CLASS 12th PHYSICS IMPORTANT QUESTIONS

Question 1

(A) In questions (i) to (vii) below, choose the correct alternative (a), (b), (c) or (d) for each of the questions given below:

(i) A body has apositive charge of $8 \times 10\text{-}19C$. It has:

(a) an excess of 5 electrons

(b) a deficiency of 5 electrons

(c) an excess of 8 electrons

(d) a deficiency of 8 electrons

(ii) The relative permittivity of water is 81. ε_0 and ε_w are permittivities of vacuum and water respectively. Then:

(a) $\varepsilon_0 = 9 \varepsilon_w$ (b) $\varepsilon_0 = 81 \varepsilon_w$ (c) $\varepsilon_w = 9 \varepsilon_0$ (d) $\varepsilon_w = 81 \varepsilon_0$

(iii) A closed surface in vacuum encloses -q and +3q. The total electric flux emerging out of the surface is:

(a) zero   (b) $2q/\varepsilon_0$ (c) $3q/\varepsilon_0$ (d) $4q/\varepsilon_0$
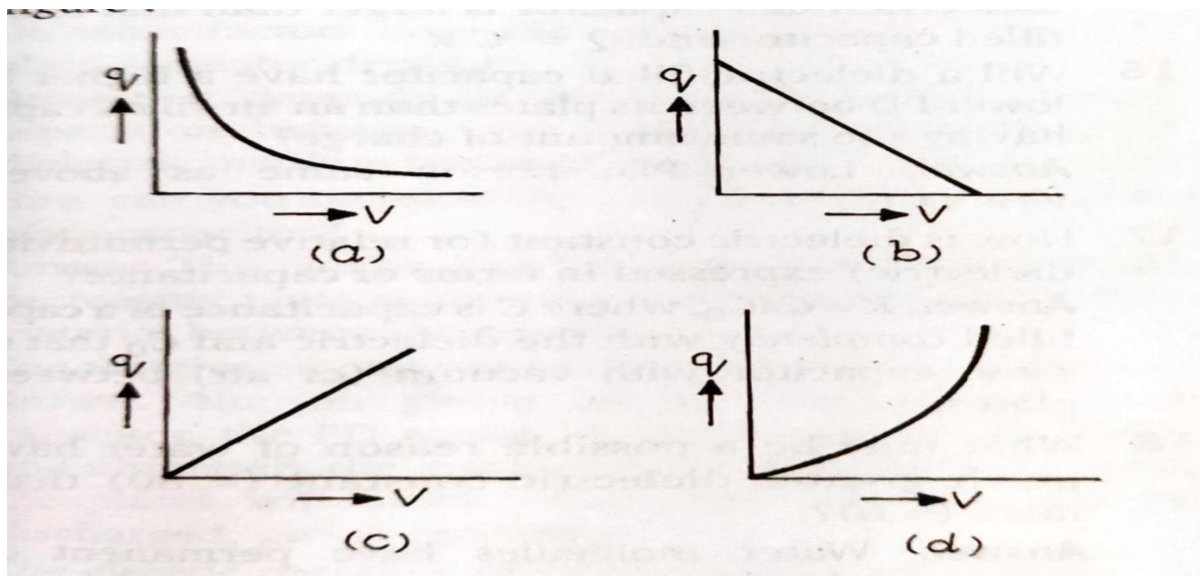
(iv) The correct relation:

(a) J=CV   (b) J=VA   (c) J=C/V   (d) V= J-C

(v) A conductor is charged to a potential V by imparting a charge q, the variation of q with V is represented by figure:

(vi) In current electricity, Ohm's law is obeyed by all:

(a) Solids   (b) metals   (c) liquids   (d) gases

(vii) When a charged particle is projected perpendicular to a uniform magnetic field, it describes a circular path in which:

(a) speed remains constant

(b) its velocity remains constant

(c) its momentum remains constant

(d) its kinetic energy increases

B) Answer the following questions briefly:

(i) Name the conservation principle implied in Kirchhoff's Junction law for electric circuits.

(ii) Write Biot Savart's law in vector form.

(iii) How will you convert moving coil galvanometer into voltmeter?

(iv) What is the potential energy of a dipole of moment p when it is perpendicular to a uniform electric field E?

(v) What do you mean by Quantization?

(vi) What is the effect of temperature on the dielectric constant K of a dielectric?

(vii) What do you mean by drift speed of free electrons?

<div align="center">SECTION B –</div>

Question 2

In the circuit shown in figure, E_1 = 17 V, E_2 = 21V, R_1 = 2 ohm, R_2 = 3 ohm and R_3 = 5 ohm. Using
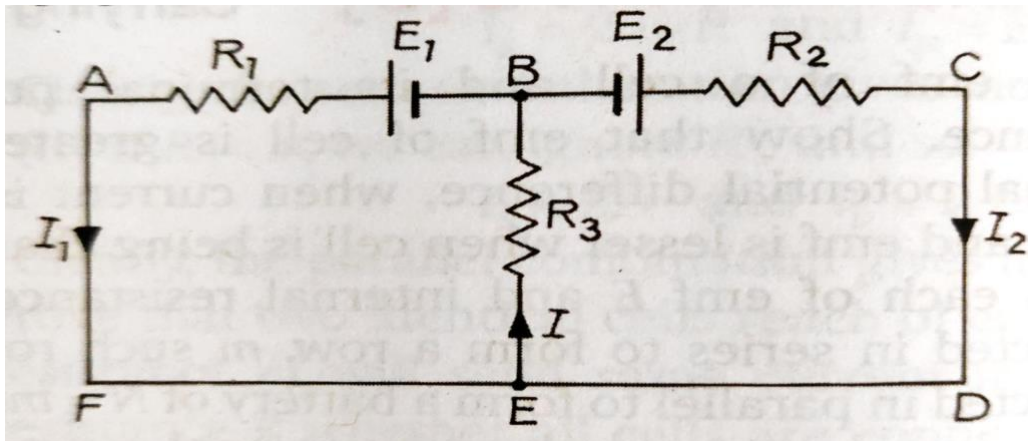
Kirchhoff's law, find currents flowing through resistors R_1, R_2, and R_3?

