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BIEE-005

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B.Tech. VIEP - ELECTRICAL ENGINEERING - III / BTELVI

Term-End Examination

December, 2011

BIEE-005 : ELECTROMAGNETIC THEORY

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any seven** questions of the following.*

1. Explain and derive Coulomb's equation. Here what is the role of permittivity of free space. **10**

2. Evaluate the sum : **5x2=10**

(a) $$\sum_{m=0}^{5} \frac{1+(-1)^m}{m^2+1}$$

(b) $$\sum_{m=1}^{4} \frac{(0.1)^m+1}{\left(4+m^2\right)^{1.5}}$$

3. A straight line charge extending along the Z axis in a cylindrical coordinate system from $-\infty$ to ∞. Find electric field intensity E at any and every point. **10**

4. Derive a relation for energy expended in moving a point charge in an electric field. **10**

5. Transform the vector $B = Ya_x - Xa_y + Za_z$ into cylindrical coordinates. **10**

6. Explain Biot savant law. Show that total current crossing any closed surface is zero. **10**

7. What do you know about standing wave ratio ? Explain, **5+5=10**

   what value of 'S' results when $\Gamma = \pm \frac{1}{2}$?

8. We wish to coat a glass surface with an appropriate dielectric layer to provide total transmission from air to the glass at a wavelength of 570 nm. The glass has dielectric constant $E_R = 2.1$. Determine the required dielectric constant for the coating and its minimum thickness. **10**

9. Light is incident from air to glass at Brewster's angle. Determine the incident and transmitted angles. **10**

10. Write short notes on ***any two*** of the following : **5x2=10**
    (a) Smith's Chart
    (b) Pointing Vector
    (c) Green's Function