Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code: 110011 Date: 03/06/2019

Subject Name: Physics

Time: 10:30 AM TO 01:00 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)**	Describe the principle and the method of producing of ultrasonic waves by magnetostriction method.	**07**
	(b)	State any five factors affecting the acoustics of the building and give at least two remedies for each.	**07**
Q.2	**(a)**	(i)What is Zener diode? Explain with circuit diagram how a Zener diode operates in reverse bias condition.	**04**
		(ii) Classify solid on the basis of energy band diagram.	**03**
	(b)	Define Miller indices. Obtain an expression for interplanar distance between two adjacent planes of Miller indices (h k l) in a cubic crystal system.	**07**
Q.3	**(a)**	Describe the construction of fiber optic cable and compare the advantage of fiber optic cable over metallic cable.	**07**
	(b)	(i) Give few important applications of superconductors.	**04**
		(ii)A hall has a volume of 1,20,000 m^3. It has a reverberation time of 1.5 seconds. What is the average absorbing power of the surface if the total absorbing surface area is 25,000 m^2?	**03**
Q.4	**(a)**	Deduce expression for electrical conductivity of conducting material and hence obtain Wiedemann-Franz law.	**07**
	(b)	Define superconducting material? List the properties of superconducting materials and explain in detail.	**07**
Q.5	**(a)**	What is Shape Memory Alloys (SMA)? Explain the temperature induced and stress induced transformations in detail.	**07**
	(b)	(i) List out the difference between step and graded index fibre.	**04**
		(ii) Draw the planes (100), (111) (011).	**03**
Q.6	**(a)**	List the various methods of Non Destructive testing and explain any one of them in details.	**07**
	(b)	(i) Explain the Hall effect.	**04**
		(ii)Refractive index of core and cladding material are 1.623 and 1.599 respectively. Find out critical angle of a fiber.	**03**
Q.7	**(a)**	Describe the construction and working of Nd-YAG laser with a suitable energy level diagram.	**07**
	(b)	(i) Describe any four applications of Laser.	**04**
		(ii) Find the relaxation time of conduction electrons in a metal having resistivity 1.54 x 10^{-8} Ω.m and electron density 6.8x 1028 per m^3.	**03**

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