Question bank (Electromagnetic theory)

1. Explain divergence of a vector field with a suitable example. 4 or 5 marks
2. Explain curl of a vector field with a suitable example. 4 or 5 marks
3. Explain electric flux and electric flux density (D). Mention the relation between electric flux density (D) and electric field (E). 4 or 5 marks
4. State and explain Gauss law in electrostatics. Express the Gauss law of electrostatics in differential form. 7 or 8 marks
5. Define current density. Obtain the equation of continuity for current. 4 or 5 marks
6. Explain magnetic field intensity (H) and magnetic flux density (B). How these two are related? 4 or 5 marks
7. State and explain Bio-Savart law. Express it in vector form. 4 or 5 marks
8. State Ampere's circuital law. Express it in differential form. 7 or 8 marks
9. State and explain Gauss law in magnetism. Give its Physical significance. 4 or 5 marks
10. State and explain Faraday's law of electromagnetic induction. Obtain it in differential form. 6 or 7 marks
11. What is the inconsistency or anomaly in Ampere's law? 4 or 5 marks
12. Explain the concept and need of displacement current. What is Maxwell-Ampere's law? 7 or 8 marks
13. Write the differential form of Maxwell's equations for time varying fields. How they are modified in static fields? 4 or 5 marks
14. What are electromagnetic waves? Derive the electromagnetic wave equation in differential form in a region free from any charges and currents. 8 or 9 marks