

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: ME407**Course Name: MECHATRONICS**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any three full questions, each carries 10 marks.*

Marks

- | | | |
|---|---|-----|
| 1 | a) Explain with schematic diagram the working of synchros. | (5) |
| | b) Illustrate the principle of operation of turbine meter for the measurement of liquid flow. | (5) |
| 2 | a) Some temperature-controlled switches are operated by bimetallic strips. Describe how they work. | (5) |
| | b) Explain any two static characteristics of a sensor | (5) |
| 3 | a) Draw the symbol for a pressure sequence valve. | (2) |
| | b) Design a circuit in which pressure sequence valve is used to initiate an operation only when another operation has been completed. | (8) |
| 4 | a) What is meant by rotary actuator? | (2) |
| | b) Draw a vane motor and show important parts. | (3) |
| | c) With a neat diagram explain the working of pilot operated check valve. | (5) |

PART B*Answer any three full questions, each carries 10 marks.*

- | | | |
|---|--|------|
| 5 | a) Explain evaporation process for MEMS fabrication with neat sketch. | (5) |
| | b) Compare dry etching process with wet etching process. | (5) |
| 6 | What is a gyroscope? Describe the working of MEMS based piezoelectric plate gyroscope with suitable diagram. Also Illustrate the steps in its fabrication. | (10) |
| 7 | a) Name the technique used to eliminate backlash in a ball screw. Illustrate the method of doing it. | (6) |
| | b) Explain two methods used for input/output processing in PLC. | (4) |
| 8 | a) Represent the basic structure of PLC with the help of a block diagram. | (5) |
| | b) What is the purpose of cascaded timers in PLC? Explain with example. | (5) |

PART C

Answer any four full questions, each carries 10 marks.

- 9 a) What are the basic building blocks of mechanical systems? Obtain their describing equations. (5)
- b) Explain the working principle of any one light based range finder. (5)
- 10 a) Propose a model for the metal wheel of a railway carriage running on a metal track. (4)
- b) Illustrate the working of harmonic drives with sketches. (6)
- 11 Describe the working of a permanent magnet DC motor and brushless permanent magnet DC motor with diagrams. Identify their differences. (10)
- 12 a) Explain histogram processing technique for image processing. (5)
- b) Describe the applications of vision systems with examples. (5)
- 13 a) Using a schematic diagram, explain the working of Vidicon camera. (5)
- b) Compare the effects of resolution and quantization on the usefulness of an image. (5)
- 14 With the help of a block diagram show different elements of car engine management system. Explain functions of important components. (10)
