

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE- SEMESTER-I & II (NEW) EXAMINATION – WINTER 2020

Subject Code: 2110011

Date: 17/03/2021

Subject Name: ENGINEERING PHYSICS

Time: 10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

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

Q.1	Objective Question (MCQ)	Mark 07
	<ol style="list-style-type: none">1. _____ reaction is used to generate electricity in fuel cell. (a) Electrochemical (b) Synthesis (c) Decomposition (d) None of these2. Photovoltaic cell converts energy from (a) Mechanical into Electrical (b) Light into Electrical (c) Hydro into Mechanical (d) None of these3. In optical communications, _____ is used as light source. (a) Photodiode (b) Solar cell (c) Light emitting diode (d) None of these4. The population inversion takes place at _____ medium. (a) active (b) steady (c) unsteady (d) None of these5. Material used for the production of ultrasonic waves in magnetostriction effect is (a) Paramagnetic (b) Ferromagnetic (c) Diamagnetic (d) Can't say6. The unit of polarization is _____ (a) m^2/C (b) m/C (c) C/m^2 (d) Can't say7. _____ is the major requirement of metallic glass formation. (a) Rapid cooling (b) Rapid heating (c) Slow heating (d) Can't say	
Q.2	Objective Question (MCQ)	07
	<ol style="list-style-type: none">1. The magnetic permeability (μ) is equal to (a) B/H (b) BH (c) B (d) None of these2. The value of 1 bel is equal to _____ dB. (a) 20 (b) 10 (c) 30 (d) can't say3. If loudness exceeds _____ dB, it produces a pain in the ear. (a) 70 (b) 50 (c) 120 (d) Ultrasonic wave4. Type I superconductors do not obey the Meissner effect. (a) False (b) True (c) both a & b (d) Can't say5. Laser beam is highly coherent (a) False (b) True (c) both a & b (d) Can't say6. The energy of photon is equal to (a) h [Planck's constant] (b) f [frequency] (c) hf (d) Can't say7. _____ is used in aircraft to reduce the engine noise. (a) SMA (b) Metallic glasses (c) Bio materials (d) Can't say	
Q.3	(a) Magnetic field intensity (H) of a paramagnetic material is 10^4 A/m. At room temperature its magnetic susceptibility (χ_m) is 3.7×10^{-3} . Calculate the magnetization (M) in the material. (b) Write the statement of Weber-Fechner law. Explain the intensity level (I_L) of a sound.	03 04
Q.4	What are type I and II superconductors.	07

Q.5	(a) The intensity of sound in a street during heavy traffic is 10^{-6} W/m^2 . Calculate the intensity level in dB.	03
	(b) Gives the principle of Magnetostriction and Piezoelectric effects.	04
Q.6	Expand: LASER. State the characteristics of LASER.	07
Q.7	(a) What is NDT. Discuss the general objectives of NDT.	03
	(b) Give the differences between stimulated and spontaneous emission of radiation.	04
Q.8	What is Numerical aperture (NA). Derive its relation with relative refractive index (Δ).	07
Q.9	(a) An optical fiber core and cladding have refractive index of 1.55 and 1.47 respectively. Calculate critical angle, numerical aperture and acceptance angle.	03
	(b) What are dielectrics. Give their classification based on polarization.	04
Q.10	List out the techniques used in synthesis of Nanomaterial's. Discuss any two of them in detail.	07
Q.11	(a) Calculate the refractive indices of the core and cladding material of a fibre. [Given, $NA=0.22$, $\Delta = 0.012$]	03
	(b) Explain the physical significance of 1dB.	04
Q.12	What are Shape Memory Alloys? Explain temperature-induced and stress-induced transformations in detail.	07
Q.13	(a) Define: Population inversion, Lasing, Life time	03
	(b) Explain: Meissner effect. Prove that a superconductor exhibits perfect diamagnetism.	04
Q.14	Define fibre optic system. Discuss in detail the advantages of fibre optic cable over metallic cable.	07
