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Total No. of Questions : 09] **Paper ID [EC208]** [Total No. of Pages : 02

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Semester - 4th)

ELECTROMAGNETIC FIELD THEORY (EC - 208)

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1) *(10 x 2 = 20)*

a) Define electric field intensity and electric flux density.

b) State Ampere's law of forces.

c) What do you mean by displacement current.

d) Define Skin Depth.

e) What is surface impedance.

f) Define Reflection coefficient.

g) How the electromagnetic waves propagate through the wave guide.

h) What do you mean by TEM waves?

i) Why em waves are also called as guided waves?

j) What are Smith charts?

Section - B

(4 x 5 = 20)

Q2) Derive an eqn. of continuity for (a) Static fields, (b) Time varying fields.

Q3) Deduce the Maxwell's eqns. for sinusoidally time varying fields.

Q4) An ideal lossless transmission line of $Z_0 = 60\,\Omega$ is connected to unknown Z_L. If SWR = 4, find Z_L, reflection coefficient, transmission coefficient.

Q5) The measured phase velocity of the dielectric medium is 186×10^6 m/s. at t_1 and 223×10^6 m/s at t_2. Find refractive index at two frequencies.

Q6) Discuss the propagation characteristics of TE and TM waves.

Section - C

(2 x 10 = 20)

Q7) Write down the Maxwell's equations in differential and integeral form. Give the physical interpretation of Maxwell's equations.

Q8) (a) Verify that $Ey = f_1(x\text{-}V_O t)$ is a solution of $\frac{\partial^2 Ey}{\partial x^2} = \mu \in \frac{\partial^2 Ey}{\partial t^2}$.

(b) Starting with Maxwell's equations derive the wave eqn for $\vec{E}$ and $\vec{H}$ in free space.

Q9) (a) The transmission line of characteristic impedance of $50\,\Omega$ is terminated with a load of $100 + j\,100\,\Omega$. Find the reflection coefficient and SWR.

(b) Differentiate between linear, elliptical and circular polarization.

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