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BME-006

B.Tech. MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING) / B.Tech. AEROSPACE ENGINEERING (BTAE)

Term-End Examination

December, 2017

00202

BME-006 : MECHATRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any* ***seven*** *questions. All questions carry equal marks.*

1. (a) Differentiate between active and passive sensors. What are the requirements for selecting a sensor ?

(b) Briefly explain the functions of a generator and a thermistor. *2×5=10*

2. (a) What is a Proximity Switch ? Describe in detail, all its industrial applications.

(b) Explain the working principles of a relay with the help of a schematic diagram. *2×5=10*

3. (a) What are the two types of data transfer techniques used in computer interfacing ? List out the main differences between them.

(b) What are the advantages of hydraulic actuators over mechanical actuators ? *2×5=10*

4. (a) Define the term "Process Control". Explain the process control system with a block diagram.

(b) Identify the sensor, conditioner and display elements in the following measuring instruments :

(i) A mercury-in-glass thermometer

(ii) A Bourdon pressure gauge *2×5=10*

5. (a) Explain what is meant by sequential control and illustrate your answer with a suitable example.

(b) A 6-bit D/A converter gives an output voltage of 17·250 volts for an input of 010111. What is the step size, the full range voltage and the percentage resolution ? *2×5=10*

6. (a) An inverting amplifier has an input resistance of 2 kΩ. Determine the feedback resistance needed to give a voltage gain of 100.

(b) Describe the principle of working of a pilot operated valve. *2×5=10*

7. (a) How does a microcontroller differ from a microprocessor ? Explain with respect to specific applications.

(b) Draw the ladder rungs to represent two switches which are normally open and both have to be closed for a motor to operate. *2×5=10*

8. (a) How do you classify Transducers ? Describe the working of any type of transducer. Also list out some industrial applications of transducers.

(b) Define a Microprocessor. What is the difference between a microprocessor and a CPU ? *2×5=10*