)/V/DCSE512**

2023

ARTIFICIAL INTELLIGENCE

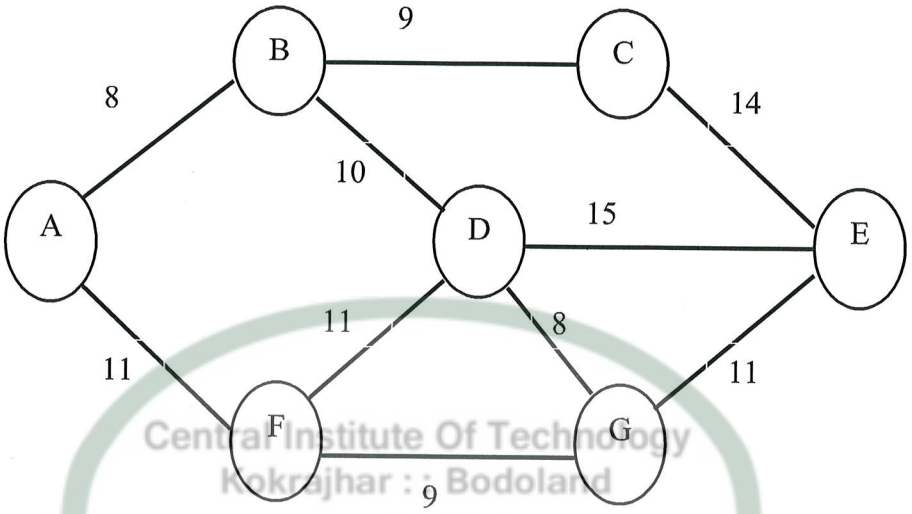
Full Marks : 100

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) Interpretation	
		ii) Modus ponens	
		iii) Propositional logic	
		iv) Unification	
		v) Artificial intelligence	
	b)	Differentiate between:	2.5x4=10
		i) Informed vs Uninformed search	
		ii) Breadth first search and Depth first search	
		iii) Inductive and Deductive inference	
		iv) Existential and Universal quantifier	
2.	a)	Mention the different types of learning? Briefly explain each of them.	2+10=12
	b)	Briefly explain the importance of AI systems in the context of present situation.	4
	c)	Express in propositional logic: "In CIT, classes start at 8.30 am and end at 4.30 pm".	4
3.	a)	Express in predicate logic: "All human drink water".	5
	b)	Prove that (PV~Q) Λ (PΛQ) is a contradiction.	5

	c)	Define breadth first search (BFS) algorithm. Apply BFS algorithm on the flowing graph and show the status of the queue during the traversal of every node.  	3+7=10
4.	a)	Define Conjunctive Normal Form	3
	b)	What is a heuristic function? What is advantage of best first search algorithm over breadth first search algorithm? What is the heuristic function for best first search?	3+2+2=7
	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: Node: A, B, C, D, E, F, H, I, S, G H(n): 11, 9, 7, 6, 5, 4, 5, 3, 14, 0 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
5.	Write short notes on any four of the followings:		5x4=20
	a)	Depth first search	
	b)	Tautology	
	c)	Resolution	
	d)	A* algorithm	
	e)	Inference	
	f)	Rule based system	

6.	a)	Express the sentence in predicate logic "All students securing average marks >=60 percent are awarded 1st class".	5
	b)	"If it rains, the road becomes wet". How would you express it in propositional logic?	5
	c)	Describe the functions of general learning model with a suitable diagram.	10