Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–I &II (NEW) EXAMINATION – SUMMER-2019

Subject Code: 2110011 Date: 03/06/2019

Subject Name: Physics

Time: 10:30 AM TO 01:00 PM Total Marks: 70

Instructions:

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

Q.1 (a) Objective Question (MCQ) **Mark**

1. Unit of Electric Flux Density =_____ **07**

(a) C/meter^2 (b) C/meter (c) meter/Coulomb (d) C^2/ meter

2. Curie's Law is_____

(a) M=T/C (b) T=M/C (c) M=C/T (d) C=T/θ

3. The Dimensional Formula of Surface Tension is

(a) MLT^{-1} (b) MLT^{-2} (c) ML^1T^{-2} (d) $ML^{-1}T^{-1}$

4. Power is measured in

(a) Volts (b) Amperes (c) Joules (d) Watts

5. Kirchhoff's law is applicable to

(a) AC circuits only (b) DC circuits only
(c) AC & DC circuits (d) Passive Networks only

6. Inertia is_____

(a) Property of matter (b) type of force
(c) Speed of an object (d) None of these

7. Temporary magnets are used in_____

(a) Motors (b) Generators (c) Loud Speaker (d) All of above

(b) Objective Question (MCQ) **07**

1. Which physical parameter is measured by voltmeter?

(a) Current (b) Voltage (c) Resistance (d) Potential Difference

2. The rate of change of momentum is _____

(a) Acceleration (b) Momentum (c) Force (d) Velocity

3. Interactive force between two charges is given by _____Law.

(a) Newton's (b) Coulomb's (c) Biot-savart (d) Faraday's

4. Which of this quantity is unit less?

(a) Sound absorption (b) Reverberation time
(c) Absorption coefficient (d) Loudness

5. What is full form of SONAR?

(a) Sound Navigation & Routine (b) Sound Navigation & Ranging
(c) Submarine Navigation & Range (d) Submarine Navigation & Ranging

6. The Ratio of Einstein's coefficients A_{21}/B_{12} is

(a) $8\pi h\nu^3/c^2$ (b) $6\pi h\nu^3/c^3$ (c) $6\pi h\nu^3/c^3$ (d) $8\pi h\nu^3/c^3$

7. Persistence current is given by

(a) $I_c=4\pi RH_c$ (b) $I_c=2\pi RH_c$ (c) $I_c=2\pi^2RH_c$ (d) $I_c=6\pi RH_c$

Q.2	**(a)**	A Josephson junction has a voltage of 9 μV across its terminals. Calculate the frequency of radiation generated by it. Given h = 6.626×10^{-34}J	**03**
	(b)	Distinguish between type-I & type-II superconductors.	**04**
	(c)	Explain Meissner Effect.	**03**
	(d)	Write a short note on SQUID.	**04**
Q.3	**(a)**	A laser beam has a power of 50mW. It has an aperture of 5×10^{-3}m and wavelength 7000 Å. The beam is focused with a lens of focal length of 0.2m. Calculate the areal spread and intensity of the image.	**04**
	(b)	Explain Laser production from Nd:YAG.	**07**
	(c)	Write Properties of LASER.	**03**
Q.4	**(a)**	Write short note on Acoustic Grating method.	**04**
	(b)	Calculate thickness of quartz plate designed to produce ultrasonic waves at 1^{st} mode of vibration with the frequency of 3MHz. Young's modulus of quartz crystal is 85 GPa and density of material is 2650kg/m^3.	**03**
	(c)	Explain Magnetostriction method for ultrasonic sound generation.	**07**
Q.5	**(a)**	The dielectric constant of diamond is 1.43. Calculate permittivity and electric susceptibility of diamond.	**03**
	(b)	What is Local Field? Derive expression for Claussius-Mosotti equation.	**04**
	(c)	What is dielectric material? Distinguish between a dielectric material and insulator. Explain different types of dielectric polarization?	**07**
Q.6	**(a)**	A paramagnetic material has magnetic field intensity of 950 A/m. if the susceptibility of material at room temperature is 2.65×10^{-3}. Evaluate the magnetization and flux density of material.	**04**
	(b)	What are metallic glasses? Write its applications.	**03**
	(c)	What are Hard & Soft magnets? Classify Paramagnetic, Ferro-magnetic & Dia magnetic materials in detail.	**07**
Q.7	**(a)**	Write short note on Quantum Confinement.	**04**
	(b)	What are Shape Memory Alloys? Write its applications	**04**
	(c)	List the factors affecting acoustics of building.	**02**
	(d)	Write disadvantages of Nano materials.	**04**

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