12th Physics
Important Questions
Lesson -1 Electrostatics

Two mark very short answer questions

1. State quantisation of electric charge.
2. State Coulomb's law in electrostatics.
3. Define one coulomb.
4. Distinguish between Coulomb force and Gravitational force.
5. Two electric field lines never intersect each other. Why?
6. Define electric dipole moment. Give its unit.
7. Define electrostatic potential. Give its unit.
8. Define electric flux.
9. State Gauss law.
10. What are called polar molecules? Give examples.
11. Define dielectric polarization.
12. During lightning, it is safer to sit inside bus than in an open ground or under tree. Why?
13. Define capacitance of a capacitor.
14. Define electrostatic induction.
15. Define action of point or corona discharge.

Three mark short answer questions

1. List the properties of electric field lines.
2. Derive an expression for torque experienced by an electric dipole placed in the uniform electric field
3. Obtain an expression electric potential at a point due to a point charge.
4. Derive an expression for capacitance of parallel plate capacitor.
5. Derive an expression for energy stored in capacitor
6. Give the applications and disadvantage of capacitors

Five mark long answer questions

1. Calculate the electric field due to a dipole on its axial line.
2. Calculate the electric field due to a dipole on its equatorial line.
3. Derive an expression for electro static potential due to electric dipole.
4. Obtain an expression for electric field due to an infinitely long charged wire.
5. Derive the expression for resultant capacitance, when capacitors are connected in series and in parallel.
6. Explain in detail the construction and working of Van de Graff generator.

Lesson -2 Current Electricity

Two mark very short answer questions

1. Define electric current.
2. Distinguish between drift velocity and mobility.
3. Define resistivity of the material.
4. Define temperature coefficient of resistivity.
5. Distinguish electric energy and electric power.
6. Write down the various equations for power.
7. Repairing the electrical connection with the wet skin is always dangerous. Why?
8. Define the internal resistance of the cell.
9. State Kirchoff's first law (current rule or junction rule)
10. State Kirchoff's second law (voltage rule or loop rule)
11. State Joule's law of heating.
12. What are the properties of the substance used as heating element?
13. Define Seebeck effect.
14. Define Peltier effect.
15. Define Thomson's effect.

Three mark short answer questions

1. Derive the relation between the drift velocity and the current.
2. Write a note on carbon resistors.
3. Write a note on electric cells in series
4. Write a note on electric cells in parallel.
5. Explain the principle of potentiometer.
6. Explain Thomson effect.

Five mark long answer questions

1. Describe the microscopic model of current and obtain general form of Ohm's law.
2. Obtain the macroscopic form of Ohm's law from its microscopic form and discuss its limitation.
3. Explain the equivalent resistance of a series and parallel resistor network.
4. Explain the determination of the internal resistance of a cell using voltmeter.
5. Obtain the condition for bridge balance in Wheatstone's bridge.
6. How the emf of two cells are compared using potentiometer?

Lesson -3 Magnetism and magnetic effects of electric current

Two mark very short answer questions

1. Define magnetic inclination or dip.
2. Define magnetic dipole moment.
3. Define magnetic flux. Give its unit.
4. State Coulomb's inverse square law of magnetism.
5. Define intensity of magnetization.
6. Define magnetic susceptibility.
7. What is Hysteresis?
8. Define Curie's law.
9. State Maxwell's right hand cork screw rule.
10. State right hand thumb rule.
11. Define Bohr magneton.
12. State Ampere's circuital law.
13. State Fleming's left hand rule (FLHR).
14. Define current sensitivity of a galvanometer.
15. How the current sensitivity of galvanometer can be increased?

Three mark short answer questions

1. Give the properties of magnetic field lines.
2. Calculate the torque acting on a bar magnet in uniform magnetic field.
3. List the properties of Ferromagnetic materials.
4. State and explain Biot-Savart law.
5. Define Lorentz force. Give the properties of Lorentz magnetic force.
6. How Galvanometer can be converted in to Ammeter.
7. How Galvanometer can be converted in to voltmeter?

