

Printed Pages—3

EAS101

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

PAPER ID :9602

Roll No.

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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 ($\lambda = 5890 \text{ \AA}$) 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 5461 \AA ?
- (d) The value of μ_e and μ_o for quartz are 1.5508 and 1.5418 respectively. Calculate the phase retardation for $\lambda = 5000 \text{ \AA}$ 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 6000 \AA 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.

