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FIRST SEMESTER M.Sc. DEGREE EXAMINATION
DECEMBER / JANUARY - 2006
Branch: PHYSICS
PH 212 – MODERN OPTICS AND ELECTROMAGNETICS

Time: 3 Hours

Max. Marks: 75

PART-A
Answer any FIVE questions. Each question carries 3 marks.

I. a. Compare Fresnel and Fraunhofer types of diffraction.

 b. Explain the principle of Holography.

 c. Differentiate spontaneous emission and stimulated emission of radiations.

 d. State and explain poynting theorem.

 e. What do you mean by Maxwell's stress?

 f. Write a short notes on Electric dipole radiation?

 g. What is called Dipole radiation?

 h. Explain Wiechert potentials?

(5 x 3 = 15 marks)

PART-B
Answer all questions. Each question carries 15 marks.

II a. Discuss the Fresnel's diffraction at a straight edge. Derive the expression for maxima and minima for a beam diffracted at a straight edge.

(OR)

 b. What is meant by population inversion and pumping mechanism? Describe any two pumping mechanisms to get the population inversion.

III. a. i. Discuss briefly the E.M waves in a non conducting medium.

  ii. Explain any one method of reflection and transmission at normal and oblique incidence.

(OR)

f. Explain the transverse EM waves along a parallel plate transmission line and hence obtain the transmission line equations.

IV. a. Discuss the working of Antennas and how do you classify the same.

(OR)

f. What is called Relativistic electro dynamics and discuss briefly the electric field of a point charge moving uniformly.

(3 x 15 = 45 marks)

PART-C

Answer THREE questions. Each question carries 5 marks.

V. a. Discuss the salient features of Fresnel's integral.

  f. Explain the working of four level solid state laser.

  f. Write briefly about coulomb gauge and Lawrence gauge.

  f. Derive and explain Newton's third law in electro dynamics.

  f. Explain the magnetic dipole radiation.

  f. Discuss the electromagnetic field tensor.

(3 x 5 = 15 marks)