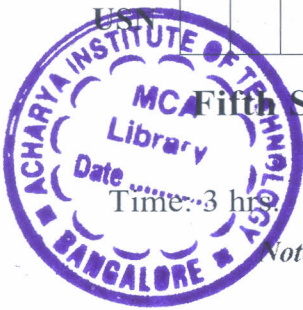


CBCS SCHEME

BMT515C



Fifth Semester B.E./B.Tech. Degree Examination, June/July 2025 Artificial Intelligence for Mechatronics

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1			M	L	C
Q.1	a.	List and explain the fundamental issues that are rising concerns in mankind about artificial intelligence.	10	L2	CO1
	b.	Explain Swarm intelligence system, mentioning their applications	10	L2	CO1
OR					
Q.2	a.	Outline the concept of fuzzy logic and fuzzy set mentioning its applications.	10	L2	CO1
	b.	With the help of block diagram, explain expert system and its functional blocks.	10	L2	CO1
Module – 2					
Q.3	a.	Summarize the two stages of robot vision with a neat block diagram.	10	L1	CO2
	b.	Explain scene analysis model using generalized cylinders for model based vision.	10	L2	CO2
OR					
Q.4	a.	Explain the elements of the averaging operation in image processing with suitable image example.	10	L2	CO2
	b.	Mention the region properties and illustrate region finding method in image processing with example.	10	L2	CO2
Module – 3					
Q.5	a.	Explain the Monte Carlo localization algorithm with a neat sketch.	10	L2	CO3
	b.	Explain the different types of robot perception and illustrate the same.	10	L2	CO3
OR					
Q.6	a.	Outline the multi-object localization and mapping in robotic mapping.	10	L2	CO3
	b.	What are end effectors? Classify the types of end effectors used in robotic applications.	10	L2	CO3
Module – 4					
Q.7	a.	Illustrate the probabilistic roadmaps based graph techniques to optimize the free space in path planning.	10	L2	CO4
	b.	Explain the process of workspace and configuration space representation with a neat diagram.	10	L2	CO4
OR					
Q.8	a.	Explain the voronoi diagrams based graph techniques to optimize the free space in path planning.	10	L2	CO4
	b.	Explain the modified cost function to estimate the distance to the closet obstacle in a potential field.	10	L2	CO4
Module – 5					
Q.9	a.	Summarize the potential field control in motion planning of a robot under cost function.	10	L1	CO5
	b.	With a neat diagram, illustrate the pipeline architecture with the relevant stages involved.	10	L2	CO5
OR					
Q.10	a.	Derive an expression for PD and PID controller in dynamic state model of the robot.	10	L3	CO5
	b.	With a neat diagram, explain the subsumption robotic architecture with the help of Augmented Finite State Machines (AFSM).	10	L2	CO5
