

M.Sc. - II (Electronics) (NEP Pattern) Semester-IV  
**PSCELT401 - Paper-I : Mechatronics**

P. Pages : 2

Time : Three Hours



**GUG/S/25/16339**

Max. Marks : 80

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- Notes :
1. All questions are compulsory and carry equal marks.
  2. Draw a Neat and Labeled diagram and use supporting data wherever necessary.
  3. Avoid vague answers and write specific points/answers related questions.

**Either:**

1. a) Draw block diagram of closed loop Control system and explain the function of each block. **8**
- b) What is mechatronics system? **8**  
Explain the need of control system with Suitable example.

**OR**

- c) Describe the static & dynamic characteristics of transducers. **8**
- d) Explain construction and working of LVDT sensor. **8**

**Either:**

2. a) Explain the rotational system with basic building block. **8**
- b) Discuss the electrical and mechanical analogies. **8**

**OR**

- c) Describe the following dynamic response of system. **8**
  - i) Natural and forced response.
  - ii) Transient and Steady State response.
- d) Explain mathematical model of a resistor and capacitor. **8**

**Either:**

3. a) Describe the transfer function of RC series circuit with suitable example. **8**
- b) Explain the effect of poles on transient response. **8**

**OR**

- c) Explain in detail stability analysis using Bode diagram approach. **8**
- d) Differentiate between a system with negative feedback and positive feedback. **8**

**Either:**

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|-----------|----|---|----------|
| <b>4.</b> | a) | Draw the block diagram of digital Control system. Explain each block. | <b>8</b> |
|           | b) | State and explain various control modes used in controller.           | <b>8</b> |

**OR**

- |           |                        |  |          |
|-----------|------------------------|--|----------|
|           | c)                     | Describe Ziegler and Nichols criterion with suitable example.    | <b>8</b> |
|           | d)                     | Explain the op-amps as signal conditioner with suitable example. | <b>8</b> |
| <b>5.</b> | Attempt the following: |  |          |
|           | a)                     | Discuss the open loop system.                                    | <b>4</b> |
|           | b)                     | Define the following performance parameter of transducer.        | <b>4</b> |
|           |                        | i) Accuracy.   |          |
|           |                        | ii) Sensitivity  |          |
|           | c)                     | Explain the location of poles on s- plane.                       | <b>4</b> |
|           | d)                     | Describe the self-tuning control system.                         | <b>4</b> |

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