Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U5105

M.E. DEGREE EXAMINATION, NOV 2025

Professional Elective

CAD / CAM

21PCD505– INDUSTRIAL ROBOTICS AND EXPERT SYSTEMS

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1.	(a)	Apply the principles of robot kinematics to calculate the end effector's position for an industrial robot performing assembly tasks with precision.	CO2-App	(20)
		Or		
	(b)	Develop a control strategy for a robot manipulator to ensure smooth and accurate movement while following a pre-defined trajectory during a welding operation.	CO2-App	(20)
2.	(a)	Choose the most suitable drive system (hydraulic, pneumatic, or electric) for a robotic arm that requires high torque for lifting heavy objects, and explain your selection.	CO3-App	(20)
		Or		
	(b)	Apply the concepts of D.C. servo motors to control the motion of a robot's arm for fine adjustments in precision machining tasks, ensuring accurate position feedback and smooth operation.	CO3-App	(20)
3.	(a)	Choose the most suitable proximity and range sensor for a robot tasked with identifying objects in a cluttered environment, and explain the advantages of your selection.	CO3-App	(20)
		Or		
	(b)	Construct a training protocol for a robotic vision system to recognize patterns in various objects, ensuring the robot can autonomously sort items based on shape and size.	CO3-App	(20)

4.	(a)	Develop a safety protocol for robotic operations in a nuclear facility, addressing the specific risks associated with radiation and hazardous materials.	CO4-App	(20)
		Or		
	(b)	Select the most appropriate type of robot for underwater exploration, considering the unique environmental challenges and operational requirements.	CO4-App	(20)
5.	(a)	Construct a robot programming workflow using a task-level language to control a robotic arm for complex assembly tasks in an automotive production line.	CO5-App	(20)
		Or		
	(b)	Select an appropriate method of motion interpolation for smooth and precise robotic movements in a welding task, and justify your selection based on task requirements.	CO5-App	(20)