GALGOTIAS UNIVERSITY

ADMISSION NUMBER												

School of Basic Sciences

Bachelor of Science Honours in Physics
Mid Term Examination - May 2024

Duration : 90 Minutes
Max Marks : 50

Sem IV - C1UD404B - Analog Electronics

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

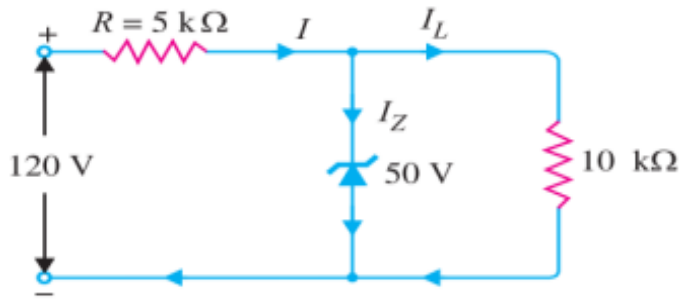
1) A potential barrier of 0.67 exists across a p-n junction , if the width of depletion region is $4.0\ X\ 10^{-5} cm$. Find the intensity of electric field in this region. K2 (2)

2) Find the resistance of an intrinsic Ge rod 3 mm long, 2 mm wide and 1 mm thick at 300 K. the intrinsic carrier density $2.5\ X\ 10^{19} m^{-3}$ is at 300 K and the mobility of electron and hole are 0.39 and $0.19\ m^2 v^{-1} s^{-1}$. K1 (3)

3) Explain about breakdown mechanisms in semiconductor diodes. K2 (4)

4) Explain how the built-in potential difference exists at pn junction without the application of an external voltage across it. K2 (6)

5) For the circuit shown in figure, First check whether Zener diode is ON or OFF and find : K3 (6)
(i) the output voltage (ii) the voltage drop across series resistance
(iii) the current through zener diode



6) Analize the voltage regulation using Zener diode when (a) Input voltage varying but load resistance is fixed, (b) When input voltage is fixed but load resistance is varying. In a circuit, series resistance is 1 K- ohm and load resistance is 2 K-ohm. Check that Zener diode is ON or OFF(if input voltage is 20 V and Zener break down voltage is 10 V) K3 (9)

7)	An a.c. supply of 230V is applied to a half-wave rectifier circuit through transformer of turns ration 5:1. Assume the diode is an ideal one. The load resistance is 300Ω. Find (a) dc output voltage (b) PIV (c) maximum value of load current (d) average value of load current and (e)power delivered to the load	K4	(8)
8)	Analize the barrier potentials in a pn junction diode . Derive an expression for barrier potential in terms of "donor" and "acceptor" concentration	K4	(12)
	OR		
	Draw the circuit diagram of full wave rectifier with inductor filter and explain its operation	K4	(12)