

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 ? **07**
Derive expressions for them (with diagram).
- (b)** 1. What are shape memory alloys ? Describe temperature induced shape memory alloy in detail (with diagram). **04**
03
2. Explain the Sol gel technique to prepare Nanomaterials. What are the advantages of this method ?
- 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**
