T3225 / T0492   ELECTROMAGNETIC ENGINEERING

Q. P. Code : 13677

REVISED COURSE

(3 Hours)   Total Marks: 80

N. B. (1) Question no 1 is compulsory

    (2) Solve any 3 questions from remaining 5 questions

    (3) Draw a neat and clean diagram whenever necessary

    (4) Assume suitable data if required

Q 1. Answer the following (Any 4)   (20)

    a) Compare MOM, FDM, and FEM.

    b) State and explain Biot Savart's Law.

    c) Derive wave equations for time varying harmonic fields.

    d) Define: Critical frequency, Virtual height.

    e) Define skin depth and derive depth of penetration in good conductors.

Q2. a) Derive Maxwell equations for time varying fields in point and integral form.   (10)

    b) State pointing theorem .Derive an expression for pointing vector with significance of each term.   (10)

Q3. a) A 10 GHz plane wave travelling in free space has amplitude of $E_x = 10$ V/m. Find V, λ, β, η and the amplitude and direction of **H**.   (10)

    b) Derive the expression for the reflection and transmission coefficient in case of reflection from Perfect dielectrics at a) Normal Incidence b) Oblique incidence.   (10)

Q4. a) Explain method of moments (MOM). Also state its advantages and drawbacks.   (10)

    b) Define directivity and gain of an antenna. An antenna has a loss resistance of 10 ohm, power gain of 20 and directivity of 22. Calculate the radiation resistance.   (10)

Q5. a) Explain principle modes of operation of a helical antenna and draw its radiation pattern.   (10)

    b) Derive boundary conditions for electric field at a boundary between 2 dielectrics.   (10)

Q6. a) Explain factors affecting field strength of a space wave signal.   (10)

    b) Define critical frequency and MUF. Also derive an expression for MUF.   (10)

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