

Guess Paper – 2014
Class – XII
Subject –Physics

IMPORTANT DERIVATIONS TYPE QUESTIONS

UNIT-1

1. Explain what is meant by quantization of charge and conservation of charge, also give the important property of charge ?
2. State and explain coulomb's law, give the vector form of coulomb law.
3. Explain the concept of electric field . give the relation between electric field strength and force.
4. Derive expression for electric field intensity at a point due to a point charge.
5. Derive an expression for dipole field intensity at any point on (i) axial line (ii) equatorial line of dipole.
6. Derive an expression for torque acting on electric dipole in a uniform electric field
7. Derive an expression for potential energy of an electric dipole in a uniform electric field.
8. Derive an expression for potential at a point due to point charge and due to an electric dipole.
9. State gauss's theorem in electrostatics . how will u prove it for spherically symmetric surfaces.
10. Using gauss's theorem , derive an expression for electric field intensity at a point due to a (i) line charge (ii) a uniformly charged spherical shell (ii) an infinite plane sheet of charge
11. Explain the term electric field intensity .electric field inside conductor is zero. Explain.
12. What is a capacitor ? define capacitance . discuss its units
13. Explain the principal of capacitor ,Derive an expression for the capacitance of a parallel capacitor.
14. Three condensers C1 , C2 and C3 are connected in series . derive an expression for the equivalent capacitance. Write two applications of capacitor

15. Derive an expression for the energy stored in a capacitor. What is the form of this energy and wherefrom it comes?
16. Three capacitors of capacitances C_1, C_2 and C_3 are connected (i) in series (ii) in parallel . show that the total energy stored in the series combination is the same as that in parallel combination.
17. Explain what is meant by dielectric polarization . hence establish relation $k = 1 + \chi$
18. Deduce the effect of introducing (i) a conducting slab (ii) a dielectric slab in between the plates of a parallel plate condenser on the capacitance of the condenser.
19. Discuss briefly the principal , construction and working of van – degraaff generator . how is the leakage minimised from the generator?
20. Derive the expression of capacitance of parallel capacitor when (i) a conducting slab is placed (ii) when a dielectric slab is placed
21. Find the expression for energy stored in capacitor, find the expression for common potential.
22. What are the polar and non-polar dielectrics, how they behave in external electric field, give their example?
23. Find the energy density across the capacitor
24. What are the electric field lines give their important property ?
25. What are the equipotential , give their important property ?

UNIT -2

1. What is drift velocity of electrons and relaxation time of free electrons in a metallic conductor carrying a current ? establish a relation between them .
2. State the ohm's law, derive the relation between resistance and relaxation time
3. Define the current density, prove the relation $J = \sigma E$ where E is the electric field, and σ is the conductivity
4. Define the resistivity of the material . state its si unit and discuss with temperature in case of (i) metals (ii) semiconductors and (iii) insulators.
5. Find the total resistance when the various resistors are connected (i) in series and (ii) in parallel

6. State and explain kirchhoff's law
7. What is potentiometer ? explain its principal of working . how can you compare the emf of two cells using potentiometer?
8. Give the principal of wheat stone bridge. How do you it to measure the unknown resistance ? explain
9. Derive the wheatstone bridge condition $P/Q=R/S$
10. State the principal of potentiometer . with the help of circuit diagram describe a method to find the internal resistance of primary cells and also giet diagram to compare the emf of two cells ?
11. Find the equivalent EMF of two cells when they are connected in series and in parallel, to the external resistance R , and their internal resistance r_1 and r_2

UNIT-3

1. Find the magnetic field at the centre of the circular coil carrying current. Show the sketch of the magnetic field produced.
2. Find the magnetic field at a point due to current flowing in a long straight conductor. Show the sketch of magnetic field produced.
3. Find the magnetic field at a point on the axis of a circular coil carrying current and hence find the magnetic field at center of circular coil carrying current.
4. State and explain ampere's circuital law and by applying it find the magnetic field at a point well inside the solenoid carrying current.
5. Derive the expression of magnetic field due to Toriod
6. State the Biot savart law for the magnetic field due to a current carrying element .
7. Describe the motion of charge particle in uniform magnetic field (i) when it is moving perpendicular (ii) when it is moving with some angle θ , hence find the time period , velocity , radius of the charge particle,
8. What is cyclotron? Discuss its construction , working and theory . explain cyclotron frequency.
9. Discuss with the help of a neat diagram the construction and theory of moving coil galvanometer.

10. Derive the expression for the force acting on a current carrying conductor placed in a uniform field , name the rule which give the direction of the force . write the condition for which this force will have max. and min.
11. Find the expression for torque on the current carrying rectangular coil.
12. Find the force between two long straight current carrying parallel wire.
13. Find the time period , velocity . frequency of the charged particle when it is moving in perpendicular magnetic field.
14. How we can convert a galvanometer into ammeter and voltmeter explain.
15. Find the expression of magnetic field due to a bar magnet on the axial line and on the equatorial line.
16. Find the expression for torque and potential energy stored in a magnetic dipole in uniform external magnetic field.
17. Explain the angle of declination , dip and horizontal component of earth's magnetic field.
18. Explain the diamagnetic , paramagnetic and ferromagnetic substance. Give at least four property of these substance.
19. Explain the hysteresis curve , how it help to select the ferromagnetic substance.

UNIT-4

1. Explain the concept of magnetic flux . discuss its units and dimension .
2. State and explain faraday 's law of electromagnetic induction.
3. State and explain lenz's law . how will you verify its experimentally ? does it obey the principal of energy conservation/
4. What are the eddy currents ? discuss briefly any two application of eddy currents .
5. Explain the phenomenon of self induction . define the coefficient of self induction . calculate the self induction of long solenoid.
6. Derive the expression of mutual induction of two coaxial long solenoid.

7. What is meant by mean value of AC ? derive an expression for mean value of alternating current and emf.
8. What is meant by rms value of AC? Derive an expression for rms value of alternating current and emf.
9. An AC voltage is applied across an (i) resistor ,(ii) inductor (iii) capacitor then find the expression for current and also draw the phasor diagram
10. Explain the electrical oscillation with the help of diagram , prove that how energy is conserved
11. Explain the series resonant frequency . hence define the quality factor.
12. Derive an expression for the average power in LCR circuit connected to AC supply . hence define power factor.
13. Explain the construction . principle and working of AC generator
14. Explain the construction principle and working of Transformer, explain the various losses of energy .

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