+2 Physics Important FIVE marks Questions

English Medium : Volume –I

PRESENTED BY

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+2 Physics Unit -1 Electrostatics - Five marks questions

1. Write the properties of electric lines of forces. *(M - 07, O - 07, M - 08, M - 10, M -11, O - 11, J - 12, M -13)*
2. Define electric potential at a point. Obtain an expression for electric potential due to a point charges. *(M - 09)*
3. What is electrostatic potential energy of a system of two point charges? Deduce an expression for it. *(O - 09)*
4. Prove that the energy stored in a parallel plate capacitors $E = q^2 / 2C$ *(M - 12)*
5. Deduce an expression for the capacitance of the parallel plate capacitor. *(J - 10)*
6. Derive an expression for the torque on the electric dipole when placed in uniform electric field. *(O - 10, O -12)*
7. Explain the effect of introducing a dielectric slab between the plates of parallel plate capacitor. (J - 13)
8. What is a capacitor? Explain the principle of a capacitor.
9. State Gauss law. Using this drive an expression for electric field due to two parallel charges sheets.
10. State Coulomb's law in electro statics and explain it in vector form.
11. *(M - 06)*

A parallel plate capacitor has plates of area 200 cm^2 and separation between the plates 1 mm. Calculate (i) the potential difference between the plates if 1n C charge is given to the capacitor (ii) with the same charge (1n C) if the plate separation is increased to 2 mm, what is the new potential difference and (iii) electric field between the plates.

12. *(J - 06, O -06, J - 11)*

Three capacitors each of capacitance 9 pF are connected in series (i) What is the total capacitance of the combination? (ii) What is the potential difference across each capacitor, if the combination is connected to 120 V supply?

13. *(J – 08)*

Two positive charges of 12 μC and 8 μC respectively are 10 cm apart. Find the work done in bringing them 4 cm closer, so that, they are 6 cm apart.

14. *(O – 08)*

Two capacitors of unknown capacitances are connected in series and parallel. If the net capacitances in the two combinations are 6μF and 25μF respectively, find their capacitances.

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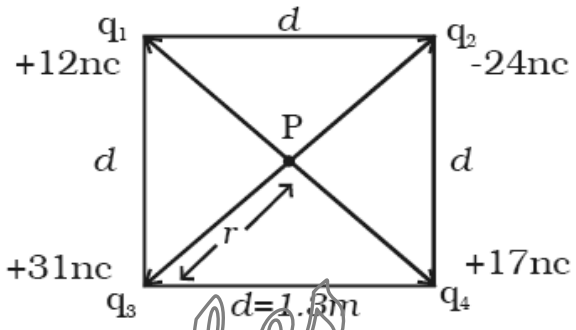
15. *(J - 07)*

Two capacitances 0.5 μF and 0.75 μF are connected in parallel and the combination to a 110 V battery. Calculate the charge from the source and charge on each capacitor.

(OR)

Calculate the electric potential at a point P, located at the centre of the square of point charges shown in the figure.



16. *(J – 09)*

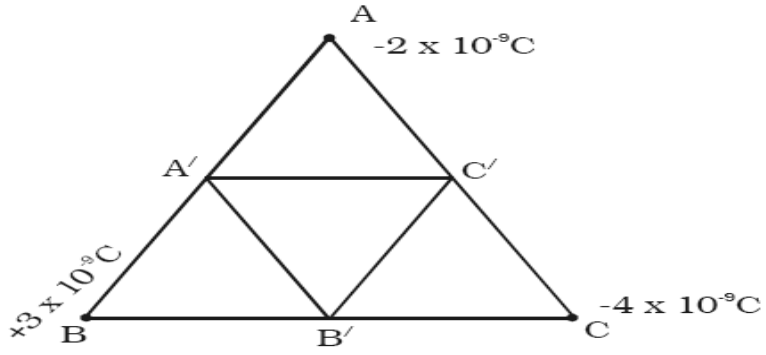
The plates of a parallel plate capacitor have an area of 90 cm^2 each and are separated by 2.5 mm. The capacitor is charged by connecting it to a 400 V supply. How much electrostatic energy is stored by the capacitor?

17. *(J – 11)*

Three capacitors each of capacitance 9 pF are connected in series (i) What is the total capacitance of the combination? (ii) What is the potential difference across each capacitor, if the combination is connected to 120 V supply?

(OR)

Three charges -2×10^{-9}C, $+3 \times 10^{-9}$C, -4×10^{-9}C are placed at the vertices of an equilateral triangle ABC of side 20 cm. Calculate the work done in shifting the charges A, B and C to A_1, B_1 and C_1 respectively which are the mid points of the sides of the triangle.



