

M.Sc. (Physics) (CBCS Pattern) Semester-II
PSCPHYT08 - Paper-VIII - Electrodynamics-II

P. Pages : 2

Time : Three Hours



GUG/S/25/11223

Max. Marks : 80

Either :

1. a) Describe the propagation of electromagnetic wave through non-conducting linear media. 8
- b) Derive an expression for Poynting theorem. 8

OR

- e) Derive the Fresnel's equations i.e. dynamic properties when 8
- i) Incident wave is polarized with its \vec{E} vector is normal to plane of incidence
- ii) Incident wave is polarized with its \vec{E} vector is parallel to plane of incidence.
- f) Explain the polarization of electromagnetic wave. 8

Either :

2. a) Define EM field tensor by using field equations. 8
- $\vec{E} = -\nabla\phi - \frac{\partial \vec{A}}{\partial t}$ and $\vec{B} = \nabla \times \vec{A}$
- b) Show that the tensor is antisymmetric of rank 2 and follows Lorentz transformation. 8

OR

- e) Show that Lorentz Gauge condition is invariant under Lorentz transformation. 8
- f) Show that $(E^2 - C^2 B^2)$ is invariant under Lorentz transformation. 8

Either :

3. a) Derive an expression for Lienard – Wiechert potential. 8
- b) Obtain an expression for total power radiated by an accelerated charge particle. 8

OR

- e) Explain 8
- i) Electric dipole radiation
- ii) Magnetic dipole radiation.
- f) Derive Larmor's formula. 8

Either :

4. a) Derive an expression for lowest cut off frequency for TE_{01} mode in dielectric waveguide. **8**
- b) Explain TM mode of propagation in cylindrical wave guide. **8**

OR

- e) Explain Bremsstrahlung synchrotron radiation. **8**
- f) Show that resonant frequency of lowest TM mode of cylindrical resonant cavity is inversely proportional to its radius 'R' **8**

5. Attempt all the following

- a) Explain Phase velocity and group velocity. **4**
- b) Write down Maxwells equations in free space. **4**
- c) Explain full wave antenna. **4**
- d) What are the advantages of wave guide over transmission line. **4**
