01804

B. TECH. IN ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

June, 2011

BIEE-009 : APPLIED ELECTROMAGNETICS

Time : 3 hours   *Maximum Marks : 70*

*Note :   Attempt **any five** questions. Each Question carries **equal** marks.*

1. (a) State and explain Gauss's law of   7
         Electromagnetics. Give the limitation of
         Gauss's law.

    (b) Given a field $\vec{E} = (-6y/x^2)\ \hat{a}_x + (6/x)$ 7
         $\hat{a}_y + 5\hat{a}_z$ V/m. Calculate the potential
         difference V_{AB}, where A and B are (-7,2,1)
         and (4,1,2) respectively.

2. (a) What is capacitor ? Define the capacitance   7
         of a capacitor and state its unit, obtain the
         capacitance of isolated sphere.

    (b) State and prove the boundary conditions of   7
         $\vec{E}$ and $\vec{D}$ for dielectric surface.

3. (a) State and explain Ampere's Circuital Law. **7**
        Describe any two applications of ampere's
        circuital law.

    (b) Derive the expression for energy stored and **7**
        energy density in a magnetic field.

4. (a) Explain Faraday's law of Electromagnetic **7**
        Induction and derive emf equation for
        Faraday's disc generator.

    (b) Derive the expression of Equation of **7**
        continuity. Give the concept of
        Displacement current.

5. (a) State and prove Poynting's theorem. Also **7**
        give the physical interpretation of $\vec{E} \times \vec{H}$.

    (b) Define wave polarization. Give the **7**
        condition for linear, elliptical and circular
        polarization.

6. (a) The lossless transmission line has **7**
        characteristic impedance of 75Ω and phase
        constant of 3 rad/m at 100MHz. Find
        Inductance and capacitance of the line per
        meter.

    (b) An open wire transmission line has **7**
        R=5 Ω/m
        L=5.2×10^{-8} H/m
        G=6.2×10^{-3} mho/m
        C= 2.13×10^{-13} F/m
        frequency =4 GHz, Find Z_0, γ and V_p.

7. Write short note on the following (*any two*)   7x2=14

   (a) Laplace and Poisson's equation

   (b) Biot savart's law

   (c) Maxwell's equation

   (d) Reflection coefficient.

   ———