B. Tech.
(SEM I) ODD SEMESTER EXAMINATION, 2015-1016
ENGINEERING PHYSICS-I
(BACK PAPER)

[*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 x 5 = 10)**

(a) What are mass less particles?

(b) What are coherent sources?

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

(d) How can you distinguish the circularly polarized light and unpolarized light?

(e) Describe scattering loss in optical fiber.

SECTION-B

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

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

(b) A glass plate 0.40 micron thick is illuminated by a beam of white light normal to the plate.
The index of refraction of the glass is 1.50. What wavelengths within the limits of the
visible spectrum (400 nm-700 nm) are strongly reflected by the plate?

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

(d) Calculate the thickness of doubly refracting crystal required to introduce a path difference
of $\lambda/2$ between the ordinary and extraordinary rays when $\lambda=6000$A° and refractive indices
for ordinary and extraordinary rays are 1.65 and 1.48 respectively.

(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 x 5=5)

    (a) Discuss the objective and outcome of Michelson Morley experiment.
    (b) What is mass-energy equivalence? Explain it.

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

    (a) Explain the formation of interference fringes by means of a fresnels biprism.
    (b) Describe the interference in thin film due to reflected light.

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

    (a) Explain the intensity distribution due to Fraunhofer diffraction at single slit.
    (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 x 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 x 5=5)

    (a) Explain the light guiding principle of an optical fiber. Describe acceptance angle and acceptance cone of an optical fiber.
    (b) Discuss main characteristics and applications of holography.