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SIIS 186 B - 14
B.Sc. IIIrd Semester Degree Examination
Physics
(Electricity and Electrodynamics)
Paper - III

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer *all* questions from section - A
2. Answer any *five* questions from section - B & *four* questions from section - C

Section - A

Answer the following questions

- 1) What is the impedance in LCR series resonance circuit?
- 2) What is admittance?
- 3) Write the expression of Q - factor in terms of band width?
- 4) What is the phase difference between alternating voltage and current in RC Circuit.
- 5) Define current magnification
- ~~6)~~ Give any one example of scalar and vector field.
- ~~7)~~ What do you mean by the flux of a vector field.?
- ~~8)~~ What is ment by displacement current?
- 9) At which point on the axis of a Solenoid the magnetic field is half
- ~~10)~~ State Lenz's law of electromagnetic induction
- 11) What is dipole moment
- 12) Write the expression for energy density of an EM - Wave
- ~~13)~~ State Amper's Circuital law

- 14) Mention the relation between the induced emf and the rate of change of magnetic flux.
- 15) State Poynting theorem.

Section - B

- 16) Explain the impedance and reactance in an a.c circuit Distinguish between them.
- 17) Show that the current leads the Voltage by $\pi/2$ in a.c circuit containing capacitor.
- 18) Show that $\text{Curl.grad } \vec{E} = 0$ or $\vec{\nabla} \times (\vec{\nabla} \cdot \vec{E}) = 0$
- 19) State and explain Biot - Savart's law
- 20) Write a note on Skin effect
- 21) State and prove Gauss divergence theorem what is its importance
- 22) State and explain Farad's Laws of electromagnetic induction

Section - C

- 23) a) Give comparison between LCR series and parallel resonant circuit (5+5)
b) Derive an expression for cut off frequency of an low pass filter in RC Circuit.
- 24) a) Describe the construction and working of a CRO with neat diagram.
b) Write the applications of CRO (8+2)
- 25) a) State and prove Stoke's theorem.
b) Show that $\vec{\nabla} \times (\vec{\nabla} \times \vec{A}) = \vec{\nabla}(\vec{\nabla} \cdot \vec{A}) - \nabla^2 \vec{A}$ (6+4)
- 26) a) Define electric potential. Derive an expression for electric potential at a point due to a point charge
b) Derive Poisson and Laplace equation in vector notation (6+4)
- 27) a) Write the Maxwell's equation in free space
b) Explain the physical significance of Maxwell's equation.
c) Obtain the expression for the torque on a dipole (2+4+4)
- 28) a) Describe Hertz experiment to produce EM - Waves
b) Write the characteristics of EM - waves. (5+5)