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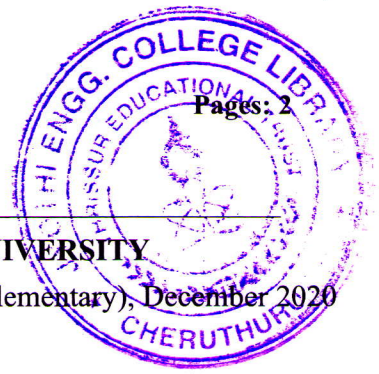
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Reg No.: _____

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)
