Sr. No.....

May 2019

B.Tech IV SEMESTER

Electromagnetic Field Theory (E-212) scheme-2010

Time: 3 Hours | **Max. Marks:60**

Instructions:
1. *It is compulsory to answer all the questions (2 marks each) of Part -A in short.*
2. *Answer any four questions from Part -B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Any other specific instructions*

PART -A

Q1 (a) State the gauss law of electrostatics. (2)

(b) Explain the physical interpretation of divergence. (2)

(c) What is meant by displacement current? (2)

(d) Write down the magnetic boundary conditions for conductor, insulator interference. (2)

(e) Mention the properties of uniform plane wave. (2)

(f) Write short notes on imperfect dielectrics (2)

(g) Explain the significance of characteristic equations of transmission line. (2)

(h) Define phase velocity and group velocity and obtain relation between them. (2)

(i) What is use of smith chart in transmission line theory? (2)

(j) Write a short note on characteristic impedance. (2)

PART -B

Q2 (a) Explain the Stoke's Theorem and prove it. (5)

(b) State and prove Ampere's work law in differential vector form. (5)

Q3 (a) Derive the boundary conditions for normal and tangential component of electric field intensity $\underset{E}{\rightarrow}$ and Electric field density $\underset{D}{\rightarrow}$ at interference between two perfectly dielectric media. (5)

(b) Discuss the concept of magnetic vector potential. (5)

Q4 (a) Derive an expression for displacement, conduction current densities. Also obtain an expression for continuity current relations. (5)

(b) Discuss the reflection of plane wave at the interface of conductor for the normal incidence as well as oblique incidence. (5)

Q5 (a) With necessary explanation, derive the Maxwell's equation in differential and integral forms. (5)

(b) Derive relation between E&H in uniform plane wave propagation and define intrinsic impedance and give its physical significance. (5)

Q6 (a) Define Poynting vector & derive an expression for poynting theorem. (5)

(b) A plane wave of 200MHz, travelling in free space normally on a large block of (5)

material having $\varepsilon_r = 4$, $\mu_r = 9$ and $\sigma = 0$. Determine η_1, η_2, β_1, β_1, Γ_T, Γ_R.

Q7 (a) A lossless transmission line of characteristics impedance $50\angle 0^0$ ohms and half wavelength is left open circuited at the far end. The r.m.s. value of open circuited voltage is 10V. Calculate the r.m.s. value of voltage and current at a distance of eight wavelengths away from the open circuit. (5)

(b) What are standing waves? Define reflection coefficient and VSWR of a transmission line. (5)