

**B.Tech. – VIEP – MECHANICAL ENGINEERING  
(BTMEVI)**

**Term-End Examination**

**December, 2016**

00572

**BIME-016 : MECHATRONICS**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Answer any **seven** questions. All questions carry equal marks. Use of calculator is permitted.

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1. (a) Describe the components of a continuous sensing system with a neat block diagram.
- (b) What are the main advantages of a capacitive proximity switch over an inductive proximity switch ? 5+5
2. (a) Describe the functioning of a pilot operated check valve.
- (b) Differentiate between a pressure relief valve and a pressure reducing valve. 5+5

3. (a) Describe the working of wrist sensors. Also explain their applications.
- (b) List the important guidelines for the selection of a sensor. Discuss each of them in brief. 5+5
4. (a) What is a sensor ? Explain about active and passive sensors. Also list out the basic requirements of sensors.
- (b) How do you classify transducers ? Describe the working of any one transducer. Also list out some industrial applications. 5+5
5. (a) Explain the working principle of a relay with the help of a schematic diagram.
- (b) Draw and explain the PLC structure. Also write the advantages of PLC over microcomputer. 5+5
6. (a) Explain the construction and principles of working of a Linear Variable Differential Transformer (LVDT).
- (b) Describe briefly 8051 microcontroller with its block diagram. Also explain its various I/O ports. 5+5

7. (a) Explain what is meant by sequential control and illustrate your answer with an example.
- (b) A compound gear train consists of the final driven wheel with 15 teeth which meshes with a second wheel with 90 teeth. On the same shaft as the second wheel is a wheel with 15 teeth. This meshes with a fourth wheel, the first driver, with 60 teeth. What is the overall gear ratio ? 5+5
8. (a) Explain the principle of operation of an Ultrasonic Range Sensor with the help of a neat diagram.
- (b) What is an inline check valve ? Explain its functioning with the help of a diagram. 5+5
9. (a) A differential amplifier is to have a voltage gain of 100. What will be the feedback resistance required if the input resistances are both  $1\text{ k}\Omega$  ?
- (b) If a stepper motor has a step angle of  $7.5^\circ$ , what digital input rate is required to produce a rotation of 10 rev/sec ? 5+5

10. Write short notes on any *two* of the following : 5+5

- (a) Radiography as NDT
  - (b) Logic Gate
  - (c) Signal Conditioner
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