DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Winter Examination – Dec. 2019

Brach: B. Tech. **Semester –I/II**
Subject: Engineering Physics (PHY103/PHY203) **Marks: 60**
Date: 13/12/2019 **Time:3 Hrs**

Instructions to the students:

1. All questions are compulsory and each question carries 10 marks
2. Illustrate your answers with neat sketches, diagrams etc. wherever necessary.
3. Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of the part is part of examination.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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Que. 1 Attempt the following. **(10)**

a) Obtain the differential equation of free oscillation and find its general solution. (8)

b) Calculate the fundamental frequency of quartz crystal 1 mm thick. (2)

Given: density of quartz is 2650 kg/m^3 and Young's modulus is 8 x 10^{10} N/m^2

Que. 2 Attempt the following. **(10)**

a) Discuss interference of light in thin film for reflected rays. (8)

b) A wedge shaped film is illuminated by light of wavelength 4650 Å. The angle of wedge is 40$^{'}$. Calculate the fringe separation between two consecutive fringes. (2)

OR

Que. 2 Attempt the following. **(10)**

a) Explain the principle and working of Ruby Laser. (8)

b) Calculate the numerical aperture of an optical fibre whose core and cladding are made of materials of refractive indices 1.6 and 1.5 respectively. (2)

Que. 3 Attempt the following. **(10)**

a) Describe Millikan's oil drop method for determination of electronic charge. (8)

b) Find the lowest energy of a neutron confined to a nucleus of size 10^{-14} m. (2)

Que. 4 Attempt the following. **(10)**

a) Derive the relation between lattice constant and density of the cubic crystal. (8)

b) Lead has a FCC crystal structure with an atomic radius of 1.746 Å. Calculate the spacing between (200) and (220) planes. (2)

Que. 5 Attempt the following. **(10)**

a) What is Hysteresis Curve? Explain retentivity, coercivity. Explain B-H curve on the basis of domain theory. (8)

b) The magnetic susceptibility of a medium is 940×10^{-4}. Calculate its absolute and relative permeability. (2)

Que. 6 Attempt any two the following. **(10)**

a) Write Maxwell equations in differential and integral form and write its physical significance (5)

b) What is Hall effect? Derive an expression for Hall Coefficient and mobility of charge carriers. (5)

c) What is electric polarization? Explain with diagrams different types of polarizations in dielectric (5)

Paper End