Division & Roll No.:_____ Enrolment No.: _____

Darshan Institute of Engineering & Technology

B.E. Semester – I ● Pre GTU Examination – February 2021

Subject Code : 3110018 **Date :** 17/02/2021

Subject Name : Physics

Time : 11:30 am to 01:30 pm **Total Marks :** 56

Instructions :
1. Attempt any **FOUR** out of **SEVEN** questions.
2. Figure to the right indicate full marks.
3. Don't do any kind of rough work or calculation in Question Paper.

Q. 1	**(A)**	Explain Drude model.	**03**
	(B)	Give the difference between Direct and Indirect band gap.	**04**
	(C)	Discuss Van Der Pauw method.	**07**
Q. 2	**(A)**	What is Drift and Diffusion current?	**03**
	(B)	Explain BCS theory for superconductivity.	**04**
	(C)	What is photovoltaic effect? Explain construction and working of solar cell.	**07**
Q. 3	**(A)**	Give difference between N type and P type semiconductors.	**03**
	(B)	Calculate critical current density for a superconducting wire of lead having diameter of 1.5 mm at 5.3 K. The value of critical temperature of lead is 7.8 K and critical magnetic field at 0 K is 6.5×10^4 A/m.	**04**
	(C)	Explain forward and reverse bias conditions in P-N junction diode.	**07**
Q. 4	**(A)**	Define Intrinsic and extrinsic semiconductor.	**03**
	(B)	Write a short note on Schottky contacts.	**04**
	(C)	Explain the dependence of Fermi level on temperature.	**07**
Q. 5	**(A)**	Define superconductivity and critical temperature.	**03**
	(B)	Calculate the fermi energy and fermi temperature in a metal. The fermi velocity of electrons in the metal is 0.86×10^6 m/sec.	**04**
	(C)	Discuss the technique to obtain band gap by UV-Vis spectroscopy using absorption or transmission.	**07**
Q. 6	**(A)**	What is Cooper pair? Explain.	**03**
	(B)	Discuss fermi golden rule.	**04**
	(C)	Explain Kronig Penney model in detail.	**07**
Q. 7	**(A)**	A superconductor Tin has a critical temperature of 3.7 K in zero magnetic field and a critical field of 0.0306 T at 0 K. Find the critical field at 2 K.	**03**
	(B)	Give the difference between type – 1 and type – 2 superconductor.	**04**
	(C)	Explain the properties of superconductors in detail.	**07**

* * * * * * * * * *