Reg.No.

S.No. 432 BATCH: 87- 2013, 2015, 2016

END OF SEMESTER EXAMINATIONS, APRIL / MAY 2017
ELECTRICITY AND MAGNETISM
SUBJECT CODE: 15UAPH02

MAJOR: B.Sc. PHYSICS SEMESTER : II
TIME : 3 HOURS MAX.MARKS: 75

SECTION – A (10 X 1 = 10)

Answer ALL Questions:
Choose the best answer:

1. The number of electrons for one coulomb of charge is
   a) 6.25×10^{18} b) 6.25×10^{19} c) 6.25×10^{21} d) 6.25×10^{23}

2. A parallel plate capacitor is charged. If the plates are pulled apart
   a) the capacitance increases b) the total charge increases
   c) the potential difference increases d) the charge and the potential difference remain the same

3. Kirchhoff's first law $\sum I = 0$ at a junction deals with conservation of
   a) charge b) energy c) momentum d) angular momentum

4. Unit of specific conductivity is
   a) Vm^{-1} b) $ohm^{-1} m^{-1}$ c) Vm^{-2} d) $ohm^{-1}m^{-2}$

5. Which one of the following is thermoelectrically positive?
   a) Pt b) Bi c) Ni d) Cd

6. Which one of the following shows Negative Thomson effect?
   a) Ag b) Zn c) Bi d) Sb

7. The unit of magnetic Induction is
   a) Am^{-1} b) Am c) Weber d) Tesla

8. Which one of the following instrument is used to measure absolute capacitance of a capacitor?
   a) Thermocouple b) Thermostate c) Moving coil Galvanometer d) Ballistic Galvanometer

9. In Lenz's law there is conservation of
   a) charge b) momentum c) energy d) current

10. Alternating current can not be measured by d.c. ammeter, because
    a) a.c. changes direction b) a.c. current cannot pass through a.c ammeter
    c) average value of complete cycle is zero d) a.c. ammeter will get damaged

SECTION – B (5 X 4 = 20)

Answer ALL Questions:

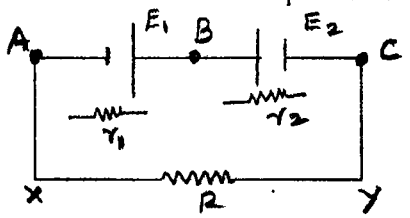
11. a) State and explain coulombs law.
    (OR)
    b) Write note on (i) Mica capacitor (ii) Electrolytic capacitor

12. a) Define current density. Derive an expression for current density.

.... 2 ....

(OR)

b) Two cells of e.m.f $E_1 = 1.5v$ and $E_2 = 2v$ and internal resistance of $r_1 = 1.0\ \Omega$ and $r_2 = 1.5\Omega$ respectively are connected to an external resistance $R = 2.5\ \Omega$ as shown. Find the current in the circuit and the potential difference between points Band C.



13. a) Write note on 'Peltier effect'.

(OR)

b) What is a thermo-electric diagram? Show how it is utilized to represent Thomson e.m.f 's, neutral temperature.

14. a) State and prove Ampere's circuital law.

(OR)

b) Calculate the value of torque on a current loop placed in a uniform magnetic field.

15. a) Write note on mutual Inductance.

(OR)

b) Deduce an expression for the emf induced in a coil rotating in a uniform magnetic field.

SECTION – C (5 X 9 = 45)

Answer ALL Questions:

16. a) Calculate the electric field due to a uniformly charged sphere at points
i) outside the sphere ii) at the surface of the sphere iii) inside the sphere

(OR)

b) Obtain an expression for capacitance of the cylindrical capacitor. Mention any two uses of capacitors.

17. a) Derive an expression for the electrical conductivity of a metal on Lorentz – Drude theory and obtain ohm's law.

(OR)

b) State Kirchhoff's laws of distribution of currents in an electrical network. Apply these laws to deduce the condition of balance of a wheat stone's bridge.

18. a) Prove that the Peltier co-efficient of a pair of metals is the product of the absolute temperature and thermoelectric power.

(OR)

b) Explain Thomson effect. Define Thomson co-efficient. Describe an experiment to demonstrate Thomson effect.

19. a) State Biot-Savart law. Using this law find magnetic induction at a point on the axis of a circular coil carrying current.

(OR)

b) Explain how absolute capacitance of a capacitor is determined using a ballistic Galvanometer.

20. a) Describe Anderson's bridge method to determine self inductance of a given coil.

(OR)

b) Explain the experiment to determine frequency of an Alternating current using sonameter. Also determine mean value of A.C.

* * * * *