Roll No. .....

78611

M. Sc. 4th Sem. Physics (New)

Examination – May, 2014

ELECTRO DYNAMICS AND WAVE PROPAGATION

(NEW)

Paper : XV

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. (a) Explain, a charged particle moving with constent velocity does not radiate energy. 4

   (b) State and write Lorentz transformation for space and time. 4

   (c) Explain the blue appearance of sky on the basis of Rayligh scattering. 4

   (d) Write the highest wavelength which can propagate through the rectangular wave guide of width a and height b such that $a > b$. 4

UNIT – I

2. Write Maxwell's Equations in four vector form. Show that they are invarient under Lorentz transformations. 16

3. Show the relativistic invariance of the following : 16

(a) $\vec{E}.\vec{B}$

(b) $E^2 - C^2B^2$

UNIT – II

4. Find the expression for the total power radiated from an accelerated charge at low velocity. 16

5. Define retarded potentials. Obtain expressions for Linard-Wiechert potential for a point charge. 16

UNIT – III

6. Define T scattering cross section and derive the expression for the total scattering cross-section. 16

7. Describe the propagation of electromagnetic wave through ionosphere. 16

UNIT – IV

8. Write about TE, TM and TEM modes of propagation of electromagnetic wave. Discuss the theory of TE mode in a rectangular wave guide. 16

9. Write notes on :

(a) Circuit representation of parallel plate transmission line. 8

(b) Low loss radio frequency and UHF transmission line. 8
