INTERNATIONAL INDIAN SCHOOL, RIYADH

GRADE – XII **PHYSICS**

FIRST TERM WORKSHEET – 2013 – 14

CH -1 Electric charge and Fields

1. 'Electric charge is quantized'. What is meant by this statement?
2. Define the term electric dipole moment. Is it scalar or vector?
3. Write the SI unit of electric flux.
4. Why no two electric lines of force can intersect each other.
5. Derive an expression for torque acting on an electric dipole in a uniform electric field.
6. A proton and an electron are placed 1.6 cm apart in free space. Find the magnitude of electrostatic force between them. What is the nature of this force?
7. Derive an expression for dipole field intensity at a point on the dipole axis.
8. State Gauss's theorem in electrostatics. Apply this theorem to derive an expression for electric field intensity at a point near an infinitely long straight charged wire.
9. A conducting sphere of radius 10 cm has an unknown charge. If the electric field 20 cm from the center of the sphere is 1.5×10^3 N/C and points radially inwards, what is the net charge on the sphere?

Electromagnetic Induction and Alternating currents

1. What are eddy currents? How can they be minimized?
2. State the law that gives the polarity of induced emf.
3. Define self inductance. Write its SI unit.
4. How will the inductive reactance and capacitive reactance change on doubling the frequency of alternating current?
5. Peak value of emf of an a.c source is E_o. What is its rms value?
6. What is an impedance triangle?
7. A wire of length 0.1m moves with a speed of 10 m/s perpendicular to a magnetic field of induction 1 Wb/m^2. What is the value of induced emf?
8. A current of 10 A in primary of a circuit is reduced to zero at a uniform rate in 10^{-3}s of coefficient of mutual inductance is 3H, what is the induced emf in the secondary?
9. Derive a expression for the coefficient of mutual inductance between two long solenoids.

10. A transformer has an efficiency of 80%. It works at 4 kw and 100 volt. If the secondary voltage is 240 V, find the primary and secondary currents.
11. Explain the construction and working of a.c generator.
12. Show that average power consumed per cycle in an a.c circuit containing an ideal capacitor is zero.
13. With the help of a suitable phasor diagram, obtain a relation for impedance in a series LCR circuit.
14. Explain the term capacitative reactance. Show graphically the variation of capacitative reactance with frequency of alternating voltage.
15. Define Q factor of the circuit.

Electromagnetic waves

1. Name the electromagnetic waves in the order of increasing wavelength.
2. Write two uses of X – rays.
3. What do you mean by the transverse nature of electromagnetic waves?
4. Define displacement current and get modified form of Ampere's circuital law.
5. Write uses of
    a. Infra red
    b. Gamma rays
    c. Radio waves
    d. Micro waves
6. What is electromagnetic spectrum?
7. Write the characteristics of electro magnetic waves.

Magnetic effect of current and magnetism

1. State curic law in magnetism.
2. Which materials have negative value of magnetic susceptibility?
3. Which material is used in making permanent magnets and why?
4. What is the direction of dipole moment?
5. What is the angle of dip at a place where horizontal and vertical components of earth's field are equal?

6. What are magnetic elements at a place? Define them.
7. Describe construction, theory and working of a tangent galvanometer.
8. What is a cyclotron? Discuss its construction, working and theory.
9. A short bar magnet placed with its axis at 30° with a uniform external magnetic field of 0.15 T experiences a torque of magnitude equal to 4.5×10^{-2} J. what is the magnitude of magnetic moment of the magnet?
10. A horizontal overhead power line carries a current of 90A in east to west direction. What is the magnitude and direction of the magnetic field due to the current 1.5m below the line?

Ch 2 Electric potential and capacitance

1. The electric potential V is constant in a region. What can you say about the electric field there?
2. Draw an equipotential surface for a uniform electric field?
3. Sketch a graph to how charge Q given to a capacitor of capacity C varies with the potential difference V.
4. How will you obtain maximum capacitance from three given condensers?
5. On inserting a dielectric between the plates of a capacitor, its capacitance is found to increase 5 times. What is the relative permittivity of the dielectric?
6. Write the principle of Van de graff generator.
7. Explain what is meant by dielectric polarization.
8. Derive an expression for the energy stored in a parallel plate capacitor.
9. A 600 pF capacitor is charged by a 200 V supply. It is then disconnected from the supply and is connected to another uncharged 600 pF capacitor. How much electrostatic energy is lost in this process?
10. Three capacitors each of capacitance 9 pF are connected in series.
    a. What is the total capacitance of the combination?
    b. What is the potential difference across each capacitor if the combination is connected to a 120 V supply.
11. Derive an expression for potential due to an electric dipole.
12. Derive a relation between electric field and potential.

Ch 3 Current Electricity

1. State the principle of working of a potentiometer.
2. State two uses of potentiometer.

3. State Kirchhoff's rules.
4. A cell of emf E and internal résistance r is connected across a variable resistor R. plot a graph showing the variation of terminal potential V with resistance R. predict from the graph the condition under which V becomes equal to E.
5. What is the effect of temperature on the relaxation time of electrons in a metal?
6. Find the value of carbon resistance when the sequence of bands marked on it, is brown, brown, black.
7. Establish a relation between Emf and potential difference.
8. Establish a relation between drift velocity and relaxation time of free electrons in a metallic conductor carrying a current.
9. With the help of a circuit diagram describe a method to find the internal resistance of a cell using potentiometer.
10. Find the current flowing through a copper wire of length 0.2 m, area of cross – section 1 mm^2, when connected to a battery of 4V. Given that electron mobility as $4.5 \times 10^{-6}\ m^2v^{-1}s^{-1}$ and charge on electron 1.6×10^{-19}C. The number density of electron in copper is $8.5 \times 10^{28} m^{-3}$