D

04000ME407052002

Pages: 2

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)

****