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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S, FE) Examination January 2024 (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		Classify robots.	(3)
2		Draw the Gerotor type hydraulic motor.	(3)
3		Differentiate range and position sensors.	(3)
4		List out the types of gripper mechanism.	(3)
5		Write the matrix equation for rotation about Y axis.	(3)
6		Explain the how the frames are mapped while translating the one point to another point.	(3)
7		Explain the capabilities of PLC.	(3)
8		What are the advantages of PLC?	(3)
9		List out the requirements for communication networks of PLC.	(3)
10		Explain about interlocking in PLC.	(3)

PART B

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

Module I

11	a)	Define robot motion. Draw and explain the Cartesian coordinate, Polar coordinate, and cylindrical coordinate configurations	(10)
	b)	Explain the working principle of DC motors.	(4)

OR

12	a)	What are the power transmission systems used in robots?	(10)
	b)	State three law of robotics.	(4)

Module II

13	a)	Explain the working and application of velocity and acceleration sensors.	(8)
	b)	Explain the working of touch and tactile sensors.	(6)

OR

14	a)	Draw and explain the working of any range sensing method used in robots.	(7)
	b)	Explain the features, working and applications of mechanical grippers.	(7)

Module III

15	a)	What is the purpose of transformation equations in robotics? Explain with neat sketches.	(9)
	b)	Write a simple VAL robot program.	(5)

OR

16	a)	Describe the manual and walkthrough method of robot Programming.	(7)
	b)	Obtain the forward kinematic equation for robot arm with 2 degree of freedom.	(7)

Module IV

17	a)	Explain PLC scan cycles.	(4)
	b)	Draw and explain in detail about the PLC architecture.	(10)

OR

18	a)	What is PLC? Discuss about the I/O modules used in PLC.	(10)
	b)	What are the types of PLC?	(4)

Module V

19	a)	Draw a ladder diagram for a water level controller.	(14)

OR

20	a)	Describe the timers and counters in PLC with suitable examples.	(14)

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