Theory and Derivative Questions

UNIT-I STATIC ELECTRIC FIELDS

1. **Obtain the expression for electric field intensity on the axis of a uniformly charged circular disc.**

2. **State and prove Divergence theorem.**

3. **A circular disc of radius 'a' m is charged uniformly with a charge density of 'σ' C/m^2. Find the electric field intensity at a point 'h' m from the disc along it's axis.**

4. **Prove that divergence of a curl of a vector is zero, using Stoke's theorem.**

5. **Obtain the expressions for $\overline{D}$ and $\overline{E}$ using Gauss's law.**

6. **Determine the electric field intensity of an infinitely long, straight, line charge of a Uniform density ρ_l in air.**

7. **Define Divergence, Gradient, Curl and Lapacian in cylindrical and spherical coordinate system with mathematical expressions.**

8. **State superposition theorem in relevance to field theory and derive the equation for total electric field intensity.**

9. **State the principle of superposition as applied to electric potential and derive a general expression for the resultant potential due to point, line, surface and volume charges composing the systems.**

10. **Distinguish scalar and vector potential as applied to electric field.**

11. **A circular disc of radius 'a' is charged uniformly with a charge density of 'σ' coulombs/m^2. Find the electric intensity at a point 'h' from the disc along its central axis.**

12. **Explain potential due to charged disc.**

13. **Prove** $\mathrm{Div}\, D = \rho$ **using Gauss Law.**