

IMAYAM ARTS AND SCIENCE COLLEGE, KANNANUR.
DEPARTMENT OF PHYSICS
II B.SC PHYSICS
SUB CODE:16SCCPH4
ELECTRICITY, MAGNETISM&ELECTROMAGNETISM

TWO MARK QUESTIONS:

UNIT-I

1.State Coulomb's law.

- The force of attraction or repulsion between two charge are
 - ❖ directly proportional to the product of the magnitudes of charges and
 - ❖ inversely proportional to the square of the distance between the charges.

2.State Gauss's law.

- The total flux linked with a closed surface is $1/\epsilon_0$ times the charge enclosed by the closed surface.

$$\phi = Q/\epsilon_0$$

3. Define Principle of a capacitor .

- A capacitor works on the principle that the capacitance of a conductor increase appreciably when an earthed conductor is brought near it. Thus a capacitor has two plates separated by a distance having equal and opposite charges.

4.Define capacitance of a conductor.

- The capacitance of a conductor is defined as the ratio b/w the charge and the potential.

5.Define relative permittivity.

- Relative permittivity is equal to the ratio of the force b/w two charges placed in vaccum at some distance and the force b/w the same charges in the medium at the same distance apart.

6.Write down applications of capacitors.

- Capacitors are used in virtually every area of electronics, and they perform a variety of different tasks.

- ii) They are used in the ignition system of automobile engines.
- iii) They are used to generate electromagnetic oscillations and in tuning radio circuits.

UNIT-II

1. Electric current.

- Flow of charges in the direction of electrons is called electric current.

2. Temperature co-efficient.

- Fractional change in resistance per kelvin is known as temperature co-efficient.

3. Define power.

- Product of voltage and current is known as power.

4. Define magnetic field.

- Current produces magnetic effect due to its magnetic field.

5. Magnetic flux.

- The total number of magnetic field lines passing through an area is magnetic flux.

UNIT-III

1. Define electromagnetic induction.

- Whenever the magnetic lines of force are cut by a closed circuit an induced current flows in the circuit. The flux is changing the emf which produces this is called induced emf. This is known as electromagnetic induction.

2. State len's law.

- The direction of the induced emf or current is such as to oppose is the change that produced it. This is also known as len's law.

3. Define Self induction.

- The phenomenon of the product of an induced emf in a circuit itself due to the changing current through it. This is called Self induction.

4. Define co-efficient of Self induction.

- The Self induction of a coil is the total magnetic flux linked with it when a unit current passes through it.

5. Define Mutual induction.

- The Mutual induction, two circuits is numerically equal to the magnetic flux linked with the one circuit when with unit current flows through the other circuit.

UNIT-IV

1. Define Resonant frequency.

- The particular frequency V_0 at which the impedance of the circuit becomes minimum and therefore current becomes maximum. This is called resonant frequency.

2. Define Q-factor.

- It is defined as the ratio b/w the reactance of the coil resonance to the resistance of the circuit.

3. Define power factor.

- It is defined as the ratio of the true power to the apparent power.

4. Define wattless current.

- The current in AC circuit is said to be wattless when the average power consumed in the circuit is zero.

5. Alternating EMF.

- A graph of E against ωt is a sine curve. Such an emf is called sine wave emf or Alternating emf.

UNIT-V

1. Define Intensity of magnetization.

- It is defined as the magnetic moment per unit volume of the material.

$$I = M/V$$

2. Define magnetic susceptibility.

- It is defined as the ratio of intensity of magnetization to the magnetic field.

$$X_m = I/H$$

3. Write down the types of magnetic materials.

- Dia magnetic materials
- Para magnetic materials
- Ferro magnetic materials

4. Write down the properties of dia magnetic materials.

- i) The susceptibility has a low negative value.
- ii) susceptibility is independent of temperature.
- iii) The relative permeability is slightly less than one.

5. Write down the properties of para magnetic materials.

- i) The susceptibility has a low +ve value.

- ii) susceptibility is inversely proportional to absolute temperature.
- iii) The relative permeability is greater than one.

6. Magnetic induction.

- The Magnetic induction is defined as the no of lines of magnetic force passing perpendicular through unit area.

7. Define Hysteresis.

- The magnetic induction B lags behind the magnetizing field H in a cycle of magnetization. This is called hysteresis.

FIVE MARK QUESTIONS:

UNIT-I

1. Explain the principle of a capacitor.
2. Derive an expression for the energy stored in a condenser.
3. Write short note on electric potential.
4. Write short note on capacitors in parallel.
5. Explain applications of capacitors.

UNIT-II

1. Explain damping correction.
2. State and prove Kirchhoff's laws of electricity.
3. Discuss calibration of ammeter.
4. Derive an equation for field along the axis of a circular coil and solenoid.
5. Explain Wheatstone 's bridge.

UNIT-III

1. Explain laws of electromagnetic induction.
2. Describe mutual inductance of a pair of solenoids.
3. Explain co-efficient of coupling.
4. Derive an equation for growth of current in a circuit containing L&R.
5. Derive an equation for decay of charge in a circuit containing C&R.

UNIT-IV

1. Derive an equation for ac circuits containing C&R.
2. Derive an equation for power in ac circuits containing L&R.
3. Discuss about comparison between series and parallel circuits.
4. Explain choke coil.

5. Write note on uses of transformers.

UNIT-V

1. Discuss about types of magnetic materials.
2. Discuss about properties of para magnetic materials.
3. Discuss about properties of ferro magnetic materials.
4. Discuss about the magnetic properties of iron and steel.
5. Derive an equation for weiss theory of ferromagnetism.

TEN MARK QUESTIONS:

1. Show that there is always loss of energy due to sharing of charges.
2. State and explain Gauss's law and its applications in electrostatics.
3. Derive an expression for the cylindrical capacitor.
4. Derive an expression for the spherical capacitor.
5. Explain B-H curve.
6. Explain calibration of high range voltmeter using potentiometer.
7. State and explain Ampere's circuital law and its applications.
8. Explain theory of ballistic galvanometer.
9. Explain Carey's Foster bridge.
10. Determine the self inductance of a solenoid using Rayleigh's method.
11. Derive an equation for growth & decay of current in a circuit containing L & R.
12. Derive an equation for growth & decay of charge in a circuit containing C & R.
13. Derive an equation for ac circuits containing CR & LR.
14. Derive an equation for power in ac circuits containing LCR.
15. Explain B-H curve.
16. Explain energy loss due to magnetic hysteresis.
17. Derive an equation for Langevin's theory of diamagnetism.
18. Derive an equation Langevin's theory of paramagnetism.