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

Paper ID : 199112   Roll No.

B. Tech.

(SEM. I) THEORY EXAMINATION, 2015-16

ENGINEERING PHYSICS - I

[Time:3 hours]   [Maximum Marks : 100]

Note : Attempt **All** Sections.

SECTION - A

1. Attempt **all** parts. All parts carry equal marks. Write answer of each part in short.   (2x10=20)

    (a) What is non-intertial frame of reference ?

    (b) What is massless particle ?

    (c) Write the main condition for sustained interference.

    (d) Show the intensity ratio of mass I_{mid}/I_{max} for resolution limit.

    (e) What is resolving power of grating ?

    (f) What do you mean by optic axis ?

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2. What was the objective of conducting the Michelson-Morley experiment ? Describe the experiment. How is the negative result of the experiment interpreted ?

3. What is proper length ? Derive the expression for it. Calculate the percentage contraction of a rod moving with speed $0.8c$ in direction inclined at $60°$ of its own length.

4. Explain the folrmation of interference fringes by means of a Fresnel's biprism and derive the expression for the fringe width. In a biprism experiment, the distance between the slit and the screen is 180 cm. The biprism 60 cm away from the slit and its refractive index is 1.5. When a source of wavelength 5890Å is used, the fringe width is found to be 0.012 cm. Find the angle between the two refracting surface of the biprism.

working of Laurent's half-shade polarimeter. Calculate specific rotation if the plane of polarization is turned through $25.4°$, travelling 25 cm length of 22% sugar solution.

7. Describe the principle and working of Ruby laser syatem. Compare it with He-Ne-laser.

8. Discuss the phenomena of attenuation and dispersion in optical fibre.

9. What is holography ? Explain the principle of holography using construction and reconstruction of images.

SECTION-C

Attempt any two questions from this section : $(15×2=30)$

10. (a) Show that the relativistic invariance of the law of conservation of momentum leads to the concept of variation of mass with velocity.

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experiment. Deduce an expression for thickness of plate.

(b) What do you understand by missing order spectrum? What particular spectra would be absent if the width of transparencies twice of opacites ?

(c) Two plane glass surfaces in contact along one edge are separated at the opposite edge by a thin wire. If 25 interference fringes are observed between these edges in sodium light of wavelength $\lambda = 5898$Å of normal incidence, then find the thickness of the wire.

(a) Discuss construction and working of Nicol prism.

(b) What are Einstein's coefficients of emission ? Establish relation between them.

(c) Determine core radius necessary for single mode operation at 0.85μm of step index fibre with $\mu_1 = 1.485$ and $\mu_2 = 1.479$. What are the numerical

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Planck's Constant, $h = 6.63 \times 10^{-34}$ J/s

Charge on electron, $e = 1.6 \times 10^{-19}$ C

Boltzmann's Constant,$k = 1.38 \times 10^{-23}$ m^{2}kgs^{-2}K^{-1}

—x—

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