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0604N126

Candidate's Seat No :_____

B.Sc Semester-6 Examination

CC 310

Electronics

April-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions: (1) **All** questions carry equal marks

(2) The symbols have their usual meanings & figures to the right indicate marks.

1 (A) Draw and explain in detail unbounded strain gage with the help of principle of construction and wheatstone bridge circuit. 7

(B) Explain Oscillation transducer, Piezoelectric transducer and Potentiometric transducer with the help of diagram. 7

OR

(A) Explain displacement measurement using two differential transformers in a closed-loop servo system and differential transformers with an E core and pivoted armature in detail with diagram. 7

(B) Explain Interfacing Resistive Transducer to Electronic Circuits with figure in detail. 7

2 (A) Define discrete-time signal. Explain Unit-impulse function, Unit-step function and Unit ramp function in detail. 7

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

OR

(A) Explain Deterministic and Non-deterministic signals. Also explain periodic and aperiodic signals in detail with some examples of periodic signals. 7

(B) Explain shifting, folding and time scaling. Sketch the following signals. (a) $x(t) = \cos(20\pi t - 5\pi)$ and (b) $x(t) = r(-0.5t + 2)$ 7

3 (A) Explain boundary conditions and uniqueness theorem. 7

(B) Explain plane waves in non-conducting media of electromagnetic waves. 7

OR

(A) Explain solution of Laplace's Equation in Rectangular Coordinates 7

(B) Explain the theory of energy flux in a plane wave of electromagnetic waves. 7

4 (A) Explain in detail about classification of solids with energy band diagrams for conductor, semiconductor and insulator. 7

(B) With the help of figure explain diffusion of carriers. Also explain current flow in semiconductors. 7

OR

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

(B) Explain with diagrams diffusion of minority carrier cloud. 7

5 Attempt any **SEVEN** out of twelve. **14**

1 The mechanical elements that are used to convert the applied force into a displacement are called _____ devices.

2 Thermocouples has disadvantage of introducing a _____ dissimilar metal.

3 In a photomultiplier the electronics emitted by the photocathode are electrostatically directed toward a secondary emitting surface, called a _____.

4 The _____ signal is one which has finite energy and zero average power.

5 Folding of a signal is done while _____ the signal with another.

6 If x(n) is causal, then the ROC includes z = _____.

7 In hysteresis, with the iron core unmagnetized at the beginning of the experiment, H may be _____ in increments ΔH.

8 If E and H are perpendicular to the propagation vector k. Such a wave is called _____ wave.

9 The velocity of the electromagnetic wave in free space is given by v_o = _____ ms^{-1}

10 In semiconductors, every electron that jumps to the conduction band leaves behind an empty _____ state in the valance band.

11 In a pure semiconductor the density of electrons in the conduction band and the hole density in the valance band are equal. Such a semiconductor is called _____ semiconductor.

12 A drop of ink in water spreads out is called _____ phenomenon.