ROLL NO:	

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 % Max Marks: 40 Max Time: 1 hr. Tuesday, 25th September, 2018

TEST – 1

Odd Semester 2018-19 Course: **PHY 101 Engineering Physics** I Sem Physics cycle

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Instruction:

(i) *Read the question properly and answer accordingly.*
(ii) *Question paper consists of 3 parts.*
(iii) Scientific and Non-programmable calculators are permitted.
(iv) *Given : Planck's constant $h = 6.63\times10^{-34}$ Js; Boltzmann's constant $k_B = 1.38\times10^{-23}$ J/K and Speed of light $c = 3\times10^{8}$ m/s*

Part A

(3 Q x 4 M = 12 Marks)

1. Explain the necessary conditions for laser

2. Differentiate between stimulated and spontaneous emission

3. Write the fundamental modes of vibration in CO_2 molecule

Part B

(2 Q x 8 M = 16 Marks)

4. (i) For a frequency $\upsilon = 8 \times 10^{14}$, the ratio of population of two energy levels is 1.059×10^{-30}. Calculate the temperature of the system.

(ii) Give any three applications of holography.

5. Explain the principle, working of a semi-conductor diode laser with necessary diagram.

Part C

(1Q x 12 M = 12 Marks)

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

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TEST 2

Odd Semester: 2018-19
Course Code: PHY 101
Course Name: Engineering Physics
Branch & Sem: Physics Cycle & I Sem

Date: 28 November 2018
Time: 1 Hour
Max Marks: 40
Weightage: 20%

Instructions:

(i) *Read the question properly and answer accordingly.*
(ii) *Question paper consists of 3 parts.*
(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **four** marks. (3x4=12)

1. Mention any four advantages of optical fiber communication system ?
2. Define Critical Temperature, Critical Magnetic field.
3. In a magnetic field, the field strength is found to be 10^6 Am-1. If the magnetic susceptibility of the material is 0.5×10^{-5}, calculate the intensity of magnetization and flux density in the material.

Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (2x8=16)

4. Define Meissner effect. Show that all superconductors are perfect diamagnetic materials in nature.
5. Define magnetic susceptibility. Distinguish between hard and soft magnetic materials.

Part C

Answer the Question. Question carries **twelve** marks. (1x12=12)

6. Define the Numerical aperture and acceptance angle. Derive an expression for it.

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GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

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SCHOOL OF ENGINEERING — SET A

END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 11 January 2019

Course Code: PHY 101 | **Time**: 2 Hours

Course Name: Engineering Physics | **Max Marks**: 80

Programme & Sem: B.Tech (Physics Cycle) & I Sem | **Weightage**: 40%

Instructions:

(i) Read the question properly and answer accordingly.

(ii) Scientific and Non-programmable calculators are permitted

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Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Relate the effect of temperature on polarization
2. Correct and re-write the following statements:
   a) According to Drude model the gas of free electrons is responsible for conduction in metals and it obeys quantum mechanics
   b) The quantum free electron theory is a microscopic theory and it obeys classical laws
3. Calculate the polarization produced in a dielectric medium of dielectric constant 5 when it is subjected to an electric field of 50 V/m. ($\varepsilon_0 = 8.85X\ 10^{-12}$ F/m)
4. Define mobility of free electrons, mean free path and give its formula

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (3Qx10M=30)

5. Explain the different types of polarization processes in dielectrics
6. An electron and a baseball are travelling at 200 m/s measured to an accuracy of 0.0025%. Calculate and compare the uncertainty in position of each of the bodies. (Mass of the baseball 100 g).
7. Briefly write the postulates of classical free electron theory. Obtain the expression for electrical conductivity in terms of microscopic quantities.

Part C

Answer **both** the Questions. **Each** question carries **fifteen** marks. (2Qx15M=30)

8. Develop the time-independent Schrodinger wave equation:-
9. a) Explain with a neat sketch the working of solar cell (7M)
   b) An electron is trapped in a one-dimensional box of length 0.5 nm. Calculate the energy required to excite the electron from its ground state to the fourth excited state (8M)

Roll No												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING — SET B

END TERM FINAL EXAMINATION

Odd Semester: 2018-19 — **Date**: 11 January 2019

Course Code: PHY101 — **Time**: 2 Hours

Course Name: Engineering Physics — **Max Marks**: 80

Programme & Sem: B.Tech (Physics Cycle) & I Sem — **Weightage**: 40%

Instructions:

(i) Physical Constant: $h = 6.625 \times 10^{-34}$ J-s, $m_e = 9.109 \times 10^{-31}$ kg, $e = 1.602 \times 10^{-19}$ C

(ii) Use of Scientific and non-programmable calculator is allowed.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. What are dielectric materials? Mention types of polarization mechanisms in dielectrics.
2. Define the term a) mean free path, b) drift velocity and c) Fermi Energy.
3. What are de Broglie waves? Mention the properties of matter waves.
4. Obtain the first two state energy of an electron in an infinite potential well of width 4nm.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (4Qx10M=40)

5. What are ferroelectrics? Explain the variation of polarization mechanisms in ferroelectric materials with frequency.
6. What is Fermi distribution function? Mention the postulates of quantum free electron model.
7. Setup one dimensional time independent Schrodinger wave equation.
8. State Heisenberg's uncertainty principle. Estimate and compare the uncertainty in position of an electron and a tennis ball when both are moving with a speed of 200 m/s measured with an accuracy of 0.1% (mass of tennis ball is 100 g).

Part C

Answer **both** the Questions. **Each** question carries **ten** marks. (2Qx10M=20)

9. Define phase velocity and group velocity. Establish relation between them.
10. Using Schrodinger wave equation, obtain normalized wave function for a particle in a potential well of width "a" and infinite height.