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BME-006

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BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING (COMPUTER INTEGRATED MANUFACTURING)
B.TECH. (AEROSPACE ENGINEERING)

Term-End Examination

December, 2010

BME-006 : MECHATRONICS

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any seven** questions. Use of **calculator** is allowed.*

1. (a) What is sensor ? Explain about any one type of discrete event sensor.

   (b) What is a temperature transducer ? Explain the principle of thermocouple and its applications. **5+5=10**

2. (a) Describe four different sensing modes for photoelectric sensors.

   (b) Describe the working of a Robot wrist sensor with neat diagram. **5+5=10**

3. (a) What is work peice transfer system ? Describe all the types of transfer systems. Also explain advantages and disadvantages of transfer systems.

(b) Discuss the relative advantages and disadvantages of the pneumatic system over hydraulic system. 5+5=10

4. (a) What is an hydraulic pump? Describe the working principle of a positive displacement pump.

(b) Describe the working of a compressor. Draw schematic diagram of compressor along with its auxiliary units and explain. 5+5=10

5. A DC motor takes an armature current 110 A at 480 V. The resistance of armature circuit is 0.2Ω. The machine has six poles and the armature is lap connected with 864 conductors. The flux per pole is 0.5 Wb. Calculate

(i) The speed, and

(ii) The gross torque developed by the system. 10

6. (a) What are the three way's of controlling the actuator speed by means of a flow control valve? What are their relative advantages and disadvantages?

(b) Describe the working principle of Hydraulic motor and its applications. 5+5=10

7. (a) Explain closed loop and open loop control systems with block diagrams.

(b) Explain the working principle of relay switch with a neat diagram. 5+5=10

8. (a) Draw and explain Programmable Logic Controller (PLC) structure and write the advantages of PLC over microcomputer.

(b) What is the application of counters in industrial control systems? List the standard types of counters used in most PLC's. 5+5=10

9. (a) Define the term process control. Draw and explain the block diagram of a process control system.

(b) With the help of a block diagram explain parallel data communication. 5+5=10

10. Write short notes on any two of the following.

(a) Pilot operated valve.

(b) Resistance Temperature Detectors (RTD)

(c) Relays 5+5=10