| **BIEE-005** |

# B.Tech. VIEP - ELECTRICAL ENGINEERING - III

## Term-End Examination

## June, 2011

### BIEE-005 : ELECTROMAGNETIC THEORY

*Time : 3 hours*          *Maximum Marks : 70*

*Note :*   *Answer **any seven** questions.*

1. State and prove Gauss's theorem.    **10**

2. A charge $+Q$ is located at A $(-a, 0, 0)$ and another charge $-2Q$ is located at B $(a, 0, 0)$. Show that the neutral point also lies on the $x-$axis where $x = -5.83a$    **10**

3. Obtain Green's function for a two - dimensional region.    **10**

4. Prove that the potential associated with a field plot consisting of curvilinear rectangles satisfies the laplaces equation.    **10**

5. Give the analogy between electric current and electric flux.    **10**

6. State Maxwell's equations for free space and prove **10** that they are satisfied by $E = -\dfrac{\partial A}{\partial t}$ and B = curl A provided that

   div A = 0 and $\nabla^2 A = \dfrac{1}{C^2}\dfrac{\partial^2 A}{\partial t^2}$.

7. For an electromagnetic wave explain the laws of **10** reflection and Snell's law of refraction.

8. A 5 GHz plane wave is propagating in a large **10** block of polystyrene ($\in_r = 2.5$) The amplitude of the electric field being 10 mV/m, find :
   (a) velocity of propagation
   (b) wavelength and
   (c) amplitude of magnetic field intensity

9. Discuss lossy transmission lines and show the **10** circuit representation of a section of a lossy transmission line.

10. Write a short note on **any two** of the following. **5+5=10**
    (a) Pressure on surface of charged conductors
    (b) Pressure on boundary surfaces of two dielectrics.
    (c) Boundary surfaces and conditions.

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