BSH103

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
First Year B. Tech. (Mechanical, Chemical, Civil and Petrochemical)
End Semester Examination -2017
Subject: Engineering Physics

3 hour 29 APR 2017 **Maximum Marks: 60**

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.

Q.1 Attempt the following.

a) Obtain the differential equation of damped oscillation and find its general solution. 7

b) Calculate the natural frequency of the ultrasonic waves generated by a quartz crystal having thickness of 5.5 mm.

Given Y= 80 GPa, $\rho = 2650\ kg/m^3$ 3

Q.2 Attempt the following

a) Explain theory of Newton's rings for reflected light. 7

b) Light of wavelength 5500 Å falls normally on a thin wedge shaped film of R.I. 1.4 forming fringes that are 2.5 mm apart. Find the angle of wedge. 3

OR

Q.2 Attempt the following

a) Explain the principle and working of He-Ne gas laser 7

b) The numerical aperture of an optical fiber is 0.5 and Core refractive index is 1.54. Find the refractive index of the cladding. 3

Q.3 Attempt the following.

a) Explain the principle and working of Bainbridge mass spectrograph. 7

b) What is Uncertainty principle? Using this principle prove that electron cannot exist in the nucleus. 3

Q.4 Attempt the following.

a) State and prove Mosley's law. What is its importance? 7

b) Silver has FCC structure and its atomic radius is 1.414 Å. Find the interplaner spacing for (200) planes. 3

Q.5 Attempt the following.

a) What is Hysteresis Curve? Explain retentivity, coercivity. Explain B-H curve on the basis of domain theory. 4

b) What is Meissner effect and effect of external magnetic field on superconducting state of material? 6

At 6 K, critical field is 5×10^3 A/m. Calculate transition temperature when critical field is 2×10^{14} A/m at 0 K.

Q.6 Attempt any two of the following.

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

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

c) Derive an expression for electromagnetic wave in free space. Find the value of velocity of light in free space. 5

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