Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R,S)(FT/PT/WP) Examinations April 2026 (2019 Scheme)

Course Code: MET402
Course Name: MECHATRONICS

Duration: 3 Hours

Max. Marks: 100

PART A

Answer all questions, each carries 3 marks.

		Marks
1	Explain the use of Piezoelectric Sensors to measure displacement.	(3)
2	Define the following static characteristics of sensors (i) Hysteresis Error (ii) Non Linearity Error.	(3)
3	Enumerate the advantages of MEMS Technology.	(3)
4	Compare Dry Etching and Wet Etching Process.	(3)
5	Describe the basic building blocks of an electrical system with their mathematical equations.	(3)
6	Explain the working of anti-friction bearings.	(3)
7	Describe the application of counters in PLC with an example.	(3)
8	Highlight the important features of a closed loop control system.	(3)
9	Explain the working on any one range sensor used in robotics.	(3)
10	Differentiate between CCD and CID cameras used in robots.	(3)

PART B

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

Module I

11	a)	Explain the construction and working of Acoustic Emission Sensor.	(6)
	b)	Explain the working of an absolute rotary encoder with a neat sketch. How is the resolution of an encoder found?	(8)

OR

12	a)	Describe the working of an Eddy Current based displacement sensor. Highlight its advantages.	(8)
	b)	Describe the working of power supply unit of a pneumatic actuation system.	(6)

Module II

13	a)	Explain the construction and working of any process control valve.	(8)
	b)	Explain the Electrodeposition process in MEMS.	(6)

OR

14	a)	Describe the different steps involved in the fabrication of a MEMS pressure sensor.	(8)
	b)	Explain micro machining methods for MEMS systems.	(6)

Module III

15	a)	Explain the mathematical model of a machine mounted on the ground.	(6)
	b)	Explain the different types of friction guideways. State its limitations.	(8)

OR

16	a)	Describe the various factors involved in the design of CNC machine structure.	(9)
	b)	Differentiate between hydrostatic and aerostatic guideways.	(5)

Module IV

17	a)	Describe the main functions of an Adaptive Control Systems.	(6)
	b)	Explain the following with respect to PLC (i) Latching (ii) Shift Registers.	(8)

OR

18		With neat sketch and ladder program explain the system for raising and lowering barrier for automatic car park barrier system.	(14)

Module V

19	a)	Explain the working of a brushless DC motor.	(6)
	b)	With a neat figure explain the basic components and working of a servomechanism.	(8)

OR

20	a)	Explain the construction and working of a strain gauge used to determine force in robotic applications.	(6)
	b)	Explain the various Image Processing Techniques in Robotics.	(8)

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