No. of Printed Pages : 3   **BIME-016**

B. TECH.-VIEP-MECHANICAL ENGINEERING (BTMEVI)

Term-End Examination

June, 2019

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) Identify the various elements that might be present in a control system involving thermostatically controlled electric heater.

    5

    (b) Explain the function of a Programmable Logic Controller.　　　　5

2. (a) What are the limitations of two steps (on-off) controls and in what situation is such a control system commonly used ?　　　5

(A-11) P. T. O.

(b) What are the various types of CAMs used in mechanism of mechanical system ? Explain any *one* in detail with neat sketches.   5

3. Explain, how the mechanical system is different from hydraulic and pneumatic systems. Discuss the relative advantages and disadvantages of the pneumatic system over hydraulic system. 10

4. (a) A 6-bit D/A converter gives an output voltage of 9.375 volts for an input of 011001. What is the step size, the full range voltage and the percentage resolution ?   5

(b) Determine the binary equivalent of $(231)_8$.   5

5. (a) Explain the principle of operation of an ultrasonic range sensor with the help of a neat diagram.   5

(b) Describe the characteristics of a proportional plus integral plus derivative control.   5

6. What do you understand by the sensors ? How are the sensors classified ? Explain in detail any *two* types of sensors used in an automobile parts manufacturing company.   10

7. (a) What are the major guidelines for the selection of a motor ?   5

(b) A force of 1800 N is required to open a process control valve. What area of diaphragm actuator to open the valve with a control gauge pressure of 180 kPa ?   5

8. Write short notes on any *four* of the following :

$$4 \times 2\tfrac{1}{2} = 10$$

(a) Radiography

(b) Accumulator

(c) Pilot operated valve

(d) Sequential controllers

(e) Pyro-electric sensors

(f) Visual inspection

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