+2 Physics Unit : 2 Current Electricity - Five marks questions

1. Define mobility. Derive the relation between drift velocity and the current. (M-06)
2. Obtain the condition for bridge balance in Wheatstone's bridge. (M-06,J-06,O-06,M-08,J-09,M-10)
3. State and verify Faraday's second law of electrolysis. (J-06,M-08,M-11)
4. If two or more resistors are connected in parallel, derive the expression for the effective resistance.(O-06)
5. How will you compare the emfs of the two given cells using the Potentiometer. (M-07,O-10,O-11,M-12)
6. State and explain Faraday's second law for electrical network. (J-07)
7. Explain the working of Leclanche cell. (J-07,O-12)
8. Explain the principle of the potentiometer. (O-07)
9. Explain the working of lead acid accumulator. (O-07)
10. Explain the method to find the internal resistance of a cell using the potentiometer(or voltmeter). (J-08,O-09,J-11,M-13,J-13)
11. State and explain Faraday's first law of electrolysis. (J-08,O-09)
12. Give any five applications of superconductors. (O-08,M-09,J-11,O-12,M-13)
13. Explain the construction and the working of a Daniel cell. (O-08,J-09,J-10,M-11)
14. Explain the variation of resistance with temperature using a graph. (J-12)
15. (M-09,J-10C)

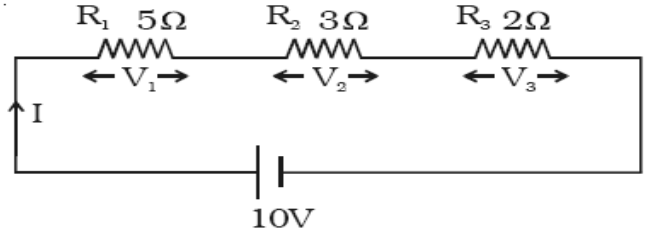
    What is the drift velocity of an electron in a copper conductor having area $10 \times 10^{-6} m^2$, carrying a current of 2 A. Assume that there are 10×10^{28} electrons / m^3.

16. (M-10,O-11)

    The effective resistances are 10Ω, 2.4Ω when two resistors are connected in series and parallel. What are the resistances of individual resistors?

17. (J-10C,M-12)

    Three resistors are connected in series with 10 V supply as shown in the figure. Find the voltage drop across each resistor.



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18. (J-12)

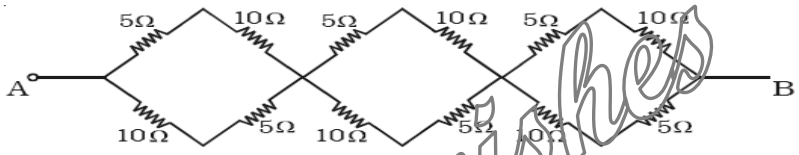
An iron box of 400 W power is used daily for 30 minutes. If the cost per unit is 75 paise, find the weekly expense on using the iron box.

(OR)

In a metre bridge, the balancing length for a 10 Ω resistance in left gap is 51.8 cm. Find the unknown resistance and specific resistance of a wire of length 108 cm and radius 0.2 mm.

19. (M-07)

In the given network, calculate the effective resistance between points A and B



20. (O-10)

Find the current flowing across three resistors 3Ω, 5Ω and 2Ω connected in parallel to a 15 V supply. Also find the effective resistance and total current drawn from the supply.

(OR)

In a metre bridge, the balancing length for a 10 Ω resistance in left gap is 51.8 cm. Find the unknown resistance and specific resistance of a wire of length 108 cm and radius 0.2 mm.

21. The resistance of a coil of wire at 20oC is 50 ohm and the resistance is 65 ohm at 70oC. Calculate the temperature coefficient of resistance of the wire. (J-13)

***** BEST WISHES *****

+2 Physics UNIT : 3 Effects of Electric current

1. What are the special features of magnetic Lorentz force? (J-07,M-11)
2. Explain the conversion of moving coil galvanometer into an ammeter. (M-08,J-12)
3. Explain the principle and the construction of tangent galvanometer. (O-08)
4. State and explain Biot-Savart law. (J-09)
5. Explain the conversion of moving coil galvanometer into an ammeter. (M-10,J-11,M-12)
6. (M-06,O-06,M-09C)

   A circular coil of radius 20 cm has 100 turns wire and it carries a current of 5A. Find the magnetic induction at a point along its axis at a distance of 20 cm from the centre of the coil.
7. (J-06,O-09C,M-13C)

   A rectangular coil of 500 turns and of area 6×10^{-4} m^2 is suspended inside a radial magnetic field of induction 10^{-4} T by a suspension wire of torsional constant 5×10^{-10} Nm per degree. calculate the current required to produce a deflection of 10^o.
8. (M-07,M-09C,J-13)

