Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-I Remedial examination March 2009

Subject code: 110011

Subject Name: Physics

Date: 18 / 03 /2009 **Time: 02:00pm To 4:30pm**

Instructions:

Total Marks: 70

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 Attempt all the questions. **14**

i) Classify the sound waves based on frequency.

ii) Define reverberation time.

Iii) Define Ultrasonic waves.

iv) What is magnetostriction method?

v) What is SONAR?

vi) What are lattice parameters?

vii) What is LASER?

viii) Define fiber optic system?

ix) What are conduction electrons?

x) Classify the solids based on band theory.

xi) What is holography?

xii) Define superconductivity?

xiii) What are Nanomaterials?

xiv) Mention the names of the various NDT methods

Q.2 **(a)**

i) The volume of room is 1500 m^3.The wall area of the room is 260m^2, the floor area is 140m^2 and the ceiling area is 140 m^2 .The average sound absorption coefficient for wall is 0.03, for the ceiling is 0.8 and for the floor is 0.06. Calculate the average absorption coefficient and the reverberation time. **03**

ii) Calculate the capacitance to produce ultrasonic waves of 10^6 Hz with an inductance of 1 henry. **02**

iii) Calculate the drift velocity of the free electrons in copper for an electrical field strength of 0.5 V/m (with a mobility of 3.5×10^{-3} m^2 V^{-1} S^{-1}). **02**

(b)

i) Discuss the various factors affecting the acoustics of buildings and give thei remedies. **04**

ii) Using Sabine's formula explains how the sound absorption coefficient of a material is determined? **03**

OR

(b)

i) Draw the circuit diagram of piezoelectric oscillator and explain the roduction of ultrasonic waves using it. **04**

ii) Explain the applications of ultrasonics. **03**

Q.3

i) Explain the various types of crystal system with example. **04**

ii) What are the difference between crystalline material and Non-crystalline material. **03**

iii) Write short note on Energy bands in solids **04**

	iv)	Explain Photovoltaic Cell and materials used	**03**

OR

Q.3

	i)	Explain with a neat diagram the construction and working of a semiconductor laser.	**04**
	ii)	Discuss the merits and demerits of semiconductor laser.	**03**
	iii)	Discuss in detail the principle of optical finer communication.	**04**
	iv)	What do you mean by acceptance angle and numerical aperture of a fiber?	**03**

Q.4

	i)	Obtain expression for thermal conductivity	**04**
	ii)	State and deduce Wiedemann-Franz law	**03**
	iii)	What are Type I and Type II superconductors?	**04**
	iv)	What is magnetic levitation? Explain with its application.	**03**

OR

Q. 4

	i)	What are the four applications of Nanomaterials?	**04**
	ii)	How will you distinguish metallic glass from ordinary glass?	**03**
	iii)	Compare the different NDT techniques with suitable examples	**07**

Q.5 List out the difference between

	i)	Stimulated emission and Spontaneous emission	**04**
	ii)	Destructive test and Non-destructive test	**03**
	iii)	Single mode fiber and Multimode fiber	**04**
	iv)	a.c.Josephson effect and d.c.Josephson effect	**03**

OR

Q.5 Write short notes on

	i)	Free electron theory of metals.	**04**
	ii)	Application of LASER in different field.	**03**
	iii)	Types of biomaterials and their applications in the medical field.	**04**
	iv)	Properties of Smart Memory Alloys	**03**

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