

GYANMANJARI INNOVATIVE UNIVERSITY

GYANMANJARI INSTITUTE OF TECHNOLOGY

B.Tech.-Mid Semester Examination (MSE)- S2026

Enrollment No.: _____

Subject Code: BETXX10205

Subject Name: PHYSICS

Time: 10:30 AM to 12:30 PM

Date: 16-03-2026

Semester: 2

Total Marks: 60

Instructions:

1. Question No. 1 is compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	Marks
Q.1 (a) Give the difference between P-type and N-type semiconductor.	05
(b) Explain Properties of ultrasonic waves.	05
(c) Explain BCS theory with neat sketch	10
Q.2 (a) Calculate the critical current for a wire of lead having a diameter of 2 mm at 4.3 K. Critical temperature for lead is 7.18 K and $H_c(0) = 6.5 \times 10^4$ A/m.	05
(b) Explain Piezoelectric production method of ultrasonic sound waves.	05
OR	
(b) Explain any 2 methods of detecting the presence of ultrasonic waves.	05
(c) Derive an expression for density of holes in valence band of an Intrinsic semiconductor	10
OR	
(c) Derive an expression for density of electrons in conduction band of an Intrinsic semiconductor	10
Q.3 (a) The intrinsic carrier density at room temperature in Germanium is, $2.37 \times 10^{19} /m^3$. If electron and hole mobilities are 0.32 and 0.22 m^2/V sec respectively, find out its resistivity.	05
(b) What is Meissner effect? Show that Superconducting material is diamagnetic in nature and obtain that magnetic susceptibility of superconductors is -1.	05
(c) Explain Application of ultrasonic sound waves.	10
OR	
Q.3 (a) Calculate the frequency to which a Nickle rod of 8.5 cm should be tuned so that it develops ultrasonic waves at fundamental node? Young's Modulus is $2.14 \times 10^{11} N/m^2$ and density of material is $7900 kg/m^3$.	05
(b) Explain the principle, construction and working of Light Emitting diode(LED).	05
(c) Explain properties of superconductor.	10