3/22

0208M134

Candidate's Seat No :_____

B.Sc. Sem.-6 Examination

CC - 310

Electronics

August 2021

Time : 2-00 Hours] **[Max. Marks : 50**

Instructions: (1) **All** Questions in Section-I carry equal marks.

(2) Attempt any **three** questions in **Section-I**

(3) Question **9** in **Section-II** is compulsory

SECTION –I

Que.1

(a) Name different Photosensitive devices. Explain photomultiplier in detail. [7]

(b) Write displacement transducer. Explain Linear Variable Differential Transformer Transducer (LVDT) with necessary diagrams. Write advantages and disadvantages of LVDT. [7]

Que.2

(a) Explain piezoelectric transducer. Write advantage and disadvantage of piezoelectric transducer [7]

(b) Explain thermistor. Explain its characteristics with necessary diagrams. Write two applications of thermistor. [7]

Que.3

(a) Write the methods to perform the inverse Z transform. Explain one of them. Determine the input sequence $x(n)$ if a system has input response $h(n) = \{1, 2, 3\}$ and output response $y(n) = \{1, 1, 2, -1, 3\}$. [8]

(b) Do as Directed : [6]

(i) Sketch the signal : $x(t) = \pi(2t + 7)$

(ii) Draw the block diagram representation for the response of the system.
$y(n) = x(n) + 3x(n-1) + 2x(n-2)$
If the input sequence is $x(n) = \{0, 1, 1, 2, 0, 0, 0 \ldots\ldots\}$, obtain the response of the system $y(n)$

P.T.O

Que.4

(a) Write the answers of following questions : [6]

(i) If $x_1(n) = \sin 5\pi t$, $x_2(n) = \sin 20\pi t$. Check the periodicity of $x_3(t) = x_1(t) + x_2(t)$.

(ii) Sketch the signal $x(t) = 4\left(t - \frac{1}{4}\right)$

(iii) Sketch the double sided amplitude and phase spectra for

$$x(t) = 12 \sin\left(10\pi - \frac{\pi}{6}\right) \quad -\infty < t < \infty$$

(b) Classify the systems. Explain the Causal and Linear systems. Check the linearity of following system.

$$3\frac{dy(t)}{at} + 5y(t) = 3x(t)$$ [8]

Que.5

(a) Derive Maxwell's equation and explain displacement current term. [7]

(b) Discuss the polarization of electromagnetic waves with necessary equations. [7]

Que.6

(a) Discuss polarization of electromagnetic waves [7]

(b) Derive Maxwell's equation and explain displacement current term. [7]

Que.7

(a) Obtain an equation for conductivity of semiconductor in terms of charge carriers densities and their mobilities. [7]

(b) Explain band theory from collective approach. [7]

Que.8

(a) Explain the motion of holes in n-type semiconductor due to diffusion process with necessary equations. [7]

(b) Discuss the motion of electron in the absence and presence of electric field. [7]

SECTION-II

Que.9 Attempt any Eight [8]

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

2) What is RTD?

3) Write examples of Analog transducer?

4) What is thermocouple?

5) Why thermistor is called transducer?

6) What are self-generating transducer?

7) Define unit step function.

8) Define ROC with reference to Z transform.

9) Write Maxwell equations.

10) What is insulator?

11) Write on advantage of digital signal processing?

12) What is Hysteresis?

13) Draw energy band diagram for conductor and insulator?

14) What is strain gauge?

15) What is P-type semiconductor?

16) Write S.I unit of hole or electron mobility?