   A moving coil galvanometer of resistance 20 Ω produces full scale deflection for a current of 50 mA. How you will convert the galvanometer into (i) an ammeter of range 20 A and (ii) a voltmeter of range 120 V.
9. (J-08)

   In a hydrogen atom electron moves in an orbit of radius 0.5 Å making 10^{16} revolutions per second. Determine the magnetic moment associated with orbital motion of the electron.
10. (O-09C,J-10,M-13C)

    Two parallel wires each of length 5m are placed at a distance of 10 cm apart in air. They carry equal currents along the same direction and experience a mutually attractive force of 3.6×10^{-4} N. Find the current through the conductors.
11. (O-11)

    Two straight infinitely long parallel wires carrying equal currents and placed at a distance of 20 cm apart in air experience a mutally attractive force of 4.9×10^{-5} N per unit length of the wire. Calculate the current.
12. (O-10)

    A galvanometer has a resistance of 40 Ω. It shows full scale deflection for a current of 2 mA. How you will convert the galvanometer into a voltmeter of range 0 to 20V?
13. (O-12)

    The deflection in a galvanometer falls from 50 divisions to 10 divisions when 12 Ω resistance is connected across the galvanometer. Calculate the galvanometer resistance.

***** BEST WISHES *****

+2 Physics UNIT : 4 Electromagnetic Induction and Alternating Current

Five Marks Questions

1. Obtain the phase relation between the current and the voltage in an AC circuit containing an inductor only. Draw the corresponding graph. (M-06,M-08)
2. What are the various types of energy losses in a transformer? Explain how these losses can be minimized. (J-06,O-06,O-09,J-10,O-10,M-11,M-13)
3. Explain the applications of eddy currents. (M-07,O-08,M-10)
4. Explain how an emf can be produced by changing the area enclosed by a coil. (J-07,O-07,M-09,O-12,J-13)
5. Explain the mutual induction between two long solenoids. Derive an expression for the mutual inductance between two long solenoids. (J-08,M-12)
6. State and explain Faraday's laws and Lenz law in electromagnetic induction. (J-11)
7. Obtain the phase relation between the current and the voltage in an AC circuit containing a resistor only. Draw the corresponding graph. (O-11,J-12)
8. (J-09)

An a.c. generator consists of a coil of 10,000 turns and of area 100 cm^2. The coil rotates at an angular speed of 140 rpm in a uniform magnetic field of 3.6×10^{-2} T. Find the maximum value of the emf induced.

***** BEST WISHES *****

+2 Physics UNIT : 5 Electromagnetic waves and wave optics

1. Writs a note on pile of plates. (M-06,J-09)

2. State and prove Brewster's law. (J-06,O-06,J-07,J-08,M-09,J-10,O-12,M-13)

3. Write a note on Nicol prism. (M-07,O-09,O-11)

4. Distinguish between interference and diffraction. (O-10)

5. Derive the radius of the nth dark ring in Newton's ring experiment (J-11,M-12)

6. (O-07C,O-08)

A soap film of refractive index 1.33, is illuminated by white light incident at an angle 30º. The reflected light is examined by spectroscope in which dark band corresponding to the wavelength 6000Å is found. Calculate the smallest thickness of the film.

7. (O-07C)

In Young's experiment a light of frequency 6×10^{14} Hz is used. Distance between the centres of adjacent fringes is 0.75 mm. Calculate the distance between the slits, if the screen is 1.5 m away.

8. (M-08,M-10C,J-12,J-13C)

A parallel beam of monochromatic light is allowed to incident normally on a plane transmission grating having 5000 lines per centimetre. A second order spectral line is found to be diffracted at an angle 30º. Find the wavelength of the light.

9. (M-10C)

In a Newton's rings experiment the diameter of the 20^{th} dark ring was found to be 5.82 mm and that of the 10^{th} ring 3.36 mm. If the radius of the plano–convex lens is 1 m. Calculate the wavelength of light used.

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10. (M-11)

A monochromatic light of wavelength 589 nm is incident on a water surface having refractive index 1.33. Find the velocity, frequency and wavelength of light in water.

(OR)

A plano – convex lens of radius 3 m is placed on an optically flat glass plate and is illuminated by monochromatic light. The radius of the 8^{th} dark ring is 3.6 mm. Calculate the wavelength of light used.

11. A 300 mm long tube containing 60 cc of sugar solution produces a rotation of 9^{o} when placed in a polarimeter. If the specific rotation is 60^{o}, calculate the quantity of sugar contained in the solution.

(J-13)

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