

Q.P. Code : 5455

(3 Hours)

[Total Marks :80

- N.B. :** (1) Question No.1 is compulsory.
 (2) Answer any **three** questions from the remaining **five** questions.
 (3) Assume any suitable data wherever required.
 (4) **Figures** to the right indicate **full marks**.

1. Answer any four of the following. 20
 - (a) With regard to ionosphere discuss the following-
 - i) E layer
 - ii) Sporadic E layer
 - (b) Give significance of boundary conditions for electric field.
 - (c) Write integral form of Ampere's law and interpret the same.
 - (d) What do you mean by depth of penetration?
 - (e) Derive the boundary conditions for electric and magnetic field.

2. (a) Explain earth reflection on horizontally and vertically polarized wave. 10
 (b) Derive Maxwell's equation in point and integral form. 10

3. (a) Compare scalar and vector potential. 5
 (b) Derive wave equation for good dielectric medium. 5
 (c) A media has the following properties $\mu_r = 8$, $\epsilon_r = 2$, $\sigma = 10^{-4}$ mho/m at 2GHz. Determine- 10
 - (i) Attenuation Constant
 - (ii) Attenuation Constant in dB
 - (iii) Phase Constant
 - (iv) Propagation Constant
 - (v) Wavelength
 - (vi) Phase velocity
 - (vii) Intrinsic Impedance
 - (viii) Refractive Index
 - (ix) Loss Tangent
 - (x) Is the medium behaving like conductor or dielectric

4. (a) Derive an expression for magnetic field intensity due to finite long straight element. 10
 (b) State the Poynting Theorem and explain meaning of each term. 5
 (c) Derive wave equation in free space. 5

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5. (a) Obtain the reflection and transmission coefficient of a parallel polarized wave incident between a dielectric-dielectric boundary with an oblique incidence. 10
(b) Explain Super refraction and Tropospheric fading. 10
6. (a) What is virtual height of a layer? Why is it called so? Is it more than or less than the actual height of the layer? 5
(b) What is ionosphere? Which layers are present during day and night? Define critical frequency. 5
(c) Prove that static electric field is irrotational and static magnetic field is solenoidal. 10
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