Total No. of Questions : 8]

SEAT No. :

PC-1774

[Total No. of Pages : 2

[6353]-93
T.E. (E & TC Engineering)
ELECTROMAGNETIC FIELD THEORY
(2019 Pattern) (Semester - I) (304182)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates :

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***
4) ***Use of a Calculator is allowed.***
5) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Derive electrostatic boundary condition for the boundary between two perfect dielectric materials. **[10]**

b) What is an electric dipole? Derive an expression for potential and electric field at point P due to an electric dipole. **[8]**

OR

Q2) a) State the significance of poison's and Laplace's equations. Derive the expression for the same. **[8]**

b) Derive an expression for the capacitance of a parallel plate capacitor. **[10]**

Q3) a) State and Explain Faraday's Law and Lenz's Law. **[8]**

b) A circular loop in $Z = 0$ plane has a radius of 0.2 m and resistance of 10Ω. Find the current flowing through the conductor due to field $\vec{B} = 0.2\sin 10^3 t\hat{a}_z$ **[8]**

OR

Q4) a) What do you mean by displacement current? Prove that the displacement current density is given by $\bar{J}_d = \frac{\delta \bar{D}}{\delta t}$. **[8]**

b) Write Maxwell equation for time varying electromagnetic fields in point form and integral form. **[8]**

Q5) a) What do you mean by uniform plane wave? Using Maxwell's equations in phasor notation derive the expression for Helmholtz's equation in free space. **[10]**

P.T.O.

b) For uniform plane waves explain : **[8]**

i) Depth of penetration

ii) Polarization

OR

Q6) a) Explain how reflection of wave takes place by perfect conductor. **[8]**

b) Derive the parameters of propagation constant, phase constant, intrinsic impedance and velocity for free space medium. **[10]**

Q7) a) A transmission line has characteristics impedance of 50 Ω. Find the reflection coefficient if line is terminated with **[8]**

i) 50 Ω

ii) 0 Ω

iii) 75 + j75 Ω

iv) 75 + j40 Ω

b) What is meant by dissipation less line? Derive an expression for input impedance for dissipation less line. **[10]**

OR

Q8) a) Explain the primary and secondary constants of Transmission line in detail. **[8]**

b) A lossless 100 Ω transmission line is terminated in an impedance 50 + j60 Ω. Find the following using smith chart **[10]**

i) VSWR

ii) Reflection coefficient

iii) Impedance of 0.35λ from the load.