

CBCS SCHEME

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BMT515C

Fifth Semester B.E./B.Tech. Degree Examination, June/July 2026 Artificial Intelligence for Mechatronics

Time: 3 hrs.

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.	Explain intelligence and the two important components of intelligence learning and communication.	10	L2	CO1
	b.	With a neat sketch, explain the expert system and its functional blocks.	10	L2	CO1

OR

Q.2	a.	Outline the concept of fuzzy logic and fuzzy set and mention its applications.	10	L2	CO1
	b.	With the help of a block diagram, Explain Genetic algorithm based on evolution theory.	10	L2	CO1

Module – 2

Q.3	a.	Explain ALVINN system for steering an automobile with a neat diagram.	10	L2	CO2
	b.	Summarize the two stages of robot vision with a neat block diagram.	10	L2	CO2

OR

Q.4	a.	Explain the scene model using generalized cylinders for model based vision.	10	L2	CO2
	b.	Sketch and explain the depth calculation from a single image.	10	L2	CO2

Module – 3

Q.5	a.	Summarize the role of sensors and their types used in a robot.	10	L2	CO3
	b.	Classify the types of end effectors used in robotic applications and brief the same.	10	L2	CO3

OR

Q.6	a.	Explain the localization method using Extended Kalman Filter (EKF) with a neat diagram.	10	L2	CO3
	b.	Outline the multi-object localization and mapping in robotic mapping.	10	L2	CO3

Module – 4

Q.7	a.	Explain the process of workspace and configuration space representation with a neat diagram.	10	L2	CO4
	b.	Outline the cell decomposition method used in path planning with cell classification.	10	L2	CO4

OR

Q.8	a.	Illustrate the probabilistic roadmaps 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 closest obstacle in a potential field.	10	L2	CO4

Module – 5

Q.9	a.	Derive an expression for PD and PID controller in dynamic state model of the robot.	10	L2	CO5
	b.	List and discuss the various application domains of robotics.	10	L2	CO5

OR

Q.10	a.	List and explain the 3-layer architecture in robotic software hybrid architecture.	10	L2	CO5
	b.	With a neat diagram, explain the subsumption robotic architecture with the help of Finite State Machine (FSM).	10	L2	CO5
