GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)
M.C.A (Third Semester) Regular Examinations, November – 2024
MCA23304 – Artificial Intelligence
(MCA)

Time: 3hrs   Maximum: 60 Marks

(The figures in the right hand margin indicate marks)

PART – A   **(2 x 5 = 10 Marks)**

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	Mention and define the components of state space search.	CO1	K1
b.	Enlist two differences between A* and AO* search algorithm.	CO2	K2
c.	Explain the issues in knowledge representation?	CO3	K3
d.	Differentiate between propositional and first-order inference.	CO4	K2
e.	Describe the process of classification in pattern recognition.	CO5	K5

PART – B   **(10 x5=50 Marks)**

Answer *ALL* questions

|		Marks	CO #	Blooms Level
2. a.	Formulate the Water Jug problem in terms of states, actions, rules and goals, and describe the steps to solve it using DFS. (Jug A – 4L, jug B – 3L). Initial state-(0,0), Goal state-(2,0).	6	CO1	K3
Kb.	Explain the working of any four Uninformed search strategies with a single example.	4	CO2	K4

(OR)

c.	Explain missionaries and cannibals' problem with appropriate state space description. Draw the solution graph using DFS. (3M3C1B)	6	CO1	K4
d.	Discuss the Hill Climbing Algorithm using a neat diagram. Describe the limitations of it.	4	CO2	K5
3.a.	What is the AO* algorithm? Calculate the revised cost of the start node 'S' using the AO* algorithm.	5	CO2	K6
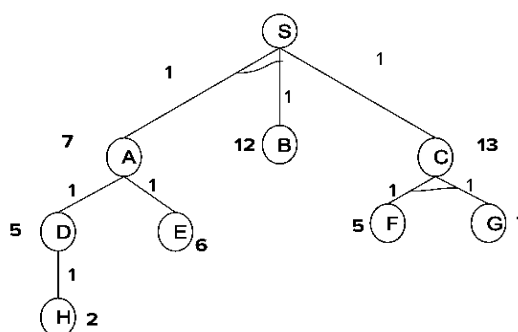
b.	What do you mean by an Agent? Explain the types of agents with neat diagram.	5	CO1	K2

(OR)

|				
c.	Explain the process of Alpha-Beta Pruning in the context of a game tree and find the optimal path for below tree.	5	CO2	K4
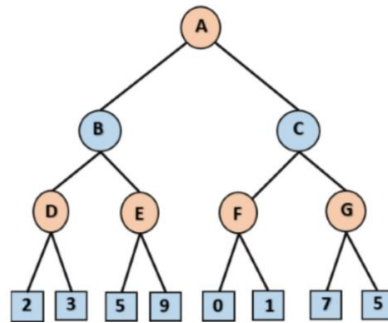
d.	List the possible moves in the Monkey-Banana Problem and draw a state-space graph to represent the solution.	5	CO1	K3

4.a. Given the Bayesian belief network for a burglary system, find the probability that the alarm has sounded but neither a burglary nor an earthquake has occurred and both john and merry called.
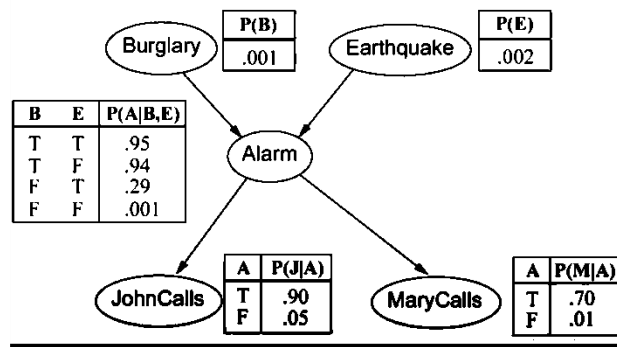
b.	What is the probability that John calls?	6	CO3	K5

(OR)

c. Provided the given Knowledge base:
   1. John likes all kinds of food.
   2. Apples and vegetables are food.
   3. Anything anyone eats and not killed is called food.
   4. Bill eats peanuts and still alive.
   5. Sue eats everything Bill eats.

Represent the knowledge base in first-order logic.

4   CO4   K2

d.	Prove that John likes peanuts via Resolution graph.	6	CO4	K4

5.a. What does the main components of a semantic network represent. Represent the following sentences into a semantic network:
   1. Marcus was a man.
   2. Marcus was a Pompeian.
   3. All Pompeian were Romans.
   4. Caesar was a ruler.
   5. Marcus tried to assassinate Caesar.
   6. All men are persons.

5   CO3   K2

b.	Explain the working of Artificial Neural Networks (ANNs) with a detailed diagram. Discuss how they mimic the human brain's functionality.	5	CO5	K3

(OR)

c.	Enlist and explain the components used for writing a script in AI and create a script for a scenario where someone goes to the bank to withdraw money	5	CO3	K5
d.	What is pattern recognition? Explain the steps involved in the classification process with an example.	5	CO5	K4

6.a. Represent the following statements in predicate logic form using the appropriate quantifier.
   1. "Not all students like both mathematics and science."
   2. "Every student in the class likes at least one book."

5   CO4   K3

3. "All birds can fly except penguins."

b. Short notes: 5   CO5   K2
   1. Contract net protocol
   2. Natural language processing

(OR)

c. Solve the given cryptarithmetic problem MATH+MYTH=HARD, and mention the basic rules and constraints of solving it?   5   CO1   K2

d. Short notes on: 5   CO4   K3
   1. Decision trees
   2. Reinforcement learning

--- End of Paper ---