

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-1st / 2nd (NEW) EXAMINATION – WINTER 2015

Subject Code: 2110011

Date: 22/12/2015

Subject Name: Engineering Physics

Time: 10:30am to 01:00pm

Total Marks: 70

Instructions:

1. Question No. 1 is compulsory. Attempt any four out of remaining Six questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Objective Question (MCQ)

**Total
MARKS**

(a)

07

1. The value of standard intensity is
(a) 0 Wm^{-2} (b) 10^{-12} Wm^{-2} (c) 10^{-2} Wm^{-2} (d) 10^{12} Wm^{-2}
2. The frequency of Infrasonic wave is
(a) $F > 20 \text{ Hz}$ (b) $f > 20 \text{ KHz}$ (c) $f < 20 \text{ KHz}$ (d) $f < 20 \text{ Hz}$
3. The SONAR is used
(a) to remove the tumors from the body (b) to measure the depth of sea
(c) to produce the ultrasonic frequency (d) none of these
4. The LASER can be produced by
(a) spontaneous emission (b) Induced absorption
(c) stimulated emission (d) Instantaneous emission
5. The conditions to be satisfied for Total Internal Reflection is
(a) $n_1 > n_2, \phi > \phi_c$ (b) $n_1 < n_2, \phi > \phi_c$ (c) $n_1 > n_2, \phi < \phi_c$ (d) $n_1 < n_2, \phi < \phi_c$
6. Which one is not correct for LASER?
(a) Highly monochromatic light (b) highly polychromatic light
(c) highly polarized light (d) highly directional light
7. Which one is not correct for Ultrasonic waves?
(a) Type of sound wave (b) longitudinal wave
(c) transverse wave (d) mechanical wave

(b)

07

1. Fuel cell is a device that converts
(a) Chemical energy into electricity (b) solar energy into electricity
(c) sound energy into electricity (d) mechanical energy into electricity
2. Solar cells operate on the principle of
(a) Electrostriction effect (b) Magnetostriction effect
(c) Photovoltaic effect (d) Josephson effect
3. SQUID is an application of
(a) Semiconducting materials (b) Nano materials
(c) Superconducting materials (d) Bio materials
4. Superconducting materials are the type of

- (a) Diamagnetic materials (b) Dielectric materials
(c) Ferromagnetic materials (d) Paramagnetic materials
5. Which one is not having permanent dipoles in absence of magnetic field?
(a) Paramagnetic material (b) Ferromagnetic material
(c) Ferrimagnetic material (d) diamagnetic material
6. Dielectric materials are also termed as
(a) Conductors (b) semiconductors (c) Insulators (d) superconductors
7. The S.I. Unit of Loudness is
(a) dB (b) Bel (c) phon (d) OWU
- Q.2** (a) The volume of a room is 1500 m^3 . The wall area of the room is 260 m^2 , the floor area is 140 m^2 and the ceiling area is 140 m^2 . The average sound absorption coefficient for the wall is 0.03, for the ceiling 0.8 and for the floor 0.06. Calculate the average absorption coefficient and the reverberation time. **03**
- (b) Give the differences between Step Index Fiber and Graded Index Fiber. **04**
- (c) What are the characteristics of LASER? Describe the principle, construction and working of Nd-YAG Laser with suitable diagrams. **07**
- Q.3** (a) Compare Type-I and Type-II Superconductors. **03**
- (b) Define and derive necessary expressions for acceptance angle and numerical aperture of a fiber. **04**
- (c) Give the properties of Ultrasonic waves. Describe basic principle, construction and working of Piezoelectric method to produce the ultrasonic waves. **07**
- Q.4** (a) Derive the necessary expression for Clausius-Mossotti equation. **03**
- (b) Discuss the properties of Superconducting materials. **04**
- (c) Explain types of Dielectric materials in detail. Mention its specific applications. **07**
- Q.5** (a) For mercury of mass number 202, the α value is 0.50 and T_c is 4.2 K. Find the critical temperature for the isotope of mercury of mass number 200. **03**
- (b) Explain the factors affecting acoustics of buildings and their remedies. **04**
- (c) List the important properties and applications of CNTs and explain the Chemical Vapour Deposition method to synthesis the CNT. **07**
- Q.6** (a) Write a note on: Quantum Confinement in nanoparticles. **03**
- (b) Discuss the characteristics of Musical sound. **04**
- (c) Describe the general properties of Diamagnetic, Paramagnetic and Ferromagnetic materials. **07**
- Q.7** (a) Define terms: (1) Dielectric constant (2) Polarization Vector P (3) Electric Flux ϕ **03**
- (b) Discuss Ball Milling mechanical method to synthesis nanoparticles. **04**
- (c) What are the types of Metallic Glasses? Describe the preparation method to produce the metallic glasses with its applications. **07**
