Uni. Roll No.....

Course: B.Tech, I-Year, I - Mid Term (Even Sem.) Examination, 2013-14

Subject: Engineering Physics - II (AHP-102)

Time: 90 Minutes **MM: 20**

Section-A

Note:Attempt all five questions. **1× 5 = 5**

Q.1 Define the standard Ampere's circuital law.

Q.2 Write the relation among $\vec{D}$, $\vec{E}$ and $\vec{P}$, where the symbols have their usual meaning.

Q.3 Using the Maxwell's concept of displacement current, write the modified form of Ampere's circuital law.

Q.4 Write down that Maxwell's equation which is based on the Faraday's law.

Q.5 Express the pointing vector along which the electromagnetic field energy per unit area flows.

Section B

Note: Attempt any three questions. **2x3=6**

Q1. A parallel plate capacitor with plate area of 5 cm^2 and plate separation of 1 mm has a voltage of 50 sin $10^3 t$ applied to its plates. Calculate the displacement current assuming $\varepsilon = 2\varepsilon_0$.

Q.2 Assuming that all the energy from a 1000 watt lamp is radiated uniformly, Calculate the amplitudes of electric and magnetic fields of radiation at a distance of 5m from the lamp.

Q.3 Write down the integral forms of Maxwell's equations and explain the physical significance of each equation.

Q.4 A 0.2cm thick insulator of dielectric constant 6 is filled inside the plates, separated by 1 cm and of area 100 cm^2 of a parallel plate capacitor, the potential difference between the plates is 100V.Find the value of **E** and **P**.

Section C

Note: Attempt any three questions. **3x3=9**

Q.1 Derive an expression for plane electromagnetic wave in the free space and show that velocity of plane electromagnetic wave in the free space is given by $c = 1/\sqrt{(\mu_o \in_o)}$.

Q.2 Derive an expression for plane electromagnetic wave in conducting medium and obtain the solution.

Q.3 Deduce poynting theorem for the flow of energy in an electromagnetic field .

Q.4 Obtain an expression for Lorentz equation for local field and hence deduce Claussius - Mossotti relation in dielectrics subjected to static electric field.

(Physical data: $\mu_o = 4\pi \times 10^{-7}$ N/A^2 , $\in_o = 8.85 \times 10^{-12}$ C/Nm^2 **)**