

Roll No. ....

78601

M. Sc. (Physics) 4th Sem.

Examination – December, 2014

ELECTRODYNAMICS & WAVE PROPAGATION

Paper : XV

Time : Three hours ]

[ Maximum Marks : 80

Before answering the question, 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) Justify the statement : A pure electric field in one co-ordinate system will appear as a mixture of electric field and magnetic field in any other frame which in moving with a uniform velocity. 4
- (b) Explain, a charged particle moving with constant velocity does not radiate energy. 4
- (c) Explain why sky appears blue at day time. 4
- (d) What is ionosphere ? 4

## UNIT - I

- (a) Explain continuity equation & obtain covariant form of this equation. 8
- (b) Show that  $\vec{E} \cdot \vec{C}\vec{B}$  is relativistically invariant. 8
3. What is four vector. Show the invariance of Maxwell's equations in covariant form. 16

## UNIT - II

4. Find the expression for power generated by a slow moving accelerated charge. 16
5. What are retarded potentials ? Find the expression for Linard-Wiechert potential for a small moving charge. 16

## UNIT - III

6. Define differential scattering cross-section. Obtain the expression for scattering cross-section of electromagnetic wave by a bound electron. 16
7. Write in detail the electromagnetic wave propagation through ionospheric medium. 16

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## UNIT - IV

8. Explain TE, TM and TEM modes. Obtain expressions for the fields of TE modes in a rectangular wave guide. 16
9. Write on :
  - (a) Circuit representation of parallel plate transmission lines. 8
  - (b) Low loss radio frequency and UHF transmission. 8

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