<div align="center">OR</div>

The wires which connect the battery of an automobile to start its motor carry a current of 300 ampere. What is the force per unit length between the wires if they are 70 cm long and 1.5 cm apart? Is the force attractive or repulsive?

Question 3

Draw the electric flies of force due to (i) equal positive points charges (b) an electric dipole
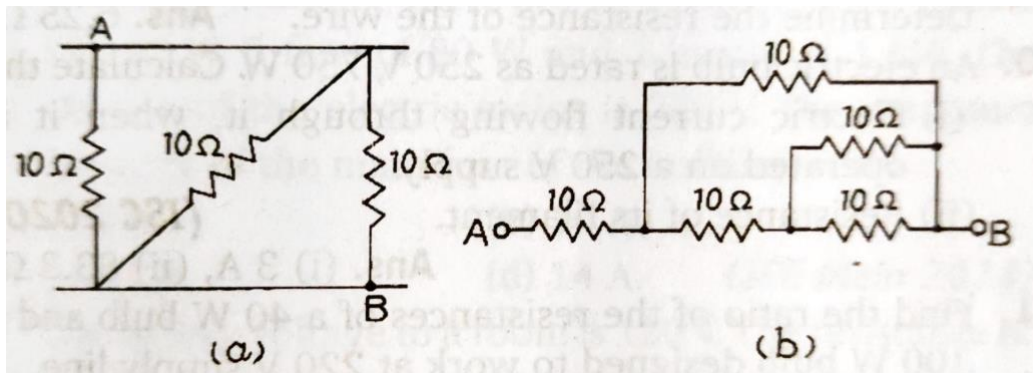
Question 4

What are equipotential surfaces. Write it's properties.

Question 5

A parallel plate air capacitor has a capacitance of 5 microfarad it becomes 15 microfarad when a electric medium occupies the entire space between its two place. What is the dielectric constant of the medium?

OR

Calculate the equivalent resistance between points A and B in each of the shown networks of resistors.

(a)   (b)

Question 6

A helium nucleus (charge +2e) completes one round of a circle of radius 0.8 m in 2s. Find the magnetic field at the centre of the circle.

Question 7

In an ammeter 0.2% of main current passes through the galvanometer. If resistance of galvanometer is G, the resistance of ammeter will be?

Question 8

Derive the formula for an electric dipole at a point on the axis of a dipole.

SECTION C –

Question 8

An electrical technician requires a capacitance of 2 microfarad in a circuit across a potential difference of 1 kV. A large number of 1 microfarad are available to him each of which can withstand a potential difference of not more than 400 V. Suggest a possible arrangement that requires the minimum number of capacitors.

Question 9

Three point charges q_1 = 25 microcoulomb, q_2 =50 microcoulomb, and q_3 = 100 microcoulomb are kept at the corners A, B and C respectively of and equilateral triangle ABC having each side equal to 7.5 m. Calculate the total electrostatic potential energy of the system.
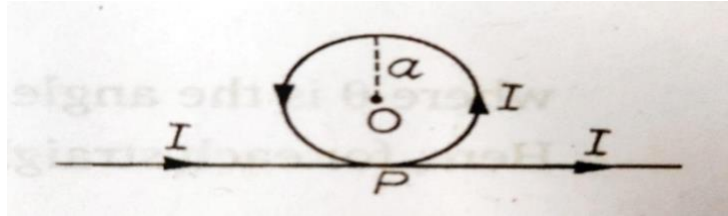
OR

Explain the principle of wheatstone bridge.

Question 10

Explain Ampere's circuital law.

Question 11

A long wire is bent as shown. Find the magnitude and direction of the magnetic force at centreO of the circular part, if a current of I ampere is passes through the wire.

Question 12

State and prove Gauss Theorem.

Question 13

Two charges 5×10^{-8} C and -3×10^{-8} C are located 16 cm apart. At what points on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.

OR

Obtain a relation between E, V and r.

Question 14

Figure shows two very long conductors PQ and RS kept parallel to each other in vacuum at a distance of 20 cm. They carry currents of 5 A and 15 A respectively, in the same direction as shown. Find the resultant magnetic flux density at a point M which lies exactly midway betwee PQ and RS.

Question 15

Explain how can we converted galvanometer into voltmeter.

Question 16

Obtain an expression for magnetic field of a magnetic dipole at an axial position.

Question 17

Two small magnets are placed horizontally, perpendicular to the magnetic meridian. Their North poles are at 30 cm. east and 20 cm west from a compass needle. If the compass needle remains undeflected, compare the magnetic moments of the magnets.

SECTION D –

Question 18

A polythene piece rubbed with wool is found to have a negative charge of 3×10^{-7} C. (a) Estimate the number of electrons transferred from which to which? (b) Is there a transfer of mass from wool to polythene?

Question 19

Obtain an expression for electric potential due to a point charge.

Question 20

Find he equivalent capacitance between the points A and B in the given circuit.