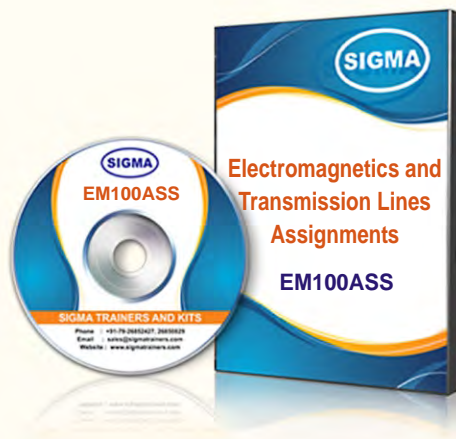




# ELECTROMAGNETIC AND TRANSMISSION LINES ASSIGNMENTS

MODEL - EM100ASS

This Software trainer provides Electromagnetic and Transmission Lines Assignments.



## SPECIFICATIONS

1. Electromagnetic and Transmission Lines Assignments
2. **Books for Electromagnetic and Transmission Lines : 10 Nos in pdf Format**
3. **Mp4 Video Class for Electromagnetic and Transmission Lines : 40 Classes in Mp4 on Pen Drive**

## EXPERIMENTS

Find the Electric field intensity and electric flux density at a given point due to following charge distributions. (In all coordinate systems)

- 1) Point charges
- 2) Line charges (finite and infinite)
- 3) Surface charges (finite and infinite)
- 4) Mixed charges ( Point charge, Line charge, Surface charge)

Find the Electric potential due to different charge distributions (Point charge, Line charge, Surface charge), in different coordinate systems.

Application of Gauss's law.

- 1) Given  $P_v$  (volume charge density) in a particular region, find  $\vec{D}$  (electric flux density) using Gauss's Law at the given location.
- 2) Given  $P_s$  (surface charge density), find  $\vec{D}$  (electric flux density) using Gauss's Law at the given location.
- 3) Given  $\vec{D}$  ( electric flux density), find total charge enclosed by the surface (Q),  $P_v$  (volume charge density) using Gauss's Law. (In all coordinate systems)
- 4) Given  $\vec{D}$  (electric flux density), prove both sides of Divergences Theorem.

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**Dealer:-**

Given  $\rho_v$  (volume charge density), and the region with reference potential, find the potential in a given region, using Poisson's equation.

Using Laplace's equation, find capacitance between any two surfaces, if the boundary conditions are given.

Find the electrostatic fields (Tangential and Normal) at the boundary between,

- 1) Free space and dielectric medium
- 2) Free space and conductor
- 3) dielectric medium and conductor
- 4) Two dielectric media.
- 5) Two dielectric media when boundary is defined by an equation of plane.

Find the capacitance of,

- 1) Parallel plate capacitor with multiple dielectric layers.
- 2) Spherical capacitor with multiple dielectric layers
- 3) Cylindrical capacitor with multiple dielectric layers,

Also find the total Energy stored within the region for all above mentioned capacitor.

Find  $\vec{H}$  (Magnetic field intensity) and  $\vec{B}$  (Magnetic flux density) at a given point due to,

- 1) Infinitely long current carrying conductor
- 2) Finite current carrying conductor
- 3) Infinite conducting surface
- 4) Finite conducting surface
- 5) Different current carrying configurations (i.e. thin conductor, surface all together)

For the following current carrying configurations, find the  $\vec{H}$  (Magnetic field intensity) in a given region (or point) using Ampere's circuital law.

- 1) Infinitely long current carrying conductor
- 2) Infinite cylindrical surfaces of different radii all centered at the same axis.
- 3) Spherical surfaces of different radii all centered at a given point.

Given the  $\vec{H}$  (Magnetic field intensity) of a particular region, find current ( $\vec{I}$ ), current density ( $\vec{J}$ ), enclosed by the given surface. (In all coordinate systems)

Prove both sides of Stokes' theorem when  $\vec{H}$  (Magnetic field intensity) is given in Cartesian, cylindrical and spherical coordinate system separately.

Find the static magnetic fields (Tangential and Normal) at the boundary between,

- 1) Two different magnetic media with nonzero surface current density ( $\vec{K}$ )
- 2) Two different magnetic media with zero surface current density ( $\vec{K}$ )
- 3) Two different magnetic media when boundary is defined by an equation of plane.

Given  $\vec{H}$  (or  $\vec{E}$ ) and the region properties (like  $\mu$ ,  $\epsilon$  etc.), find  $\vec{B}$ ,  $\vec{D}$  and  $\vec{E}$  (or  $\vec{H}$ ) using Maxwell's equations. (In all coordinate systems)

Given  $\vec{H}$  (or  $\vec{E}$ ) and the region properties (like  $\mu$ ,  $\epsilon$  etc.), the average power density in  $\text{W/m}^2$ , Total power crossing the given surface in watts using Poynting Theorem (In all coordinate systems)

Given the primary constants ( $R$ ,  $L$ ,  $G$ ,  $C$ ) along with the generator specifications and termination, find secondary constants ( $\beta$ ,  $\alpha$ ) and other parameters like velocity, wavelength, received voltage, received power, reflection coefficient etc.

Given secondary constants ( $\beta$ ,  $\alpha$ ), find the primary constants ( $R$ ,  $L$ ,  $G$ ,  $C$ ) at the given frequency.

Problems on Transmission Line Analysis.

Problems on Impedance matching and design of stub matching using Smith Chart.