No. of Printed Pages : 3

BIME-016

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

Term-End Examination

00123

December, 2018

BIME-016 : MECHATRONICS

Time : 3 hours *Maximum Marks : 70*

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

1. (a) What is meant by sequential control ? Illustrate your answer by an example.

(b) Compare and contrast the traditional design of a watch with that of a mechatronics-designed product involving micro-processor. *5+5*

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

(b) Explain the working and draw the symbols for

(i) a pressure relief valve, and

(ii) a 2/2 valve which has actuators of a push-button and a spring. *5+5*

3. (a) Describe the working principle of a pilot operated valve.

(b) A force of 600 N is required to open a process control valve. What will be the area of diaphragm needed with a diaphragm actuator to open the valve with a control gauge pressure of 90 kPa ? *5+5*

4. (a) Compare and contrast a closed loop and open loop system. Is it possible to convert an open loop system into a closed loop system ? Explain.

(b) Briefly explain the mechatronic sub-system design consideration. *5+5*

5. (a) Discuss the principle of operation of an ultrasonic flow detector. List all the features for which ultrasonic technique is not suitable.

(b) Briefly explain the steps that are involved in dye penetrant testing. *5+5*

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

(b) Describe the components of a continuous sensing system. *5+5*

7. (a) What are the advantages and limitations of hydraulic systems over other systems ?

(b) Explain the working of wrist sensors. *5+5*

8. Write short notes on any ***four*** of the following : $4 \times 2\frac{1}{2} = 10$

(a) Fuzzy Logic

(b) Microprocessor

(c) Microcontroller

(d) Acoustic Emission

(e) Robot

(f) Diode