

A

0400MET402082401

Pages: 2

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Supplementary Examination August 2024 (2019 Scheme)



Course Code: MET402

Course Name: MECHATRONICS

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 3 marks.*

Marks

- |    |   |     |
|----|---|-----|
| 1  | Suggest three applications of Hall effect sensor in mechatronic systems.    | (3) |
| 2  | Illustrate how capacitive sensor works when area changes?                   | (3) |
| 3  | Analyze various types of direction control valves (DCV)?                    | (3) |
| 4  | What are the major advantages of surface micromachining process?            | (3) |
| 5  | Explain the working of Recirculating ball screws.                           | (3) |
| 6  | List the basic building blocks to mathematically model a mechanical system. | (3) |
| 7  | Give an example for open loop system and closed loop systems                | (3) |
| 8  | What is Latching in PLC? Draw a simple latched circuit.                     | (3) |
| 9  | What are the factors to be considered for selecting solenoids?              | (3) |
| 10 | List any three applications of robotic vision systems.                      | (3) |

**PART B**

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

**Module I**

- 11 a) Analyse the working of Bimetallic thermometer and thermocouples with a help of a neat sketch. (10)
- b) Explain the working of any one non-contact temperature measurement system. (4)

**OR**

- 12 a) Evaluate the working of resolver and synchro with the help of neat sketch. (10)
- b) Differentiate between absolute and incremental encoders. (4)

**Module II**

- 13 a) Explain the working of a double acting hydraulic cylinder with a neat figure. (10)
- b) Mention any four differences between Hydraulic and Pneumatic actuators. (4)

**OR**

**0400MET402082401**

- 14 a) Analyse the principle, fabrication and working of MEMS based pressure sensor (10)  
b) Write a short note on Lithography (4)

**Module III**

- 15 a) What is meant by guide ways? Explain most commonly used guide ways in CNC machines. (10)  
b) Discuss the various steps to reduce thermal deformation in modern CNC machines. (4)

**OR**

- 16 a) List the basic building blocks to mathematically model a mechanical system. (10)  
b) Comment on the stick-slip phenomenon associated with friction guideways. (4)

**Module IV**

- 17 a) With neat sketch and ladder program explain the system for raising and lowering barrier for automatic car park barrier system (14)

**OR**

- 18 a) Discuss the working of mechatronics system based automobile engine management system with the help of sketches and block diagrams. (14)

**Module V**

- 19 a) What is meant by stretching and thresholding in Image processing? (10)  
b) Illustrate the histogram processing technique for enhancing the image contrast. (4)

**OR**

- 20 a) Illustrate the working of harmonic drive with neat sketches. List out its applications. (10)  
b) Explain the working of an ultrasonic range finder (4)

\*\*\*\*