1. **Which of the following can be an electrostatic field?**
   (a) $x\hat{\mathbf{i}}$, **(b)** $y\hat{\mathbf{i}}$, **(c)** $(1/r)\hat{\theta}$, **(d)** $(1/s)\hat{\phi}$

2. **A sphere of radius a is maintained at a uniform potential V_0. Find the potential both, inside and outside the sphere.**

3. **A infinite plane has a uniform charge density σ over it. Find the electric field on either side of the plane by solving the Laplace's equation and using the appropriate boundary condition. Consider the potential of the plane to be 0.**

4. **The screened Coulomb potential**

$$\Phi = \frac{q}{4\pi\epsilon_0}\frac{e^{-r/\lambda}}{r}$$

   commonly occurs in a medium. Calculate the corresponding electric field and charge density.

5. **Given a region of space in which the electric field is everywhere directed parallel to the x axis. Prove that the electric field is independent of the y and the z co-ordinates.**