

TPH-101

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Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

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**B. Tech. I Year I Sem.**

Odd End Semester Examination-2015

**ENGINEERING PHYSICS**

*Time : 3 Hrs.]*

*[Max. Marks :100*

**UNIT - 1**

**Answer Any Four**

**(4x5=20)**

1. What is proper interval time? Explain why a moving clock appears to go slow to a stationary observer.
2. Discuss the formation of interference fringes due to a wedge shaped thin film seen by normally reflected sodium light and obtain an expression for fringe width.
3. What is polarised light? How will you produce and detect the plane, circular and elliptical polarized light.
4. Prove that electromagnetic waves are transverse in nature.
5. What are the type I and type II superconductor? Distinguish between them.

(1)

UNIT - II

Answer Any Four

(4x5=20)

1. An electron has de-Broglie wavelength  $6 \times 10^{-7} \text{ m}$ . Find its kinetic energy. Also find the phase and group velocities of its de-Broglie waves.
2. A 1000 watt monochromatic lamp radiating its power in all direction. Calculate the maximum value of electric field and magnetic field at a distance of 10 m from the lamp.
3. A thin film of a soap solution is illuminated by white light at an angle of incidence  $i = \sin^{-1}\left(\frac{4}{5}\right)$ . In reflected light, two dark consecutive overlapping fringes are observed corresponding to wavelength  $6.1 \times 10^{-7} \text{ m}$  and  $6 \times 10^{-7} \text{ m}$ . The refractive index for soap solution is  $\frac{4}{3}$ . Calculate the thickness of the film.
4. A circular lamina moves with its plane parallel to the x-y plane of a reference frame  $s$ . at rest. Assuming its motion to be along the axis of x (or y), calculate the velocity at which its surface area would appear to be reduced to half to an observer in frame  $s'$ .
5. An electron has a speed of 40 m/s accurate up to 99.99%. What is uncertainty in locating its position?

UNIT - III

Answer Any Two

(2x10=20)

1. Explain Compton effect and show that Compton shift depends only on the angle of scattering and it's independent of the wavelength of the incident photons

$$\Delta\lambda = \frac{h}{m_0c}(1 - \cos\theta)$$

2. Discuss the phenomenon of interference of light due to thin films and find the condition of maxima and minima. Show that the interference patterns of reflected and transmitted monochromatic source of light are complementary.
3. What is hysteresis curve? Show that the area of this curve is equal to hysteresis loss in each cycle. Give important application of hysteresis curve.

UNIT - IV

Answer Any Two

(2x10=20)

1. What was the objective of conducting the Michelson-Morley experiment? Describe the experiment. How is

the negative result of the experiment interpreted?

2. Describe and explain the formations of Newton's rings in reflected monochromatic light. And prove that in reflected light Diameters of bright rings are proportional to the square root of odd natural numbers.
3. What is the pointing vector? Discuss the work-energy theorem for the flow of energy in an electromagnetic field.

#### UNIT - V

Answer Any Two

(2x10=20)

1. Deduce the Einstein's mass-energy relation  $E = mc^2$ , and Show that for small velocities the relativistic kinetic energy reduces to classical kinetic energy.
2. Discuss three methods for producing coherent sources. Is it possible to obtain coherent sources from two separate sources? If not why?
3. What is pumping? How can it help in achieving population inversion? Differentiating optical pumping and electrical pumping.

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