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MONTHLY TEST-JULY 2015
STD XII   PHYSICS   Max marks: 50

Section A

1. An electron moving through a uniform magnetic field along the negative x direction experiences a force along the positive z direction. What is the direction of the magnetic field? (1)
2. A wire of resistance 2R is bent into a circle. What is the resistance across the ends of its diameter? (1)
3. A voltage of 30 V is applied across a carbon resistor with first, second and third rings of blue, black and yellow colours respectively. Calculate the value of current in mA through the resistor. (1)
4. The distance between the plates of a parallel plate capacitor is d. A metal plate of thickness d/2 is placed between the plates, what will be the new capacitance? (1)

Section B

5. The variation of potential difference with length for 2 potentiometers A&B is as shown. Which of them would you prefer and why? (2)

6. Three capacitors of equal capacitance when connected in series have a net capacitance 1μF what is the net capacitance when connected in parallel? Find the ratio of energy stored in the two configurations if they are both connected to the same source. (2)
7. Plot the variation of terminal voltage versus current for a cell . From the graph show how the emf of the cell and internal resistance can be determined. (2)

8. A charged particle enters perpendicular to a uniform magnetic field. Show that work done by the field on the particle is zero. (2)
9. Using Kirchhoff's laws determine the current I_1 flowing in the circuit (2)

Section C

10. Give the working principle of a meter bridge. In a meter bridge, balance point is found at a distance l_1 with resistance R and S as shown in the figure. When an unknown resistance X is connected in parallel with the resistance S, the balance point shifts to a distance l_2. find an expression for X in terms of l_1, l_2 and S (3)

11. Two metallic wires of the same material have the same length but cross sectional area in the ratio 1:2. they are connected (i) in series and (ii) in parallel. Compare the drift velocities of electrons in the two wires in both the cases (i) & (ii)   (3)

12. Write any two factors on which internal resistance of a cell depends. The reading on a voltmeter, when a cell is connected across it is 2V. When the terminals of the cell are also connected to a 3 resistance the voltmeter reading drops to 1.5V. Find the internal resistance of the cell.   (3)

13. Calculate the equivalent resistance of the given network between points A & B Also calculate the current through CD and ACB if a 10V DC source is connected between A and B and the value of R is 2 Ω   (3)

Section D
14. Supriya was doing potentiometer experiment in physics lab. But her galvanometer showed same side deflection. She checked the circuit and found the connections to be correct. Her friend Manasi came to help. Manasi explained the possible reasons for the situation.

I)   What are the values displayed by Manasi?

II)   State the reasons why galvanometer showed same side deflection.

(4)

<u>Section E</u>

15. a) State the function of electric and magnetic field in a cyclotron.

  b) Derive an expression for the cyclotron frequency.

  c) Two particles A and B of equal charge enter a cyclotron with same momentum. A has twice the mass as B . Which of them under goes a larger circular path?

(5)

16. (i) Derive an expression for the energy stored in a capacitor.   (ii)

  A capacitor is connected to a battery and a dielectric is introduced between the plates. What happens to

  a) Charge

  b) Capacitance

  c) Electric field

  d) Energy stored   (5)

17. a) Give the principle of a potentiometer. Draw the circuit diagram showing the potentiometer used to determine the internal resistance of a cell.

  b) Using a potentiometer a balance point of 60cm was obtained when a cell of 1.5V emf was used. The balance point shifts to 80cm when a cell of unknown emf was used. Find the unknown emf.   (5)

18. Define drift velocity. Establish the relation between drift velocity and current. Hence deduce Ohm's law.   (5)