

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

Term-End Examination

00303

June, 2017

BME-006(S) : MECHATRONICS

Time : 3 hours

Maximum Marks : 70

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

1. (a) Describe four different sensing modes for photoelectric sensors.
- (b) A 6-bit D/A converter gives an output voltage of 15.725 volts for an input of 100101. What is the step size, the full range voltage and the percentage resolution ? $2 \times 5 = 10$
2. (a) Show the binary addition and subtraction of 275 (decimal) and 450 (decimal).
- (b) Draw and explain the PLC structure. Also write the advantages of PLC over microcomputer. $2 \times 5 = 10$

3. (a) Describe and compare the characteristics of
- (i) proportional plus integral control, and
 - (ii) proportional plus integral plus derivative control.
- (b) With the help of a neat sketch, describe how the hydraulic system can be used to amplify force. $2 \times 5 = 10$
4. (a) Discuss the functions of feedback systems used in process control. Differentiate between open loop and closed loop control.
- (b) Identify the various elements that might be present in a control system involving thermostatically controlled electric heater. $2 \times 5 = 10$
5. (a) Describe the important guidelines for the selection of a sensor.
- (b) What is a transfer system ? What are its uses ? Explain the methods, advantages and disadvantages of a transfer system. $2 \times 5 = 10$
6. (a) Describe the working principle of hydraulic pumps and its types.
- (b) What is a compressor ? What are the various methods by which the efficiency of a reciprocating compressor can be improved ? Explain. $2 \times 5 = 10$

7. (a) What are the two data transfer techniques used in computer interfacing ? List out the main differences between them.
- (b) What is GRAFCET ? What are the advantages of GRAFCET over Ladder logic ? $2 \times 5 = 10$
8. (a) What are the main differences between Ladder logic and Relay logic ?
- (b) Write short notes on any *two* of the following : $2 \times 5 = 10$
- (i) Feedback Control
 - (ii) Ultrasonic Crack Detection
 - (iii) Logic Gates
 - (v) Signal Conditioning
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