M 8348

Reg. No. : .....

Name : .....

VI Semester B.Sc. Degree (CCSS – Reg./Sup./Imp.) Examination, May 2015
CORE COURSE IN PHYSICS
6B11 PHY : Electrodynamics – II
(2012 Admn.)

Time : 3 Hours Max. Weightage : 30

SECTION – A

Choose the correct answer. **Each** bunch carries a weightage of **1**.

1. i) Which of the following is must suitable for the core of electromagnets ?
   a) Soft iron b) Steel
   c) Copper-nickel alloy d) Air

   ii) The magnetic moment of atomic neon is
   a) Zero b) μ B/2
   c) μB d) 3μ B/2

   iii) A strong magnetic field is applied on a stationary electron, then
   a) Electron moves in the direction of magnetic field
   b) Electron moves perpendicular to the direction of magnetic field
   c) Electron moves opposite to direction of magnetic field
   d) None of the above

   iv) In what form of energy stored in an inductor ?
   a) electric b) magnetic
   c) mechanical d) both electric and magnetic

2. i) Electromagnetic waves were first of all produced by
   a) Marconi b) J.C. Bose
   c) Maxwell d) Hertz

   ii) The electromagnetic wave used in communication are
   a) U.V. rays b) IR rays
   c) Microwaves d) Visible

P.T.O.

iii) Name the scientist who built and operate cyclotron

a) Lawrence b) Living stone

c) Kerst d) Both a) and b)

iv) Which of the following instrument used to accelerate electron ?

a) Cyclotron b) Betatron

c) CRO d) None of the above **(2×1=2)**

SECTION – B

Answer **any six**. **Each** question carries **1** W.

3. Discuss the effect of magnetic field on atomic orbits.

4. Give the physical interpretation of bound currents.

5. Derive Faraday's law in differential form.

6. Describe the boundary condition for B.

7. Write down the wave equation in one dimension and explain.

8. Define reflection coefficient.

9. Give the principle of CRO.

10. List some of the application of electromagnetic fields. **(6×1=6)**

SECTION – C

Answer **any nine**. **Each** question carries **2** W.

11. Show that divergence of a curl is always zero.

12. Discuss Ampere's law in magnetized materials.

13. Show that the energy of a magnetic dipole in a magnetic field is given by $U = -m.B$.

14. Show that $\nabla \times B = -\frac{\partial B}{\partial t}$.

15. Show that $M_{12} = M_{21}$.

16. Show that Lenz's law is in agreement with the law of conservation of energy.

17. Calculate the speed of electromagnetic wave in free space $\mu_0 = 4\pi \times 10^{-7}$ and $\epsilon_0 = 8.857 \times 10^{-12}$.

18. A laser beam has a power of 25 GW and diameter of 2 mm. Calculate the peak value of E and B.

19. Obtain the wave equation for E and B.

20. Describe the function of time base voltage in a CRO.

21. What is the principles and working of magnetic separator ?

22. Briefly explain the principle and operation of a DC motor. **(9×2=18)**

SECTION – D

Answer **any one** question. **Each** carries a weightage of **4**.

23. Derive Maxwell's equations in matter.

24. With a neat diagram explain the principle and working of a cyclotron. Compare its action with Betatron. **(1×4=4)**
