

M.Sc. S.Y. (Electronics) (CBCS Pattern) Sem-III  
**PSELT304.2 - Paper-IV : Mechatronics**

P. Pages : 2

Time : Three Hours



**GUG/W/22/11259**

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks.
  2. Draw neat diagrams wherever necessary.
  3. Use of log table/calculator is allowed.

**Either :**

1. a) Explain closed loop control system with suitable example. 8
- b) Explain the following parameter of transducer 8
  - i) Accuracy
  - ii) Sensitivity
  - iii) Repeatability
  - iv) Stability

**OR**

- c) Explain the construction & working of LVDT sensor. 8
- d) Describe the potentiometric sensor. How does it can be used as a displacement transducer. 8

**Either :**

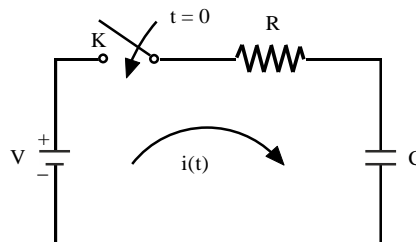
2. a) Describe the basic blocks of mechanical system. 8
- b) Explain the any two elements in electrical system. 8

**OR**

- c) Derive the differential equation for natural response of the system and force function. 8
- d) Describe the dynamic response of first order system with suitable example. 8

**Either :**

3. a) Describe the transfer function of RC series circuit with suitable example. 8
- b) Derive the expression for  $i(t)$  in the series RC circuit with switch K is closed at time  $t = 0$  by Laplace transform. 8



**OR**

- c) Describe the negative feedback system with suitable example. 8
- d) Explain the effect of poles on transient response. 8

**Either :**

- 4. a) Explain the op-amps as signal conditioner with suitable example. 8
- b) Discuss 8
  - i) PD controller
  - ii) PI controller

**OR**

- c) Draw the block diagram of digital control system and explain it. 8
- d) State and explain various control modes used in controller. 8
- 5. a) Explain the working of eddy current proximity sensor. 4
- b) Describe the mathematical model of a system. 4
- c) Explain the location of poles on s-plane. 4
- d) Describe self-tuning control system. 4

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