1904E108

Candidate's Seat No :_____

B.Sc. Sem-6 Examination
CC 310
Electronics
April 2022

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.
(4) All Symbols carry their usual scientific meanings.

	Section-I	
Q-1		
(a)	What is strain gage? Derive the expression of gage factor.	(7)
(b)	Explain LVDT (linear variable differential transducer) in detail.	(7)
Q-2		
(a)	What is the difference between a photo-emissive, a photoconductive and a photovoltaic cell? Describe one application for each.	(7)
(b)	Explain thermistor and its characteristics.	(7)
Q-3		
(a)	Describe singularity functions with necessary diagrams.	(8)
(b)	Do as directed:- (1) Define Periodic and aperiodic signals. *If* $x_1(t) = sin8\pi t$ *and* $x_2(t) = sin20\pi t$; then check the periodicity of $x(t) = x_1(t) + x_2(t)$ (2) Sketch the signal: $x(t) = \pi(t + 7)$ (3) Sketch the signal : *x(t) = 2 [u(t) - u(t-2)] + [u(t-3) -u(t-5)]*	(6)
Q-4		
(a)	What is Z-transform? Write linearity property of Z-transform and find the Z-transform for $x(n)=sin\omega_0 n$ *for* n>0	(7)
(b)	State the convolution property of Z-transform and find *y(n)* for $x(n)=\{1,2,3,1,-1,1\}$ $h(n)=\{1,1,1\}$	(7)
Q-5		
(a)	Obtain general solution of Laplace equation in rectangular coordinate system.	(7)
(b)	State and prove uniqueness theorem.	(7)
Q-6		
(a)	Obtain Maxwell's equations and discuss displacement current term.	(7)
(b)	Explain the theory of polarization of electromagnetic waves.	(7)
Q-7		
(a)	Discus the drift motion of electron with necessary equations.	(7)
(b)	Explain the diffusion of holes in N-type semiconductor and obtain expression for current density.	(7)
Q-8		
(a)	Obtain Einstein relation for non-uniformly doped P-type semiconductor.	(7)
(b)	Obtain the expression of conductivity of semiconductor in terms of charge carrier densities and their mobility.	(7)

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	Section-II	
Q-9	Write short answers for following questions. (Attempt any 8)	(8)
1	What are self-generating transducers?	
2	Name one mechanical transducer.	
3	What is thermocouple?	
4	Name any two force summing devices.	
5	What is LTI system?	
6	Define energy signal.	
7	Find the Z-transform for $\delta(t+5)$.	
8	Write statement of initial value theorem.	
9	Why electromagnetic waves are called transverse waves?	
10	What is Hysteresis?	
11	Write Poisson equation.	
12	Give the names of the ferromagnetic substance.	
13	Draw the general band diagram for conductor and insulator.	
14	Which type of impurities are added in semiconductor to form n-type semiconductor?	
15	Why effective mass of the electron is considered negative at the top of the valance band?	
16	Define intrinsic semiconductor.	

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