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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING  
MODEL EXAMINATION  
QUESTION PAPER-2**

**SUBJECT CODE: EC2253**

**SUBJECT NAME: ELECTROMAGNETIC FIELDS**

**MARKS:100**

**PART-A**

**(10\*2=20)**

1. State coulombs law?
2. What is an absolute potential?
3. What is magnetic dipole moment?
4. Can a magnetic field exist in a good conductor if it is static or time varying? Explain.
5. What is the relation between relative permeability and susceptibility?
6. What are the different types of magnetic materials?
7. State lenz's law
8. Give the equation of transformer emf ?
9. For a loss dielectric material having  $\mu_r=1$ ,  $\epsilon_r=48$ ,  $\sigma=20\text{s/m}$ . calculate the propagation constant at a frequency of 16 GHz ?
10. Mention the properties of uniform plane wave.

**PART-B**

**(16\*5=80)**

11 a) Derive an expression for the electric field due to a straight and infinite uniformly charged wire of length 'L' meters and with a charge density of  $+\lambda$  c/m at a Point P which lies along the perpendicular bisector of wire.. (16)

OR

b) Derive an expression for potential due to infinite uniformly charged line and also derive potential due to electric dipole. (16)

12. a (i) Derive an expression for force between two current carrying conductors (8)

(ii) An iron ring with a cross sectional area of 3cm square and mean circumference of 15 cm is wound with 250 turns wire carrying a current of 0.3A. The relative permeability of ring is 1500. Calculate the flux established in the ring. (8)

OR

b) Derive the expression for magnetic field intensity and magnetic flux density due to finite and infinite line. (16)

13 . a (i) Derive an expression for the capacitance of two wire transmission line. (8)

(ii) Derive an expression for capacitance of co-axial cable. (8)

OR

b) Solve the Laplace's equation to find the Capacitance between two Parallel plates at  $x=0$  and  $x=d$  with  $V=0$  and  $V=V_0$  respectively.(16)

14 a) Derive modified form of Amperes Circuital Law. Write the Maxwell's Equation in integral, differential and Complex form (16)

OR

b (i) Write short notes on Faraday's law of electromagnetic induction. (8)

(ii) The magnetic field intensity in free space is given as  $H = H_0 \sin \theta \hat{a}_y \cos t$  A/m. Where  $\theta = \omega t - \beta z$  and  $\beta$  is a constant quantity. Determine the displacement current density. (8)

15 a) Discuss about the plane waves in lossy dielectrics. (16)

OR

b) Discuss about the plane waves in lossless dielectrics. (16)