

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

**Term-End Examination**

00279

**December, 2017**

**BIEEE-004 : MECHATRONICS**

*Time : 3 hours*

*Maximum Marks : 70*

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

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1. “Mechatronics is the synergistic integration of mechanical engineering with electronics and intelligent control algorithms in the design and manufacture of product process.” Justify the statement. 10
  
2. Distinguish between a transducer and a sensor. Also explain the transduction principle for proximity sensors. 10

- 3.** What is meant by the term “signal conditioning” ?  
Also define the following along with plotting the  
frequency versus gain curve : *2+8=10*
- (a) Band-pass filter
  - (b) Band-reject filter
  - (c) Narrow-band filter
  - (d) Notch filter
- 4.** Explain the functioning of a stepper motor and  
its control methodology. What are the  
applications of stepper motors ? *10*
- 5.** Explain the working principle and applications of  
a hydraulic actuator. *10*
- 6.** Draw and explain a schematic block diagram of a  
microcontroller showing peripheral units. *10*
- 7.** What are the commonly used configurations of  
robots in the context of the degrees of freedom ?  
With the help of a block diagram, describe  
different components of a robotic system. *10*
- 8.** Model a rotational mechanical system with  
spring, mass and damper. *10*

9. Write short notes on any *two* of the following :  $2 \times 5 = 10$

- (a) Electromechanical Disc Control
  - (b) Closed-Loop Controllers
  - (c) Data Acquisition
  - (d) Solenoid Operated Solid-State Switches
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