



ROLL NO.	
ID NO.	

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 40

Max Time: 120 Mins

Weightage: 40 %

ENDTERM FINAL EXAMINATION

I Semester AY 2017-18

Course: **PHY 101 ENGINEERING PHYSICS**

28 DEC 2017

Instructions:

- i. Write legibly
 - ii. Scientific and non-programmable calculators are permitted
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Part A

[5 Q x 3 M= 15 Marks]

1. Differentiate soft and hard magnetic materials (Any three points).
2. Calculate the energy band gap of GaAsP semiconductor whose output wavelength is 6715\AA .
3. What are the similarities between Classical free electron theory and Quantum free electron theory.
4. State Heisenberg's uncertainty principle. Write its mathematical form for the following pairs of variables.
 - a) Position and momentum
 - b) Energy and time.
5. Define the efficiency and fill factor of a solar cell.

Part B

[2 Q x 5 M= 10 Marks]

6. Derive Claussius-Mossotti equation.
7. Derive the expression for de-Broglie wavelength in terms of group velocity.

Part C

[1 Q x 15 M= 15 Marks]

8. a) A magnetic material has a magnetization of 2500 Am^{-1} and produces a flux density of 0.00414 Wb/m^2 . Calculate the magnetizing force of the material. [05M]
- b) Derive the time independent Schrodinger wave equation in one dimension. [10M]

OR

9. a) Define Polarization. Explain types of polarization in a dielectric material. [10M]
- b) A metallic wire has a resistivity of $1.52 \times 10^{-8} \Omega \text{ m}$ for an electric field of 0.18 V/m . Find the mean collision time. Given electron density in the metal is $6 \times 10^{28} \text{ electrons / m}^3$. [05M]



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Max Marks: 20

Max Time: 60 Mins

Weightage: 20 %

TEST 2

I Semester 2017-2018

Course: **PHY 101 Engineering Physics**

27 OCT 2017

Instructions:

- i. Write legibly
 - ii. Scientific and non-programmable calculators are permitted
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Part A

(3 Q x 2 M= 06 Marks)

1. Name the different types of optical fibers based on refractive index profile?
2. Define relative refractive index.
3. Define phenomena of superconductivity.

Part B

(1 Q x 4 M= 04 Marks)

4. Estimate NA when the core refractive index is 1.48, relative refractive index is 2%. Also calculate the critical angle.

Part C

(1 Q x 10 M= 10 Marks)

5. What do you mean by Numerical Aperture and acceptance angle of a fiber? Derive expression for them with neat diagram. (2+8)

(OR)

Explain BCS theory of superconductivity. Differentiate Type I and Type II superconductors.

(6+4)



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TEST 1

I Semester 2017-2018

Course: **PHY 101 Engineering Physics**

16 SEPT 2017

Instructions:

- i. Write legibly
- ii. Scientific and non programmable calculators are permitted
- iii. Given Planck's constant $h = 6.63 \times 10^{-34}$ Js; Boltzmann's constant $k_B = 1.38 \times 10^{-23}$ J/K and Velocity of light $c = 3 \times 10^8$ m/s

Part A

(3 Q x 2 M= 06 Marks)

1. Define population inversion
2. What is the principle of light used in Holography
3. Name any two applications of Laser

Part B

(1 Q x 4 M= 04 Marks)

4. Find the ratio of population of two states in a diode laser that produces a light of wavelength of 7500 \AA at 30°C

Part C

(1 Q x 10 M= 10 Marks)

5. For atomic transitions, derive Einstein's relations and hence deduce the expression for the ratio of stimulated emission rate to spontaneous emission rate.

(OR)

Explain the mode of vibration, construction and working of CO_2 laser with energy level diagram.