(19)

B.E (FULL TIME) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2011
(ARREAR EXAMINATIONS)

ELECTRICAL AND ELECTRONICS ENGINEERING

THIRD SEMESTER (REGULATIONS -2008)

EE 9202 ELECTROMAGNETIC THEORY

Time : 3 hr Max. Marks : 100

Answer ALL Questions

Part- A (10x 2=20 Marks)

1. Differentiate non-ionizing and ionizing electromagnetic fields with suitable examples.
2. Give example for gradient, divergent and curling fields in electrical engineering.
3. Explain the necessity of having uniform field distribution in an electrical system.
4. Draw the equipotential lines and electric field lines in and around a spherical conductor.
5. Draw the magnetic field inside and around a long solenoid.
6. Derivation of Poisson's equation for magnetostatics in terms of magnetic vector potential
7. Explain Lenz law with example.
8. What are the limitations of circuit theory.
9. Explain when an EM wave will be generated?
10. Find the intrinsic impedance of sea water at 10kHz and 10 MHz with σ=5S/m.

Part- B (5x16=80 Marks)

11. Derive the expression for capacitance for the following configurations starting from field concept (i) parallel plate (ii) coaxial cable

12.a. Classify the different sources of emf .

Explain the positive and negative effects of emf (in human, animal, plant , equipment/system, atmosphere). (6+10)

(OR)

12.b. Field under DC transmission line:
Two long parallel conductor of a DC transmission line separated by 2 meter have charges of ρ_l = 5μc /m of opposite signs. Both the lines are 8 meter above the ground. What is |E| at 4 meter directly below one of the lines.

13.a. State Ampere's Law.
Calculate and plot H inside and outside a circular conductor of uniform current density.

(OR)

13.b. Calculate the force between two conductors carrying current in the same and opposite directions. (2+8)

14.a. Derive the Maxwell's equations with Maxwell's contribution.

(OR)

14.b. Explain in detail the working principle of a DC generator. Also explain when maximum and minimum voltage will be induced.

15.a. Derive the wave characterizing parameters (velocity, propagation constant, intrinsic impedance) for free space, lossless dielectric and conductor.

(OR)

15.b. Derive the transmission and reflection coefficients for the wave traveling through two different media.