

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN  
 [AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]  
 Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

**Question Paper Code: 130018**

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2025

Fourth Semester

Computer Science and Technology

U19CT406 – FOUNDATION OF ARTIFICIAL INTELLIGENCE

(Regulation 2019)

Time : Three Hours

Maximum : 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List the four categories under which AI is classified with examples.	2	K1	CO1
2.	Describe about the characteristics of a problem	2	K1	CO1
3.	How iterative deepening a* algorithm differs from a* algorithm.	2	K2	CO2
4.	Define Bounded Look-ahead Strategy.	2	K1	CO2
5.	When a formula is said to be satisfiable and unsatisfiable in first order logic?	2	K2	CO3
6.	Convert the formula $(\neg A \rightarrow B) \wedge (C \wedge \neg A)$ into its equivalent CNF representation.	2	K2	CO3
7.	Mention the advantages and disadvantages of Extended semantic networks over semantic networks.	2	K1	CO4
8.	Draw the Structure of Frame.	2	K1	CO4
9.	Compare and Contrast Expert system versus Traditional systems.	2	K2	CO5
10.	State Bayes theorem.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Define “Artificial Intelligence and explain about Artificial Intelligence Technique”. Briefly discuss the foundations of AI and list out some of the task domain and components of AI.	13	K2	CO1
	(OR)			
b)	Define agent. List all the basic types of agent and discuss in detail with an example.	13	K2	CO1
12. a)	A man has to cross a river with his dog, goose and grain. Each trip, his boat can only carry himself and one of his possessions. How can he cross the river if an unguarded dog eats the goose and an unguarded goose the grain? i. Find a good representation. ii. Perform Depth-first search (queues)	13	K3	CO2
	(OR)			
b)	Discuss in detail about Alpha Beta Pruning in Game playing	13	K2	CO2
13. a)	i. Show that a set $S=\{-AVB\},\{B\rightarrow C\},\{AVC\}$ is Consistent	6	K3	CO3
	ii. State the concept of semantic tableau method. Show that the following formulae are valid by giving tableau proof a. $(\neg AVB)\leftrightarrow(A\rightarrow B)$ b. $((A\rightarrow(B\rightarrow C))\rightarrow[(A\wedge B)\rightarrow C])$	7	K3	CO3
	(OR)			
b)	Consider the following sentences • Sam likes all kinds of food • Oranges are food • Fish is food • Anything anyone eats and isn't killed by is food • pall eats peanuts and is still alive • Sue eats everything paul eats i. Translate these sentences into formulas in predicate logic ii. Prove that sam likes peanuts using backward chaining iii. Convert the formulas of a part into clause form iv. Prove that john likes peanuts using resolution	13	K3	CO3

14. a) Draw a semantic network for the following and describe the inheritance in prolog 13 K3 CO4
- Shadow is an instance of dog.
  - Shadow caught a cat
  - Shadow is owned by Sid.
  - Shadow is brown in color.
  - Dogs like bones.
  - The dog sat on the mat.
  - A dog is a mammal.
  - A cat is an instance animal
  - All mammals are animals.
  - Mammals have fur
- (OR)
- b) Explain with example, how knowledge is represented using Frames. 13 K2 CO4
15. a) Define Expert system, and discuss about the architecture and explain in detail. 13 K2 CO5
- (OR)
- b) Construct a Bayesian Network and define the necessary CPTs for the given scenario. We have a bag of three biased coins a,b and c with probabilities of coming up heads of 20%, 60% and 80% respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins) and then the coin is flipped three times to generate the outcomes X1, X2 and X3. 13 K3 CO5

### PART – C

(1 x 15 = 15Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Solve the Water Jug problem: you are given 2 jugs, a 5-gallon one and 3-gallon one. Neither has any measuring maker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 4gallons of water into 5-gallon jug? Explicit assumptions: A jug can be filled from the pump, water can be poured out of a jug onto the ground, water can be poured from one jug to another and that there are no other measuring devices available.	15	K3	CO1
(OR)				
b)	Write in detail about the constraint satisfaction procedure with crypt arithmetic puzzle as an example and find out the Solution for the below If USA + USSR = PEACE. Find P + E + A + C + E.	15	K3	CO2