Question Paper

# 1-Mark Questions

Question: Electric charges are distributed within a small volume. the electric flux through a spherical surface of radius 0.2m around the said volume is 50 V-m. Calculate the electric flux over the surface of a concentric sphere of radius 0.5m? A.)50V-m B.)312.5V-m C.)125V-m D.)25V-m

Question: A point charge of +10 μC is placed at the origin. Calculate the electric field intensity at a point 0.2 m away from the charge.

Question: Two electric bulbs rated 100 W,220V and 40W,220V respectively are joined in series across a supply voltage of 220V. Electric current passing through them is in the ratio A.)5:2 B.) 2:5 C.) 25:4 D.) 1:1

Question: A battery of emf 8V with internal resistance of 0.5Ω is being charged by a 120V D.C supply using a series resistance of 15.5Ω. The terminal voltage of the battery is A.)20.5V B.)15.5V C.)11.5V D.)2.5V

Question: Using Ohm's law, calculate the voltage across a resistor of 5 Ω carrying a current of 2 A.

Question: An electric heater rated 1000 W operates on a 220 V supply. Calculate the current flowing through the heater and the resistance of the heater element.

Question: Under the influence of a uniform magnetic field, a charged particle moves with constant speed v in a circle of radius. The time period of revolution of the particle is A.)depends on v and not on r B.)depends on r and not on v C.)is independent of both v and r D.)depends on both v and r

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# 2-Mark Questions

Question: Derive the expression for the electric potential at a point due to a point charge.

Question: Two point charges of +5 μC and -5 μC are placed 0.1 m apart. Calculate the force between them.

Question: An electric dipole is placed in a uniform electric field. Show that the net force acting on it is zero and derive the expression for the torque acting on it.

Question: Define resistivity and explain its dependence on temperature.

Question: Derive the formula for the combined resistance of three resistors connected in series.

Question: Derive the expression for the force acting on a current-carrying conductor placed in a magnetic field.

Question: Explain the working of a current loop as a magnetic dipole and derive the expression for its magnetic moment.

Question: A current-carrying circular loop is placed in a uniform magnetic field. Explain the orientation of the loop to experience maximum torque.

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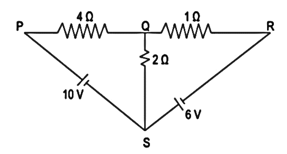
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# 3-Mark Questions

Question: Calculate the electric field at a point on the axial line of an electric dipole.

Question: Calculate the work done in moving a charge of 2 μC from a point at a potential of 5 V to a point at a potential of 10 V.

Question: Using Kirchhoff laws, calculate the current flowing through 4 Ω, 1 Ω, and 2 Ω resistors in the circuit shown below.



Question: A parallel plate capacitor has plates of area 2 m² separated by a distance of 0.01 m. If a dielectric of dielectric constant 5 is placed between the plates, calculate the capacitance.

Question: Determine the equivalent resistance of a network consisting of three resistors of 2 Ω, 3 Ω, and 6 Ω connected in parallel.

Question: A wire of resistance 10 Ω is stretched to double its length. Calculate the new resistance of the wire.

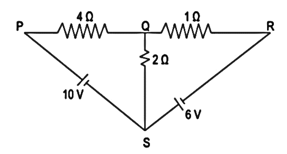
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Question: Explain the concept of magnetic flux and derive the expression for the flux through a rectangular loop placed in a uniform magnetic field.

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# 5-Mark Questions

Question: Using Coulomb’s law, explain the concept of electric field lines and their properties.

Question: Explain Gauss's law and its application in calculating the electric field due to a charged spherical shell.

Question: Discuss the concept of electric dipole moment and derive the expression for the potential due to an electric dipole at an axial point.

Question: Describe the construction and working of a potentiometer. How can it be used to measure the internal resistance of a cell?

Question: Explain the construction and working of a Wheatstone bridge and derive the condition for its balance.

Question: Describe the construction and working of a transformer. Derive the expressions for the efficiency and voltage transformation ratio.

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