

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

00443

Term-End Examination

December, 2016

BIEE-005 : ELECTROMAGNETIC THEORY

Time : 3 hours

Maximum Marks : 70

Note : *Attempt any five questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. (a) State the Coulomb's law. Four identical charges of $30 \mu\text{C}$ each are located at the four corners of a square, the diagonal measures 8 m. Find the force on a $100 \mu\text{C}$ charge located 3 m above the centre of the square. 7

- (b) State and prove the Gauss divergence theorem and explain its physical significance and applications. 7

2. Two parallel conducting plates are separated by distance 'd' apart and filled with dielectric medium having relative permittivity ' ϵ_r '. Using Laplace's equation, derive an expression for capacitance per unit length of the parallel plate capacitor, if it is connected to a DC source supplying 'V' volts. 14

3. (a) Write Laplace's equations in rectangular and cylindrical co-ordinates system. 7
- (b) State and explain Ampere's circuital law and Stokes' theorem. 7
4. (a) Write about the equation of Continuity and Inconsistency of Ampere's law. 7
- (b) Write down Maxwell's equations in free space for time varying and static fields in differential form. 7
5. (a) Discuss the reflection of an electromagnetic wave from a perfect insulator incident diagonally and perpendicular. 7
- (b) Derive the expression for attenuation factor for electromagnetic waves between parallel conducting planes. Also explain the Snell's law of refraction of waves. 7
6. (a) Explain the double stub method for impedance matching on a transmission line. What are the advantages of double stub over the single stub ? 7
- (b) What is Smith's chart and why is it useful in making transmission line calculations ? 7

7. Write short notes on any *two* of the following : 2×7=14

- (a) Biot-Savart's Law and its Applications
 - (b) Gauss's Theorem
 - (c) Wave Propagation in Dielectric and Conducting Media
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