R22 Regulation *Subject code: 4P5EG&4E5GC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech V Semester Regular/Supplementary Examinations, November 2025

ARTIFICIAL INTELLIGENCE

(Common to CSE & CSE(AI&ML))

Maximum Marks: 60 Date:12.11.2025 Duration: 3 hours

Note:
1. **This question paper contains two parts A and B.**
2. **Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
3. **Part B consists of 5 Units. Answer any one full question from each unit.**
4. **Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

All the following questions carry equal marks (10×1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	What is meant by Turing test?	1M	1	L1
b)	Define Ideal Rational Agent.	1M	1	L1
c)	Define Alpha beta pruning.	1M	2	L1
d)	What is constraint propagation.	1M	2	L1
e)	State the role of Unification in FOL.	1M	3	L1
f)	What is ontological engineering?	1M	3	L1
g)	Define Bayes' rule.	1M	4	L1
h)	What is heuristic function?	1M	4	L1
i)	Define planning graph.	1M	5	L1
j)	What is Dempster–Shafer theory?	1M	5	L1

Part-B

Answer All the following questions. (5×10M=50Marks)		Marks	CO	Bloom Tx
2	a) Discuss the characteristics of AI problem solving agents. Can Towers of Hanoi problem be considered as AI problem? Justify your answer with suitable discussions. b) Apply BFS to solve a simple graph search problem.	5M 5M	1 1	L3 L3
	OR			
3	a) Demonstrate A* algorithm with an example and explain admissibility of A*. b) Represent 8 puzzle problem in state space.	5M 5M	1 1	L3 L4
4	a) Explain alpha-beta pruning algorithm with example. b) Represent the following knowledge using a semantic network: Tom is a cat Tom caught a bird Tom is owned by John Tom is ginger in colour Cats like cream Cat is on the mat A cat is a mammal	5M 5M	2 2	L3 L3

	A bird is an animal All mammals are animals Mammals have fur			
	OR			
5	a) Discuss how inference is achieved in a Wumpus world. b) Give the rules of inference in propositional logic using example.	5M 5M	2 2	L3 L3
6	a) Explain unification algorithm used for under predicate logic (first order logic) with an example. b) Describe Backward chaining in First-Order Logic.	5M 5M	3 3	L3 L3
	OR			
7	a) Explain the forward chaining process in detail with example? What is the need of incremental chaining. b) Differentiate between Propositional and First-Order inference.	5M 5M	3 3	L4 L4
8	a) Explain Ontological Engineering with examples. b) Describe Classical Planning with State-Space Search algorithms.	5M 5M	4 4	L3 L4
	OR			
9	a) Analyze Reasoning with Default Information. b) Examine Planning Graphs and their analysis.	5M 5M	4 4	L4 L4
10	a) We have a bag of three biased coins a, b and c with probabilities of coming up heads of 30%, 60% and 75% 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. Draw the Bayesian network corresponding to this step and define the necessary conditional probability tables. b) Compare Bayesian reasoning with Dempster–Shafer theory.	7M 3M	5 5 	L3 L4
	OR			
11	a) Consider the following set of propositions i) A heart patient has spots ii) A heart patient has measles iii) A heart patient has high fever iv) A heart patient has an allergy v) A heart patient was recently bitten by a tick. Create a network that defines the casual connections among these nodes. Convert it to a Bayesian network by constructing the necessary conditional probability matrix. b) How do we act under uncertainty, make use of Baye's rule.	5M 5M	5 5	L3 L3