



Code No. : 6004

FACULTY OF ENGINEERING AND INFORMATICS
B.E. I Year (Common to all Branches) Supplementary
Examination, Dec. 2009/Jan. 2010
ENGINEERING PHYSICS

Time: 3 Hours]

[Max. Marks: 75

Note : Answer all questions of Part A at one place in the answer book. Answer five questions from Part B.

PART - A (25 Marks)

1. A soap film of $\mu = 1.333$ is illuminated by white light incident at an angle of 45° . The light refracted by it is examined by a spectrometer and a bright band is found corresponding to a wavelength of 6000 \AA . Find the thickness of the film. 3
2. In Fraunhofer diffraction pattern due to a narrow slit a screen is placed 2 m away from the lens to obtain the pattern. If the slit width is 0.2 mm and the first minima lie 5 mm on either sides of the central maximum, find the wavelength of light. 3
3. Intensity of light through a polariser and analyser is maximum when their principal planes are parallel. Through what angle the analysing Nicol must be rotated so that the intensity gets reduced to $\frac{1}{4}$ of the maximum value. 3
4. Heisenberg's uncertainty principle is related to
 - a) Special theory of relativity
 - b) Classical mechanics
 - c) Quantum mechanics
 - d) Statistical mechanics. 1
5. Optical microscope gives the magnification around _____ where as electron microscope gives the magnification around _____. 2
6. Transverse nature of light can be confirmed from the following :
 - a) Interference
 - b) Diffraction
 - c) Laser
 - d) Polarization. 1
7. Match the following : 3
 - 1) Poynting vector
 - 2) Fermi energy level
 - 3) Malus law
 - 4) Variation of mass with velocity
 - a) $\Delta t' = \Delta t / \sqrt{1 - \frac{v^2}{c^2}}$
 - b) Transfer of energy
 - c) Meissner effect
 - d) Energy gap

(This paper contains 2 pages)



5) Superconductivity

e) $m = m_0 / \sqrt{1 - \frac{v^2}{c^2}}$

f) $I = I_0 \cos^2 \theta$

g) Highest occupied energy level at 0k.

A) 1 - c, 2 - b, 3 - d, 4 - g, 5 - f

B) 1 - b, 2 - g, 3 - f, 4 - e, 5 - c

C) 1 - e, 2 - c, 3 - g, 4 - a, 5 - b

D) 1 - d, 2 - b, 3 - a, 4 - c, 5 - g

8. Define Hall effect and obtain expression for Hall constant. 3

9. The maximum electric field in a plane electromagnetic wave is 10^2 Newton/coul. The wave is going in the X-direction and the electric field is in the Y-direction. Find the maximum magnetic field in the wave. 3

10. If the uncertainty in the location of a particle is equal to its de Broglie wavelength, what is the uncertainty with velocity? 3

PART - B (50 Marks)

11. a) What do you mean by two coherent sources? 2

b) Distinguish between Fresnel and Fraunhofer diffraction. 2

c) Explain the diffraction due to grating. Obtain its intensity equation and discuss different intensity conditions. 6

12. a) What is the difference between the intensity patterns obtained by interference due to two slits and diffraction due to two slits and explain when they become same. 3

b) Explain the recording and reconstruction of hologram. 4

c) Explain the fibre drawing process (double crucible) with neat diagram. 3

13. a) Obtain an equation for Bose-Einstein distribution. 5

b) Applying the Schrodinger's equation to potential barrier discuss different cases and show that it leads to tunneling effect. 5

14. a) Deduce the Lorentz transformation equations for space and time in special theory of relativity. 6

b) Explain the conducting and displacement currents in electromagnetic theory. 4

15. a) What are point defects? And explain them. 3

b) Obtain an expression for Bragg's law. 3

c) What are the conclusions can be drawn from Kronigpenny model. 4

16. a) Explain any two thermal evaporation techniques of thin film preparation. 4

b) Explain the construction and working of thermistor. 4

c) Sketch the structure of High Tc superconductor. 2

17. Write short notes on following :

a) The mossbauer spectra. 3

b) Dielectric constant by schering bridge method. 5

c) Applications of ferrites. 2