Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER 1st / 2nd EXAMINATION (OLD SYLLABUS) – SUMMER - 2017

Subject Code: 110011 **Date:30/05/2017**

Subject Name: Physics

Time: 2:30 PM to 05:00 PM **Total Marks: 70**

Instructions:

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

Q.1 **(a)** Answer the following questions. [One mark each] **07**

1. Classify the sound waves based on frequency.
2. Name the characteristics of musical sound.
3. Expand the term: 'SONAR'.
4. What is NDT ?
5. Give one example of gaseous state laser.
6. Define: Metastable State.
7. _____ is three dimensional photography.

(b) Answer the following questions. [One mark each] **07**

1. Give two conditions for Total Internal Reflection.
2. State the main components of optical fiber communication system.
3. What is transition temperature for Mercury ?
4. What is a 'SQUID' ?
5. What is metallic glass ?
6. Give any two applications of Biomaterials.
7. What are Nanomaterials ?

Q.2 **(a)** What is Meissner effect ? Show that Superconducting material is diamagnetic in nature and obtain $\chi_m = -1$ for superconductors. **07**

(b) 1. Write applications of ultrasonic waves. **04**

2. Calculate the NA and acceptance angle of the fiber having $n_1 = 1.52$ and $n_2 = 1.45$. **03**

Q.3 **(a)** Describe the construction and working of Nd-YAG laser with a suitable energy level diagram. **07**

(b) 1. List the differences between step index and graded index optical fiber. **04**

2. Calculate the critical current through a long thin superconducting wire of radius 0.5 mm. The critical magnetic field is 7.2 kA / m. **03**

Q.4 **(a)** Define : Intensity (I) and Intensity level (I_L) for sound wave. Show that a change in intensity level of 1 dB alters the intensity by 26%. **07**

(b) 1. Write a short note on Biomaterials. **04**

2. The amplitude of a sound wave is doubled. By how many decibel the intensity level will increase ? **03**

Q.5 **(a)** Define and discuss the factors : reverberation , loudness , echelon effect and noise that affect the acoustics in a hall and the remedies for them. **07**

(b) 1. Write the applications of LASER in engineering. **04**

2. 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 sea water is 1800 m/s. Calculate the depth of the sea and wavelength of the pulse. **03**

Q.6	**(a)**	What do you mean by acceptance angle and numerical aperture of a fiber ? Derive expressions for them (with diagram).	**07**
	(b)	1. What are shape memory alloys ? Describe temperature induced shape memory alloy in detail (with diagram).	**04**
		2. Explain the Sol gel technique to prepare Nanomaterials. What are the advantages of this method ?	**03**
Q.7	**(a)**	Describe the principle and the method of producing ultrasonic waves by magnetostriction method (with diagrams).	**07**
	(b)	1. Properly explain the advantages of optical fiber communication system.	**04**
		2. Distinguish between the loudness and intensity of sound.	**03**

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