

EE-402 (GS)**B.E. IV Semester Examination, June 2020****Grading System (GS)****Electromagnetic Theory****Time : Three Hours****Maximum Marks : 70**

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

- Define Gaussian surface. Calculate total electric flux leaving the cylindrical surface $\rho = 4.5$, $z = \pm 3.5$ for a line charge on x -axis with $\rho_L = 2 \cos(0.1x)$, x is in radians.
- Derive the expression for transmissions coefficient and reflection coefficient of uniform plane waves with normal incidence at plane dielectric boundary.
- State and explain Ampere's circuital law.
 - What do you understand by boundary conditions? Explain boundary conditions due to magnetic field.
- Write short notes on :
 - Poisson's equation
 - Uniqueness theorem
- What is polarization? Explain polarization of waves and their types.
 - Deduce Maxwell's equation in differential form by preparing tabular chart.
- Find the magnitude of electric field intensity in a simple of silver having $\sigma = 6.17 \times 10^7$ mho/m and $\mu_e = 0.0056$ m²/V-S. If
 - Drift velocity is 1 mm/s
 - Current density in 10^7 A/m.

OR

Define electrostatic potential and electric field intensity. Hence show that, $E = -\nabla V$.

- Obtain electric field in all regions due to following charge distribution in free space.

$$\begin{aligned} \rho(r, \phi, z) &= 0, 0 < r < a \\ &= \rho_0, a < r < b \\ &= 0, b < r < \infty \end{aligned}$$

OR

For uniform plane wave in sea water $\sigma = 4$ S/m, $\epsilon = 80\epsilon_0$, $\mu = \mu_0$. Find α , β , η and λ at

- 10,000mHz
 - 25 KHz
- Write short notes on: (any two)
 - Method of images
 - Magnetic dipole and its moment
 - Biot-Savart law
 - Divergence theorem
 - Electric field intensity
