



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

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|----|---|-----|
| 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

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|----|---|-----|
| 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)
