| BIEEE-004 |

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00635   **Term-End Examination**

December, 2014

BIEEE-004 : MECHATRONICS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume missing data if any.*

1. (a) A 6-bit D/A converter gives an output voltage of 8·775 volts for an input of 011011. What is the step size, the full range voltage and the percentage resolution ?   5

    (b) Show the binary addition and subtraction of 195 (decimal) and 235 (decimal).   5

2. (a) What is a temperature transducer ? How are these classified ? Briefly explain all of them.   5

    (b) Describe the methods for range sensing.   5

3. (a) What are the advantages of hydraulic system over mechanical system ?   5

    (b) With the help of a neat sketch describe how the hydraulic system can be used to amplify force.   5

4. (a) What do you mean by Inverse Kinematics ? Briefly explain the importance of path planning. *5*

(b) How can a transistor be used as a switch ? Explain. *5*

5. (a) What are the two types of data transfer techniques used in computer interfacing ? List out the main differences between them. *5*

(b) Describe and compare the characteristics of proportional plus integral plus derivative (PID) control. *5*

6. (a) Explain in brief the hysteresis in a device. *5*

(b) Identify the various elements that might be present in a control system involving a thermostatically controlled electric heater. *5*

7. (a) Describe the functioning of a relay with schematic diagram. *5*

(b) Explain the principle of a stepping motor along with a diagram. *5*

8. (a) Explain the functioning of a servo motor with the help of a diagram. *5*

(b) Describe armature voltage speed control of a DC motor. *5*

9. Describe Programmable Logic Controller with a block diagram. Give examples of popular PLCs in use. *10*

10. Write short notes on any *two* of the following : *2×5=10*

   (a) VCR

   (b) Industrial Robot

   (c) Timers