Reg. No. : .....

Name : .....

K16U 0212

VI Semester B.Sc. Degree (CCSS-Reg./Supple./Improv.)
Examination, May 2016
CORE COURSE IN PHYSICS
6B11 PHY : Electrodynamics – II
(2012 Admn. Onwards)

Time : 3 Hours Max. Weightage : 30

SECTION – A

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

1. I) A magnetic field has no effect on
   a) Stationary magnets b) Moving magnets
   c) Stationary charges d) Charges in motion

   II) Which of the following quantity is not a vector quantity ?
   a) Magnetic moment b) Magnetic intensity
   c) Magnetic potential d) Magnetic lines of force

   III) Lenz's law is a consequence of law of conservation of
   a) Charge b) Momentum c) Mass d) Energy

   IV) The equivalent quantity of mass in electricity is
   a) Charge b) Potential c) Inductance d) Current

2. I) The meaning of the expression $\sum.\phi_s$ E.ds is
   a) Charge b) Current c) Electric flux d) Electric field

   II) The wavelength of electromagnetic waves produced by Hertz was
   a) 6 mm b) 6 cm c) 6 m d) 6 km

   III) A charged particle is released from rest in a region of steady and uniform electric and magnetic field which are parallel to each other. The particle was move in a
   a) Straight line b) Circle c) Helix d) Cycloid

   IV) When a charged particle enters in a uniform magnetic field, its KE
   a) Remains constant b) Increases
   c) Decreases d) Become zero **(2×1=2)**

P.T.O.

SECTION – B

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

3. Show that the torque on any steady current distribution in a uniform field is the cross product of M and B.
4. Write down the expression for the magnetic field of a uniformly magnetized sphere.
5. Define mutual inductance.
6. Discuss Maxwells equation in matter.
7. Define transmission coefficient.
8. Name the factors on which the refraction index of a conducting medium depend.
9. Discuss the principle of magnetic separator.
10. What is cyclotron ? **(6×1=6)**

SECTION – C

Answer **any nine** questions. **Each** carries **2** weightage.

11. Obtain an expression for the interaction energy of two magnetic dipoles.
12. Discuss the properties of ferromagnetic material.
13. Find the new field inside a sphere when it placed in an originally uniform magnetic field B_0.
14. What are boundary conditions of E and B ?
15. How did Maxwell's modify Ampere's law ?
16. State and explain Poynting theorem.
17. Derive the wave equation in one dimension.
18. Discuss the boundary condition for transmission.

19. A source has a power output of 1 kW. An observer is at a distance 1 m from it. Find the electric and magnetic fields as observed by the observer.
20. Describe the function of time base voltage in a CRO.
21. What is the principle of magneto hydrodynamic generator ? Give its uses.
22. Discuss the principle and operation of mass spectrometer. **(9×2=18)**

SECTION – D

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

23. a) Derive Neumann's formula for the mutual inductance of coupled coils.
    b) Using Maxwell's equation show that $\nabla \times H = J + \frac{\partial D}{\partial t}$.
24. a) With a neat diagram explain the principle and working of a Betatron.
    b) Compare the operation of Betatron and Cyclotron. **(1×4=4)**

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