

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER- I & II EXAMINATION – SUMMER 2026

Subject Code:3110011

Date:10-07-2026

Subject Name:Physics

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What is full form of LASER? Write any four properties of laser light. **03**
- (b) Draw Stress versus Strain diagram with necessary notation and discuss it. **04**
- (c) Write detailed note on He-Ne laser with proper diagram. **07**

- Q.2** (a) Write any three properties of ultrasonic waves. **03**
- (b) Write short note on I-shape girders. **04**
- (c) State principle of Piezoelectric Generator. Describe construction and working of Piezoelectric generator. **07**

OR

- (c) State principle of Magnetostriction Generator. Describe construction and working of Magnetostriction generator. **07**

- Q.3** (a) What is reverberation and reverberation time? Write Sabin's formula for reverberation time and explain each term. **03**
- (b) State any four points of differences between spontaneous emission and stimulated emission. **04**
- (c) Derive the expression for depression of Cantilever loaded at free end. **07**

OR

- Q.3** (a) Write and discuss any three factors affecting acoustic of building and their remedies. **03**
- (b) Write any four points of differences between Destructive test and Non-destructive test. **04**
- (c) Deduce the expression for the moment of couple required to twist the lower end of a solid wire of circular cross section by an angle θ , the upper end being clamped. **07**

- Q.4** (a) Write short note on London Penetration Depth. **03**
- (b) What is superconductivity? Discuss any three properties of superconductor. **04**
- (c) (i) Write a short note on SQUID. **07**
- (ii) Explain in detail BCS theory of superconductivity.

OR

- Q.4** (a) Discuss various applications of Laser in Science and Engineering. **03**

- (b) The volume of a room is 1500 m^3 . The wall area of the room is 240 m^2 , the floor area is 125 m^2 , and the ceiling area is 125 m^2 . The average sound absorption coefficient (i) for wall is 0.025; (ii) for the ceiling is 0.85; and (iii) the floor is 0.09. Calculate the average sound absorption coefficient and reverberation time. **04**
- (c) Write detailed note on Ruby laser with proper diagram. **07**
- Q.5** (a) What is Meissner effect? For superconductor show that $\chi_m = -1$. **03**
- (b) Write any four points of comparison of type-I and type-II superconductor. **04**
- (c) With the help of Einstein's theory of radiation establish the relation between Einstein's coefficients. **07**
- OR**
- Q.5** (a) The critical current passing through a superconducting wire of radius 10 mm is 15 A. Calculate critical magnetic field. **03**
- (b) Calculate the length of iron rod which can be used to produce ultrasonic waves of 20 kHz. Given that the density of iron is 7230 kg/m^3 and its Young's modulus is $11.6 \times 10^9 \text{ N/m}^2$. **04**
- (c) Write short note on **07**
- (i) Amplitude Resonance
- (ii) Velocity Resonance
