(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 2013-14

ENGINEERING PHYSICS—I

Time : 2 Hours *Total Marks : 50*

Note : There are three sections A, B and C in this paper. Questions are to be done from all three sections.

SECTION—A

1. Attempt **all** parts. Give answer of each part in short :— **(2×5=10)**

   (a) Whether Earth is inertial or non-inertial frame of reference ? Explain.

   (b) What are coherent sources ?

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

   (d) How a circular polarized light can be changed into plane polarized light ?

   (e) What do you mean by scattering losses in fiber ?

SECTION—B

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

   (a) The mass of a moving electron is eleven times its rest mass. Find its kinetic energy and momentum.

(b) A parallel beam of light ($\lambda = 5890\,A°$) strikes a film of oil ($\mu = 1.46$). If the 8th dark ring be seen, when viewed at an angle of 30° to the normal, calculate the thickness of the film.

(c) In a grating spectrum, which spectral line in 4th order will overlap with 3rd order line of 5461A° ?

(d) The value of μ_e and μ_o for quartz are 1.5508 and 1.5418 respectively. Calculate the phase retardation for $\lambda = 5000A°$ when the plate thickness is 0.032 mm.

(e) Calculate the population ratio of two states in He-Ne laser that produces light of wavelength 6000A° at 300 K.

SECTION—C **(5×5=25)**

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

3. Attempt any **ONE** part of the following :— **5×1=5**

(a) What are Galilean transformations ? How they failed ?

(b) Obtain the expression for the addition of the relativistic velocities. Show that velocity of light is invariant.

4. Attempt any **ONE** part of the following :— **5×1=5**

(a) Explain the formation of interference fringes by means of Fresnels' biprism. What happens when a transparent mica sheet is introduced in one of the interfering beams ?

(b) Explain the intensity distribution due to Fraunhofer diffraction at a single slit.

5 Attempt any **ONE** part of the following :— **5×1=5**

(a) What do you understand by resolving power ? Explain the Rayleigh criterion of resolution.

(b) Explain the construction and working of a Nicol prism.

6. Attempt any **ONE** part of the following :— **5×1=5**

(a) Discuss the phenomenon of rotation of the plane polarized light by optically active material.

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

7. Attempt any **ONE** part of the following :— **5×1=5**

(a) Discuss the different type of pulse dispersion in optical fiber.

(b) What is holography ? Explain its properties and applications.