

GOVERNMENT DEGREE COLLEGE , NANDIKOTKUR

DEPARTMENT OF PHYSICS

II Year B. Sc (Hon.) IV Semester- Minor Subject-Physics

Academic Year 2024-25

Course III: *Electricity & Magnetism*

QUESTION BANK

UNIT I: Electrostatics and Dielectrics

Short Answer Questions:

- 1.State and Explain Gauss law in Electrostatics.
- 2.Explain equipotential surfaces.
- 3.Obtain expression for Electric potential due to a point charge.
- 4.What are Polar and Non-polar dielectric.
- 5.Explain atomic view of dielectrics.
- 6.Define dielectric strength.

Long Answer Questions:

- 1.Derive expression for electric intensity due to a uniformly charged sphere.
- 2.Define Electric potential. Derive equation for Electric potential due to a charged sphere.
- 3.Define D, E, P and Derive relation between them.
- 4.Define electric susceptibility and dielectric constant and write relation between them.

UNIT II: Current Electricity

Short Answer Questions:

- 1.Derive expression for drift velocity
- 2.Explain equation for continuity.
- 3.State and Explain Ohm's Law and write its limitations.
- 4.Explain branch current method.

Long Answer Questions:

1. Explain Wheatston's bridge and write expression for balance condition

- 2.Explain star to delta and delta to star conversions
- 3.State and explain superposition theorem
- 4.State and Explain Norton's theorem.
- 5.State and Explain Thevenins theorem
- 6.State and Explain Maximum Power transfer theorem.

UNIT III: Magnetostatics

Short Answer Questions:

- 1.State and Explain Biot-Savart's Law.
- 2.State and explain Ampere's circuital law.
- 3.Write few applications of Hall Effect.
- 4.Explain Lenz's law.
- 5.Explain Self Inductance
- 6.Explain Mutual Inductance
- 7.Write a short note on Magnetic energy density
- 8.Explain Coefficient of coupling.

Long Answer Questions:

- 1Derive expression for Magnetic Induction due to current carrying circular loop.
- 2.Derive an expression for Magnetic Induction due to a solenoid.
- 3.Explain Hall Effect and explain Hall Coefficient
- 4.Explain Faraday's Laws of Electromagnetic Induction
- 5Derive expression for self inductance due to a solenoid.
- 6.Explain Mutual Inductance of pair of coils.

UNIT IV: Electromagnetic waves-Maxwell's equations

Short Answer Questions:

- 1.State the basic laws of electricity and magnetism.
- 2.Write a short on Displacement current.
- 3.Express the plane electromagnetic wave equation.

Long Answer Questions:

1. Derive Maxwell's equations in differential and Write its Integral forms.
2. Show that electromagnetic waves are transverse in nature.
3. Explain Hertz experiment.
4. Express electromagnetic wave equation in conducting media.
5. Derive expression for Poynting vector

UNIT V: Varying and Alternating Currents

Short Answer Questions:

1. Explain the growth and decay of current in LR Circuit.
2. Explain the growth and decay of current in CR circuit.
3. Explain critical damping.
4. What is alternating current.
5. Derive relation between voltage and current in pure Resistance circuit
6. Derive relation between voltage and current in pure inductance circuit
7. Derive relation between voltage and current in pure capacitance circuit.
8. Write a short note on Q-factor.
9. Write a short note on power factor.
10. Derive expression for power in ac circuits.

Long Answer Questions:

1. Explain the growth and decay of current in LCR circuit.
2. Derive relation between voltage and current in LR Circuit
3. Derive relation between voltage and current in CR circuit.
4. Derive relation between voltage and current in LCR series circuit.
5. Explain LCR parallel circuit.

Prepared By

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