EM WAVES AND DIELECTRICS

1. Write Maxwell's equations in differential form. (2) {JUN 15 [GNE]}
2. Derive Maxwell's electromagnetic wave equation for a non-conducting medium. (4) {JUN 15 [GNE]}
3. Show that electrostatic field is equal to the negative of potential gradient and hence show that electrostatic field is conservative. (4) {JUN 15 [GNE]}
4. What is the physical significance of divergence of of a vector field? (2) {JUN 15 [PTU]}
5. What do you mean by displacement current? (2) {DEC 14 [GNE]}
6. Show that velocity of plane electromagnetic waves in free space is given by $c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$. (4) {DEC 14 [GNE]]}
7. Using Maxwell's equations prove that $\vec{\nabla}.\vec{J} + \frac{\partial \rho}{\partial t} = 0$. (4) {DEC 14 [GNE]}
8. Derive differential form of ampere's circuital law for (i) steady currents and (ii) varying currents. (4) {JUN 14 [GNE]}
9. Derive Maxwell's electromagnetic wave equation for vacuum. (4) {JUN 14 [GNE]}
10. Define Poynting vector. Give its significance. (2) {JUN 14 [GNE]}
11. What is the origin of displacement current density? (2) {JUN 14 [GNE]}
12. What is dielectric polarization? (2) {Dec 2013 [GNE]}
13. Derive Maxwell's electromagnetic wave equation and hence find the velocity of light in vacuum. (4) {Dec 2013 [GNE]}
14. Give an example of lamellar and solenoidal vector fields. (2) {Jun 2013 [GNE]}
15. Define divergence of a vector field. Write its expression in terms of Cartesian coordinates and discuss its physical significance. (4) {Jun 2013 [GNE]}
16. Use Maxwell's equations to deduce wave equations in terms of $\vec{E} \& \vec{H}$ field vectors for free space. (4) {Jun 2013 [GNE]}
17. What is the significance of divergence and curl of a vector? (2) {Dec 2012 [GNE]}
18. What is dielectric polarization? Explain. (2) {Dec 2012 [GNE]}
19. Write Maxwell's equations and discuss their significance. (4) {Dec 2012 [GNE]}
20. In an electric field, the potential is given as $V(x, y, z) = \sqrt{4x^2 + 3y^2 + 9z^2}$ Volt. Calculate electric field at the point $(1,2,3)$. (4) {Dec 2012 [GNE]}