

II B.Tech I Semester(RR) Supplementary Examinations, May/June 2010**ELECTROMAGNETIC FIELDS
(Electrical & Electronic Engineering)****Time: 3 hours****Max Marks: 80****Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Find the point charge placed at the center of square which will hold four equal charge $+Q$ each in equilibrium at the corners of the square [8]
(b) Find the value of electric potential at the point at which $E = 0$ when point charge of $3\mu C$ and $5\mu C$ are located at $(0,0,0)$ and $(0.6,0)m$ in XY plane [8]
2. (a) State and explain Gauss's law. [8]
(b) Using gauss law Find E at any point due to long infinite charge wire. [8]
3. (a) A co axial cable with inner and outer conductor radii 'a' and 'b' respectively have the respective voltage V_a and V_b . By using laplaces equation, find E at all points. [10]
(b) The construction of a paper capacitor is as follows: Aluminum foil of 100 cm^2 area is placed on both sides of paper of thickness 0.03 mm . If the dielectric constant of paper is given as 3, and its dielectric breakdown strength is 200 kV/cm , what is the rating of the capacitor? [6]
4. (a) Derive the integral form of continuity equation and also write its meaning. [10]
(b) What is the Capacitance of a Capacitor consisting of two parallel plates 30 cm by 30 cm , Separated by 5 mm in air. What is the energy stored by the capacitor if it is charged to a potential difference of 500 volts . [6]
5. Derive an expression for the magnetic field intensity on the axis at a height 'h' due to a current carrying rectangular loop of sides 'a' and 'b'. [16]
6. (a) Derive an expression for force per meter length between two straight long parallel wires situated in space, separated by a distance 'd' in carrying a steady current of I amp. in the opposite direction. [8]
(b) Two long straight parallel wires in air 2 m apart carry currents I_1 & I_2 in same direction. The field intensity H at mid way is 7.5 AT/m . If the force on each wire per unit length is $2.5 \times 10^{-4}\text{ N}$, Determine the values of I_1 & I_2 . [8]
7. A wire is bent in to the form of a circle of radius 10 cm . A d.c current of 10 Amps flows in the coil. Find vector magnetic potential at the centre of the coil Medium is air. [16]
8. Explain the Faradays disc generator and derive an expression for finding the unknown magnetic field. [16]
