DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Semester Winter Examination – Dec. - 2019

Branch: Electronics and Telecommunication Engineering **Sem.:- V**
Subject with Subject Code:- Electromagnetic Field Theory [BTEXC501] **Marks: 60**
Date:- 09/12/2019 **Time:- 3 Hr.**

Instructions to the Students
1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

(Marks)

Q.1. a) What is importance of boundary conditions? Derive expressions for **E** and **H** in static electric field at following interfaces **(06)**
(i) Dielectric-Dielectric
(ii) Conductor-Dielectric

b) Three field quantities are given by **(06)**

$$\mathbf{P} = 5\mathbf{a}_x - \mathbf{a}_z$$
$$\mathbf{Q} = 4\mathbf{a}_x - \mathbf{a}_y + \mathbf{a}_z$$
$$\mathbf{R} = 5\mathbf{a}_y + \mathbf{a}_z$$

Determine: $(\mathbf{P}+\mathbf{Q}) \times (\mathbf{P}-\mathbf{Q})$, $\mathbf{P} \times (\mathbf{Q}\times\mathbf{R})$ and component of **P** along **Q**.

Q.2. a) State and prove Poynting Theorem. **(12)**

OR

b) Derive expressions for attenuation constant, phase constant, phase velocity, wave velocity, wavelength and intrinsic impedance for the wave propagation in lossy dielectric. **(12)**

Q.3. a) Obtain the expression for the general line equations that give voltage and current at any distance x from source on a transmission line not terminated into Z_0. **(12)**

Q.4. a) Determine the amplitudes of reflected and transmitted **E** and **H** at the interface between two dielectrics at Z = 0. (06)

b) For an ideal dielectric medium state derive Helmholtz equations. (06)

Q.5. a) What are various types of modes in waveguide? Explain them in detail with field patterns. (12)

OR

b) Derive an Expression for attenuation in waveguide. (12)

Q.6. Define the terms: Field radiation pattern, Power radiation pattern, Beam width, Bandwidth, Isotropic antenna, Directivity, Gain, HPBW, Isotropic antenna. (12)

Paper End