Dr. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE- RAIGAD
End Semester Examination Dec 2018 (Supplementary)

Course: B. Tech (All Branches)   **Semester:** I/II
Subject Name with Subject Code: Engineering Physics (PHY103/ PHY203)
Date: 04/12/2018   **Marks:** 60   **Time:** 3 Hrs

Instructions to the Student:
   1. Each question carries 12 marks.
   2. Attempt any five questions of the following.
   3. Illustrate your answer with neat sketches, diagrams, etc. Wherever necessary.
   4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q. 1   Attempt the following

  A   What is free vibration? Derive an expression for differential equation of free vibration.   (6)

  B   What is Piezoelectric effect? Explain production of ultrasonic waves using piezoelectric oscillator.   (6)

Q. 2   Attempt any two of the following.

  A.   In case of Newton's rings, prove $D_n \alpha \sqrt{n}$, where D_n is diameter of nth dark ring.   (6)

  B.   Explain Double refraction using Huygen's wave theory of light.   (6)

  C.   Explain the construction and working of Ruby laser with neat diagram.   (6)

Q. 3   Attempt the following

  A.   Discuss Thomson's method for determination of e/m of an electron.   (6)

  B.   Derive time independant Schrodingers wave equation.   (6)

Q. 4   Attempt the following

  A.   What is primitive and nonprimitive unit cells? Find the number of atoms per unit cell in SC, BCC, FCC lattices.   (6)

                                    OR

  A.   Define atomic radius. Find the atomic radius in SC, BCC, FCC lattices.   (6)

  B.   State and Derive Bragg's law of X-ray diffraction. An X-ray is operated at 20 kV. Calculate the minimum wavelength of X-rays emitting from it.   (6)

Q. 5   Attempt the following

  A.   What are Ferrites and Garnets? Write their general formula. Determine the magnetization and flux density of the diamagnetic, if its magnetic susceptibility is - 0.4 X 10^{-5} and magnetic field in it is 10^4 A/m.   (6)

OR

A. Prove Bohr Magnetron $\mu_B = e\hbar/2m$. Differentiate between hard and soft magnetic materials.

(6)

B. What is Superconductivity? Explain Meissner effect in superconductor. (6)

Q. 6 Attempt any two of the following

A. What is Hall effect? Derive an expression for Hall coefficient of p and n type semiconductor. (6)

B. Explain the effect of frequency and temperature on Dielectric material. (6)

C. What is Displacement current? Write Maxwell's equations in differential and integral form.

(6)

*** End ***