

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

June, 2017

00664

BIEE-009 : APPLIED ELECTROMAGNETICS

Time : 3 hours

Maximum Marks : 70

Note : *Attempt any five questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume data, if any missing.*

1. (a) Define standing-wave ratio. How is it related to voltage and current reflection coefficients ? 7
- (b) State and explain Faraday's law of electromagnetic induction. 7
2. (a) State and prove Poynting's theorem. 7
- (b) Explain the terms instantaneous, average and complex Poynting vectors. 7
3. (a) Write and explain differential and integral forms of Maxwell's equations. 7
- (b) Explain the significance of displacement current. 7

4. (a) State and explain Biot-Savart's law for static magnetic fields as applied to different types of current distribution. 7
- (b) Using Biot-Savart's law, derive an expression for inductance per unit length of a long coaxial cable with radii of inner and outer conductors as 'a' and 'b' ($b > a$) respectively. 7
5. (a) Show that the magnetostatic field can be described in terms of vector potential which satisfies the vector Poisson's equation. 7
- (b) Derive the expression $\text{curl } \mathbf{H} = \mathbf{J}$, where the symbols have their usual meanings. 7
6. (a) Explain the phenomenon of polarization when a dielectric slab is subjected to an electric field; with the help of neat sketches. How does this phenomenon reduce the electric field inside the dielectric? 10
- (b) Give the limitations of Gauss's law. 4
7. (a) Derive Poisson's and Laplace's equations in electrostatics. 7
- (b) Considering a parallel plate capacitor, explain the concept of energy density. 7
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