# ELECTROMAGNETIC FIELD THEORY (TEC-244)
## CLASS TEST-II

**Time: 1 Hour** **M.M:15**

**Note:** Attempt all questions:

Q 1. Drive boundary conditions for perfect dielectric materials. [2]

Q 2. A large conducting cone $(\theta = 45^o)$ is placed on conducting plane with a tiny gap separating it from the plane. If the cone is connected to a 50V source, find V and E at point (-3, 4, 2) [3]

Q 3. Define and write continuity equation. [2]

Q 4. The potential $V = 200(x^2 - y^2)$ and a point P(2, -1, 3) that is lie on a conductor-to-free-space boundary, let us find V, **E**, **D**, and $\rho_s$ at $P$ also the equation of the conductor surface. [3]

Q 5. Given the magnetic vector potential $A = -\rho^2/4\, a_x$ Wb/m, calculate the total magnetic flux crossing the surface $\varphi = \frac{\pi}{2}, 1 \le \rho \le 2m, 0 \le z \le m.$ [2]

Q 6. An electric field in free space is given by

$$E = 50\ \cos(10^8 t + \beta x) a_y\ V/m$$

(a) Find the direction of wave propagation.

(b) Calculate $\beta$ and the time it take to travel a distance of $\lambda/2$ [3]