

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2289593

Roll No.

B.TECH

Regular Theory Examination (Odd Sem-I), 2016-17 ENGINEERING PHYSICS

Time : 3 Hours

Max. Marks : 70

- Note:** i) All symbols have usual meaning.
ii) Assume any relevant data, if missing.

SECTION - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (7×2=14)
- Define angle of contact.
 - Explain viscosity and coefficient of viscosity.
 - What is Coherent Source?
 - State the principle of superposition with reference to interference of light waves
 - Explain the law of Malus.

- A particle of charge q and mass m is accelerated from rest through a potential difference V , calculate its de-Broglie wavelength, if particle is an electron and potential difference $V=50$ volts.
- What is ferromagnetism.

SECTION - B

2. Attempt **any three** Parts from this section. (3×7=21)
- Explain the theory and method of the capillary rise to find the surface tension of liquid.
 - What do you understand by resolving power. Explain the Rayleigh criterion of resolution.
 - What do you mean by retardation plate. Find the thickness of quarter wave plate for the wavelength of light of 5890 \AA . The refractive indices for Ordinary and Extraordinary rays are 1.55 and 1.54 respectively.
 - Explain the term spontaneous emission and stimulated emission of radiation. Obtain a relation between transition probabilities of spontaneous and stimulated emission.
 - What is polarized light. How will you produce and detect plane, elliptically and circularly polarized lights.

SECTION - C

Note: Attempt **any five** questions from the follow (5×7=35)

3. State Heisenberg's uncertainty principle. Calculate the uncertainty in the velocity of an electron which is confined in a box of length 10 \AA . Given $m=9.1 \times 10^{-31} \text{ kg}$ and $h = 6.63 \times 10^{-34} \text{ joule-sec}$.
4. Derive Schrodinger time dependent wave equation.
5. What do you mean by Fermi Level. Show that the Fermi level of an intrinsic semiconductor lies half way between conduction and valance bands.
6. What do you mean by turbulent flow. Derive Poiseuille's formula for the rate of flow of a liquid through a capillary tube.
7. Light of wavelength 5893 \AA is reflected at nearly normal incidence from a soap film of refractive index $\mu = 1.42$. What is the least thickness of the film that will appear
 - i) Dark
 - ii) Bright.
8. Discuss the condition of principal maxima and secondary maxima in the case of diffraction pattern of a plane transmission grating.

9. Describe the essential components of a Ruby Laser. Explain its working on the basis of the relevant diagram.
10. Describe Langevin's theory of Diamagnetism. Show that the magnetic susceptibility is negative and independent temperature.
