

M.Sc.(Physics) (NEP Pattern) Semester-I
NEP-234 / 01MSCPH2 - DSC Paper-II : Electrodynamics

P. Pages : 1

Time : Three Hours



GUG/W/23/15135

Max. Marks : 80

Either:

1. a) State and explain Gauss's Law derive its differential form. 6
b) Derive Poisson and Laplace's equation. 6
c) Discuss method of separation of variables. 4

OR

- e) State and prove Green's theorem. 8
f) Derive an expression for multiple expansion of potential. 8

Either:

2. a) Discuss Biot-savart law and obtain an expression for magnetic field. 8
b) Derive 'Ampere's' law in differential and integral form. 8

OR

- e) State and prove Poynting's theorem. 8
f) Discuss magnetostatics boundary conditions. 8

Either:

3. a) Discuss Scalar and Vector potential. 8
b) Using Maxwell's equation show that e.m. waves penetrate the conducting media to a depth ' δ '. 8

OR

- e) Explain in details properties of electromagnetic field. 8
f) Explain conservation laws for electro-magnetic waves. 4
g) Discuss Gauge transformation. 4

Either:

4. a) Obtain Electromagnetic plane wave equation for non-conducting media. 8
b) Explain polarization for electromagnetic wave. 8

OR

- e) Discuss Fresnel polarization on reflection and refraction. 8
f) Explain total internal reflection and critical angle. 8

5. All questions are compulsory.
a) State and explain Coulomb's law. 4
b) Discuss Maxwell's displacement current. 4
c) Obtain an expression for Lorentz gauge transformation. 4
d) Explain interference of Electromagnetic waves. 4
