Paper Code: RAS101	**Roll No.**									

B. Tech.
FIRST SEMESTER THEORY EXAMINATION, 2016-17
ENGINEERING PHYSICS I

[Time: 3 Hours] **[Total Marks: 70]**

Note- Attempt all question. Each question carries equal marks.

Q1. Attempt any **two** parts. [7x2=14]

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

(b) What do you mean by length contraction? Calculate the percentage contraction of rod moving with a velocity of 0.8 c in a direction at 60^o to its own length.

(c) Deduce Einstein's mass-energy relation, $E=mc^2$. The mass of a moving electron is eleven times its rest mass. Find its kinetic energy.

Q2. Attempt any **two** parts. [7x2=14]

(a) Derive time independent Schrodinger wave equation and give physical interpretation of wave function.

(b) Describe energy distribution in black body radiation and explanation by Planck.

(c) Explain the modified and unmodified radiations in Compton scattering. Why Compton Effect is not observable for visible light?

Q3. Attempt any **two** parts. [7x2=14]

(a) Discuss the interference in thin film due to reflected light. What happens to fringe pattern if film is wedge shaped?

(b) Draw intensity distribution curve for diffraction at single slit and explain it (Do not derive expressions). Light of wavelength $5000A^o$ is incident normally on a slit. The first minimum of diffraction pattern is observed to lie at a distance of 5mm from the central maximum on a screen placed at a distance of 2m from the slit. Calculate the width of the slit.

(c) What is Rayleigh criterion of resolution? A plane transmission grating has 15000 lines per inch. Find the resolving power of grating and the smallest wavelength difference that can be resolved with a light of wavelength 6000 A^o in the second order.

Q4. Attempt any **two** parts. [7x2=14]

(a) Show that the plane polarized and circularly polarized light are the special cases of elliptically polarized light

(b) What do you understand by specific rotation? A certain length of 5% solution causes the optical rotation of 20^o. How much length of 10% solution of the same substance will cause 35^o rotation?

(c) What are Einstein's coefficients? Establish a relation between them and explain outcome.

Q5. Attempt any **two** parts. [7x2=14]

(a) Explain acceptance angle and acceptance cone. Calculate the acceptance angle and numerical aperture of the optical fiber if the refractive index of core and cladding are 1.50 and 1.45 respectively.

(b) What do you understand by attenuation in optical fiber? Discuss various factors responsible for attenuation.

(c) What is holography? Explain the construction and reconstruction of image in holography.