Exam.Code:0928
Sub. Code: 6587

2053

B.E. (Electronics and Communication Engineering)

Fourth Semester

EC-408: Electromagnetic Theory

Time allowed: 3 Hours | Max. Marks: 50

***NOTE:*** *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section. Use of scientific calculator is allowed.*

*x-x-x*

**Q.**1 Attempt all questions:-

(a) Differentiate between conductors and insulators. **(2)**

(b) Define conduction and convection current densities. **(2)**

(c) Write the integral and point forms of Faraday's laws **(2)**

(d) Define the term phase velocity. **(2)**

(e) In a material for which = 5s/m and r= 1 and E=250 sin 1010t (V/m) find the conduction and displacement current densities. **(2)**

**Section- A**

**Q. 2 (a)** Derive the expressions for Electric field intensity and potential due to an electric dipole. **(5)**

**(b)** State and derive the expression for Equation of continuity. **(5)**

**Q.3 (a)** A filamentary current of 15A is directed in from infinity to the origin on the positive x axis and then back out to infinity along the position y axis. Use the Biot-Savart's law of find H at P (0, 0, 1)? **(5)**

**(b)** State Poynting Theorem. Give an expression for Poynting Theorem. **(5)**

**Q.4 (a)** Find H at the center of an equivalent triangular loop of side 6m carrying current of 8A. **(5)**

(b) Define and explain Scalar Magnetic potential and its limitations. **(5)**

**Section-B**

**Q.5 (a)** Explain load matching using quarter wave transformer. **(5)**

**(b)** Define clearly dominant and degenerate modes with examples. **(5)**

**Q.6 (a)**Evaluate the ratio of the area of a circular waveguide, to that of a rectangular one if both are to have the same cut-off frequency for dominant mode. **(5)**

**(b)** Explain why the TEM waves does not exist in waveguides. **(5)**

**Q.7** (a) How a Cavity resonator is formed? What are its different types? **(5)**

(b) Derive the expression for TM mode in rectangular wave guide. **(5)**

*x-x-x*