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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Examination June 2022 (2019 Scheme)

Course Code: MRT302

Course Name: ROBOTICS & AUTOMATION

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Draw the basic structure of Robot.	(3)
2		State the laws of Robotics	(3)
3		Write the advantages of LVDT.	(3)
4		Classify end effectors used in robots.	(3)
5		Write the equations for rotation about X and Z axis.	(3)
6		Differentiate forward and inverse kinematics.	(3)
7		Explain PLC wiring.	(3)
8		Explain PLC types.	(3)
9		What are the two methods commonly used to represent a timer instruction with in a PLC's Ladder logic program?	(3)
10		What is alarm in PLC?	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Explain wrist configurations in robotics end effectors.	(6)
	b)	Explain about chain, Belt and Gear drives used in Robotic power transmission systems with neat sketches.	(8)

OR

12	a)	What is work volume? Draw the work volume of any two robot configuration.	(10)
	b)	Explain the working principle of stepper motor with neat sketch.	(4)

Module II

13	a)	Describe the working, applications and advantages of Potentiometer sensors.	(8)
	b)	Describe the working principle of mechanical grippers.	(6)

OR

14	a)	What are the tools? List some applications of tool as end effectors in robotics.	(6)
	b)	Name one force sensor. Explain it with the help of diagram.	(8)

Module III

15	a)	Obtain the inverse kinematics equation for robot arm with 2 degree of freedom	(8)
	b)	Classify robot programming, Explain offline programming.	(6)

OR

16	a)	Discuss about the mapping of description from one frame to another frame.	(14)

Module IV

17	a)	What is PLC? Discuss about the I/O modules used in PLC.	(9)
	b)	Explain about scan cycle.	(5)

OR

18	a)	Draw and explain in detail about the PLC architecture.	(10)
	b)	List and explain the capabilities of PLCs.	(4)

Module V

19	a)	Draw a ladder diagram for a Sequence motor.	(14)

OR

20	a)	Describe the steps for connecting PLC to computer.	(9)
	b)	Write a note on arithmetic instructions in PLC	(5)

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