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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-II Remedial Examination September 2009

Subject code: 110011 **Subject Name: Physics**

Date:09/09/2009 **Time: 03:00pm- 05:30pm**

Total Marks: 70

Instructions:

1. **Write seat no. and enrolment no. at given location on question paper.**
2. **Attempt all questions.**
3. **Make suitable assumptions wherever necessary.**
4. **Figures to the right indicate full marks.**

Q.1	(a)	Define (i) Loudness (ii) Echo (iii) crystalline materials (iv) unit cell (v) Total internal reflection	**05**
	(b)	Explain Magnetostriction and piezoelectric effect.	**05**
	(c)	Briefly explain spontaneous and stimulated emission.	**04**
Q.2	(a) i	The reverberation time is found to be 1.5 sec for an empty hall and it is found to be 1.0 sec when a curtain cloth of 20 m^2 is suspended at the centre of the hall. If the dimension of the hall are $10\times8\times6$ m^3, calculate the coefficient of absorption of curtain cloth.	**04**
	ii	The Bragg angle corresponding g to the first order reflection from plane (111) in a crystal is 30^o when x-rays of wavelength 1.75 Å are used. Calculate the interatomic spacing.	**03**
	(b)	Explain the terms (i) reflection (ii) reverberation (iii) absorption of sound energy and then show graphically only the nature of growth and decay of sound energy in a hall due to reverberation.	**07**
		OR	
	(b)	What is laser? How does it differ from an ordinary source of light? Describe the construction and working of CO_2 laser with diagrams.	**07**
Q.3			
	(a)	What is an acoustic grating? Describe an experimental method of determining the velocity of ultrasonic waves in liquids.	**05**
	(b)	Deduce a relation between an interlinear distance'd' and the Miller indices of the planes for cubic crystals.	**05**
	(c)	An ultrasonic source of 0.09 MHz sends down a pulse towards the seabed which returns after 0.55 sec.The velocity of sound in water is 1800 m/s. Calculate the depth of the sea and wavelength of pulse.	**04**
		OR	
Q.3	(a)	What do you mean by acceptance angle and numerical apertaure of a fiber? Derive expression for them.	**07**
	(b)	Derive the equation for Ohm's law explaining the free electron theory of metals.	**07**
Q.4	(a)	What are Type-I and Type-II superconductors?	**05**
	(b)	Explain Josephson effect and its application.	**05**
	(c)	Give few important applications of superconductors.	**04**
		OR	
Q. 4	(a)	What are metallic glasses? Explain the melt spinning technique to	**07**

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prepare metallic glasses.

(b) What is Shape Memory Alloys (SMA)? Explain the temperature induced and stress induced transformations in detail. **07**

Q.5 (a) Describe the ultrasonic testing method of flaw detection. List the limitations of the method. **07**

(b) Describe briefly the radio-graphical methods for non-destructive examination of engineering components. How will you decide the exact location of the flow. **07**

OR

Q.5 (a) What is Hall effect? Derive an expression for Hall coefficient. Describe an experimental set up for the measurement of the Hall coefficient. **07**

(b) Explain the different types of fibers based on (i) material (ii) mode and (iii) index profile. **07**

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