# **GUJARAT TECHNOLOGICAL UNIVERSITY**

B.E. Sem- 1<sup>st</sup> Regular Examination January 2011

#### Subject code:110011 Subject Name: PHYSICS

#### Date: 03/ 01/2011

Time: 10.30 am - 01.00 pm Total Marks: 70

#### Instructions:

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

#### Q.1 Answer the following in short

- (a) State the characteristics of Laser.
- (b) Define reverberation time
- (c) Define piezoelectric effect
- (d) What do you mean by primitive cell
- (e) Give the full form of NDT
- (f) Give two examples of tri-valent impurities for semiconductors
- (g) Explain the term lattice and basis
- (h) State the types of the optical fibers.
- What is the transition temperature for mercury.
- (j) Define superconductivity.
- (k) Define shape memory effect
- (1) Give two examples solid lasers
- (m) State the main components of the optical fiber
- (n) Define sound intensity.

#### Q.2 (a) Answer the following in detail

- 1 Explain the construction and working of Nd: YAG laser
  2 Compare type-I and type-II superconductors.
  92
- (b) Answer the following in detail
  - Discuss the advantages of optical fiber communication system over the conventional system.
- 2 Calculate the NA, the acceptance angle of the fiber having n<sub>1</sub> = 1.52 and n<sub>2</sub> = 02 1.45.

#### OR

#### (b) Answer the following in detail

- 1 Discuss the properties, types and applications of metallic glasses 05
- 2 A hall has volume of 7500 m<sup>3</sup>. What should be the total absorption in the hall if the reverberation time of 1.5 sec is to be maintained?

#### Q.3 Answer the following in detail

- (a) Derive the relation between Einstein's coefficients A and B. 05
- (b) State the characteristics of laser light .Explain the terms stimulated emission, 65 spontaneous emission, population inversion, optical resonators and active medium
- (c) 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 water is 1800 m/s .Calculate the depth of the sea and wavelength of the pulse.

1.4

0.5

0.4

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**AN Whitehead** 

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#### **Table of Contents 110011 Physics Gtu Paper**

- 1. Understanding the eBook 110011 Physics Gtu Paper
  - The Rise of Digital Reading 110011 Physics Gtu Paper
  - Advantages of eBooks Over Traditional Books
- 2. Identifying 110011 Physics Gtu Paper
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
- 3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an 110011 Physics Gtu Paper
  - User-Friendly Interface
- 4. Exploring eBook Recommendations from 110011 Physics Gtu Paper
  - Personalized Recommendations
  - 110011 Physics Gtu Paper User Reviews and Ratings
  - 110011 Physics Gtu Paper and Bestseller Lists
- 5. Accessing 110011 Physics Gtu Paper Free and Paid eBooks
  - 110011 Physics Gtu Paper Public Domain eBooks
  - 110011 Physics Gtu Paper eBook Subscription Services
  - 110011 Physics Gtu Paper Budget-Friendly Options

- 6. Navigating 110011 Physics Gtu Paper eBook Formats
  - o ePub, PDF, MOBI, and More
  - 110011 Physics Gtu Paper Compatibility with Devices
  - 110011 Physics Gtu Paper Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of 110011 Physics Gtu Paper
  - Highlighting and Note-Taking 110011 Physics Gtu Paper
  - o Interactive Elements 110011 Physics Gtu Paper
- 8. Staying Engaged with 110011 Physics Gtu Paper
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers 110011 Physics Gtu Paper
- 9. Balancing eBooks and Physical Books 110011 Physics Gtu Paper
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection 110011 Physics Gtu Paper
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine 110011 Physics Gtu Paper
  - Setting Reading Goals 110011 Physics Gtu Paper
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of 110011 Physics Gtu Paper
  - Fact-Checking eBook Content of 110011 Physics Gtu Paper
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends
  - Integration of Multimedia Elements

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