B.TECH
(SEM III) THEORY EXAMINATION 2018-19
ELECTROMAGNETIC FIELD THEORY

Time: 3 Hours   *Total Marks: 100*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

a) Explain the application of transmission lines

b) Describe gradient of a scalar field.

c) state and explain coulomb's law in electrostatics.

d) What is standing wave ratio

e) Explain amperes circuital law in differential form

f) Establish the relation for total current density and electric field density.

g) A vector in Cartesian coordinate is given A =$[5a_x + 7a_y + 9a_z]$ .Find magnitude vector originally from the origin.

h) explain the term magnetic flux density and magnetic permeability.

i) Explain biot-savart law in magnetostatics.

j) Establish the relation between electric potential and electric field intensity.

SECTION B

2.   **Attempt any *three* of the following:**   **10 x 3 = 30**

a) Define the terms and obtain expression for the voltage wave standing ratio, reflection coefficient and reflection percentage on a loss free transmission line having mismatch .

b) State and explain the divergence theorem.

c) Derive Maxwell's third and fourth equation by the basic equation.

d) Derive the wave propagation equation in dielectric medium . Find out the propagation constant, attenuation constant and phase shift constant also.

e) State faradey's law of electromagnetic induction an maxwell's equation.

SECTION C

3.   **Attempt any *one* part of the following:**   **10 x 1 = 10**

a) State and prove continuity equation.

b)   How the wave propagation takes place in dispersive medium? Light is incident from air to glass at screw sters glass. Determine the incident and transmitted angles.

4. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) What is a smith chart? Why it is useful in making transmission line calculation?

   b) Explain curl of a vector field and stoke theorem.

5. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) What is transmission line? Discuss various types of transmission lines .

   b) Describe the spherical and cylindrical coordinate system?

6. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) derive the expression for energy stored in magnetic field.

   b) What is skin effect? Determine skin depth, intrinsic impedence phase velocity and pointing vector.

7. **Attempt any *one* part of the following:**   **10 x 1 = 10**

   a) state and explain laplace equation and poisson's equation

   b) Derive expression or the potential at a point outside a hollow sphere having a uniform charge density.