DURATION: 3 HRS   MAX MARKS:100

PART A(10X2=20 MARKS)

1.State Coulombs law of electrostatic field

2.What are the limitations of Guass's law

3.How the inconsistency in Amperes law rectified in time varying field

4.State Ampere's law of force between two current carrying circuits.

5.Give the significance of BIOT SAVART law

6.Define Reluctance and Permeance and compare it with its circuit theory counterpart

7.Specify the role of Vector potentials in solving field equations

8. Quote the importance of loss tangent

9.Define Brewster angle

10.Compare the depth of penetration,δ of an EM wave in copper at f = 75 Hz.

for copper $\sigma=5.8\times10^7$ mho/m $\mu_r=1$ $\varepsilon_r=1$.

PART B(5X16=80 MARKS)

11. What is meant by boundary condition? Derive and explain the boundary condition for the electric field between

(i)	Dielectric – Dielectric	(8)
(ii)	Conductor- Dielectric	(8)

12a)(i) Given that D= $z\rho\cos^2 \phi$ a_z C/m^2, calculate the charge density at (1, π/4, 3) and the total charge enclosed by the cylinder of radius 1m with -2$\leq$ z $\leq$ 2 m   .(8)

(ii) Point charges 1mC and -2mC are located at (3,2,-1) and (-1,-1,4), respectively. Calculate the electric force on a 10nC charge located at (0,3,1) and the electric field intensity at that point.   (8)

(or)

12.b. Determine the force on a point charge of 10nC at (0,0,7) m due to uniformly distributed charge of 5mc over a circular disc of radius r$\leq$1m in Z=0 plane.

13.a)(i) Derive expression for vector magnetic potential using Biot Savart Law. (6)

(ii) A circular loop located on x^2 + y^2 - 9, z = 0 carries a direct current of 10A along aϕ. Determine H at (0,0,4) and (0,0,-4).   (10)

(OR)

13.b) (i) Show that with proof that the tangential component of H is continuous while that of B is discontinuous at the boundary.   **(10)**

(ii) Derive the equation for continuity for time varying fields   **(6)**

14.a. What are the properties of a uniform plane wave.Derive the wave equations for free space and obtain the solution of it.Also obtain the relation between E and H in uniform plane wave.

(or)

14.b. Discuss the behavior of the uniform plane wave when it is incident i) normally ii)at 45 degree angle on the interface of good conductor.   **(8+8)**

15.   State and prove poynting theorem. Give its physical significance

(or)

15.b. State and Prove Maxwell's equations. Give their physical interpretation.