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

PAPER ID : 9602 **Roll No.** | | | | | | | | | | |

B.Tech.

(SEM. I) ODD SEMESTER THEORY EXAMINATION 2012–13

ENGINEERING PHYSICS—I

Time : 2 Hours *Total Marks : 50*

SECTION—A

1. Attempt **all** parts. All parts carry equal marks. Write answer of each part in short. **(2×5=10)**

   (a) What are massless particles ?

   (b) Two independent sources could not produce interference. Why ?

   (c) What do you mean by dispersive power of a plane diffraction grating ?

   (d) What is stimulated emission of radiation ?

   (e) Describe scattering loss in optical fiber.

SECTION—B

2. Attempt any **three** parts. All parts carry equal marks. **(5×3=15)**

   (a) The total energy of a moving meson is exactly twice its rest energy. Find the speed of the meson.

(b) Two plane glass surfaces in contact along one edge are separated at the opposite edge by a thin wire. If 20 interference fringes are observed between these edges, in sodium light of wavelength $\lambda = 5890$ Å of normal incidence, find the diameter of the wire.

(c) A plane grating has 15000 lines per inch. Find the angle of separation of the 5048 Å and 5016 Å lines of helium in the second order spectrum.

(d) A certain length of 5% solution causes the optical rotation of 20°. How much length of 10% solution of the same substance will cause 35° rotations ?

(e) A step index fiber has core and cladding refractive indices 1.466 and 1.460 respectively. If the wavelength of light 0.85 μm is propagated through the fiber of core diameter 50 μm, find the normalized frequency and the number of mode supported by the fiber.

SECTION—C

Note :— Attempt **all** questions of this section. All questions carry equal marks.

3. Attempt any **one** part of the following : **(1×5=5)**

(a) Discuss the objective and outcome of Michelson Morley experiment.

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

4. Attempt any **one** part of the following : **(1×5=5)**

(a) What do you understand by coherent sources ? How are these obtained in practice ?

(b) Describe the formation of Newton's rings in reflected light. Explain briefly why Newton's rings are circular.

5. Attempt any **one** part of the following : **(1×5=5)**

(a) What do you understand by missing orders ? Which order will be missing if opacities are twice the transparencies ?

(b) What do you understand by resolving power ? Deduce the expression for the resolving power of grating.

6. Attempt any **one** part of the following : **(1×5=5)**

(a) Describe the construction and working of a Nicolprism.

(b) What are Einstein's coefficients A and B ? Establish a relation between them.

7. Attempt any **one** part of the following : **(1×5=5)**

(a) What is an optical fiber ? Discuss its classification.

(b) Discuss main characteristics and applications of holography.