Code No: R1621024 **R16** SET - 1

II B. Tech I Semester Supplementary Examinations, October/November - 2020
ELECTROMAGNETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are the properties of potential function (2M)
   b) What is meant by polarization (2M)
   c) State the Ampere's circuital law (2M)
   d) States the Lorentz force equation (2M)
   e) How you determine the self-inductance of a toroid (3M)
   f) What are the modification of Maxwell's equations for time varying fields (3M)

PART -B

2. a) Define electric field in terms of point charge and also in terms of potential, mention salient features of electric field intensity. (7M)
   b) Prove the following expression for the electric field due to infinite line charge along z-axis. $\bar{E} = \frac{\rho_L}{2\pi \in_o \rho} \bar{a}_\rho$ (7M)

3. a) State and prove the boundary conditions at the boundary between two dielectrics? (7M)
   b) Given $\bar{J} = 10^3 \sin\theta \bar{a_r} (A/m^2)$ in spherical co-ordinates, find the current passing through the spherical shell of radius $r = 0.02m$. (7M)

4. a) Using Biot-Savart's law and derive an expression for the magnetic field intensity in the vicinity of a straight current carrying conductor of finite length? (7M)
   b) Explain the Oesterd's experiment (7M)

5. a) Determine the force between two linear parallel conductors carrying currents in opposite directions (7M)
   b) Obtain the expression for torque on a current loop placed in a magnetic field. (7M)

6. a) Derive the expression for energy density in magnetic field? (7M)
   b) Calculate the inductance of a solenoid of 2000 terms wound uniformly over a length of 500mm on cylindrical paper tube 40mm in diameter. The medium is air ($\mu = \mu_o$). (7M)

7. a) Explain the statically and dynamically induced EMFs (7M)
   b) Write the Maxwell's equations both in point and integral forms for time varying fields. (7M)

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