

2/21

**1504E201**

Candidate's Seat No : \_\_\_\_\_

**B.Sc. Sem.-6 Examination**

**CC-310**

**Electronics**

**April-2025**

**Time : 2-30 Hours]**

**[Max. Marks : 70**

Q.1 (a) Explain Linear Variable Differential Transducer (LVDT) in detail. (7)

(b) What is strain gauge? Derive an expression of gauge factor. (7)

OR

(a) Name different photosensitive devices. Explain photomultiplier in detail. (7)

(b) Explain Thermistor and its characteristics. (7)

Q.2 (a) Explain Even and Odd signals, Causal and Non-causal signals and Energy and Power signals in detail. (7)

(b) Write a detailed note on Singularity functions. (7)

OR

(a) Find the Z – transform for  $x(n) = n^2 u(n)$ . (7)

(b) Write a short note on Deterministic and Non-deterministic signals and Periodic and Aperiodic signals. Give examples of Periodic signals. (7)

Q.3 (a) Obtain Maxwell's equations and discuss the displacement current term. (7)

(b) State and prove the Uniqueness theorem. (7)

OR

(a) Explain Hysteresis with necessary figures. (7)

(b) Explain the theory of polarization of Electromagnetic waves. (7)

Q.4 (a) Obtain the expression of conductivity of semiconductor in terms of charge carrier densities and their mobility. (7)

(b) Explain the Band theory using collective approach. (7)

OR

(a) Discuss in detail about carrier transport under drift. (7)

(b) Obtain Einstein's relation for non-uniformly doped P-type semiconductor. (7)

Q.5 Answer in short (Any Seven) (14)

(i) What kind of electrical displacement transducers are used to measure an angular displacement?

(ii) Why is thermistor called a transducer?

(iii) What is a photovoltaic cell?

(iv) Define Unit-step function.

(v) Give one advantage of digital signal processing.

(vi) Write statement of Initial value theorem.

(vii) Write Poisson's equation.

(viii) Write Laplace's equation in rectangular coordinate system.

(ix) Why are electromagnetic waves called transverse waves?

(x) Draw energy band diagram for conductor and insulator.

(xi) What is N-type semiconductor?

(xii) Define Intrinsic semiconductor.

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