Five mark long answer questions

1. Calculate the magnetic induction at a point on the axial line of a bar magnet.
2. Obtain the magnetic induction at a point on the equatorial line of a bar magnet.
3. Deduce the relation for magnetic induction at a point due to an infinitely long straight conductor carrying current.
4. Obtain a relation for the magnetic induction at a point along the axis of a circular coil carrying current.
5. Describe the principle, construction and working of Cyclotron.
6. Obtain an expression for the force on a current carrying conductor placed in a magnetic field.
7. Obtain a force between two long parallel current carrying conductors. Hence define ampere.

Lesson - 4 Electromagnetic Induction And Alternating Current

Two mark very short answer questions

1. Define electromagnetic induction.
2. State Faraday's laws of electromagnetic induction.
3. State Lenz's law
4. State Flemming's right hand rule (*generator rule*).
5. Define self inductance or coeffient of self induction.
6. Define mutual inductance or coefficient of mutual induction.
7. Define the unit of inductance (one henry)
8. What are called eddy currents? How are they produced?
9. What the methods of producing induced emf?
10. Distinguish step up and step down transformer.
11. Define RMS value of AC.
12. A capacitor blocks DC but it allows AC. Why?
13. Define resonance.
14. Define Q - factor or quality factor.
15. Define wattles current.

Three mark short answer questions

1. Obtain an expression for motional emf from Lorentz force.
2. Assuming that the length of the solenoid is large when compared to its diameter, find the equation for its inductance.
3. An inductor of inductance 'L' carries an electric current 'i'. How much energy is stored while establishing the current in it?
4. Show that the mutual inductance between a pair of coils is same ($M12=M21$)
5. How will you induce an emf by changing the area enclosed by the coil.
6. Find out the phase relation ship between voltage and current in a pure resistive circuit.
7. Obtain an expression for average power of AC over a cycle. Discuss its special cases.

Five mark long answer questions

1. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
2. Explain the working of a single - phase AC generator with necessary diagram.
3. Explain the principle , construction and working of transformer.
4. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.

Lesson - 5 Electromagnetic waves

Two mark very short answer questions

1. Define displacement current.
2. Give the modified form of Ampere's circuital law.
3. Define dispersion.
4. Define Fraunhofer lines. Give its uses.
5. Define absorbtion spectra.

Three mark short answer questions

1. Discuss briefly the experiment conducted by Hertz to produce and detect electromagnetic spectrum.
2. Give the uses of (i) microwaves, (ii) IR –rays and (iii) UV – rays
3. Explain the properties of electromagnetic waves.

Five mark long answer questions

1. Write down Maxwell equations in integral form.
2. Explain in detail the emission spectra.

Lesson - 6 Ray Optics

Two mark very short answer questions

1. State the laws of reflection.
2. Define focus or focal point,
3. Define focal length of spherical mirror.
4. Define refractive index.
5. Define optical path.
6. State the laws of refraction (Snell's law).
7. Define total internal reflection.
8. Define critical angle.
9. What are the conditions to achieve total internal reflection?
10. Define power of a lens.
11. Obtain the reason for glittering of diamond.
12. State Rayleigh's scattering law.
13. Why does sky appears blue colour?
14. Why does sky and Sun looks reddish during sunset and sunrise?
15. Why does cloud appears as white colour?

Three mark short answer questions

1. What is the angle of deviation due to reflection?
2. What are the characteristics of the image formed by the plane mirror?
3. Obtain the relation between focal length (f) and radius of curvature (R) of the spherical mirror.
4. What is the angle of deviation due to refraction?
5. Obtain the equation for apparent depth.
6. Obtain an expression for critical angle.
7. What are mirage and looming?

Five mark long answer questions

1. Derive the mirror equation and the equation for lateral magnification.
2. Describe the Fizeau's method to determine speed of light.
3. Obtain Lens maker formula and metion its significance.
4. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism.
5. Obtain the equation for dispersive power of a medium.

Lesson - 7 Wave Optics

Two mark very short answer questions

1. What is Dual nature of light ?
2. Define wave front. Give its types.
3. State Huygen's principle.
4. Define interference.
5. Whar are called coherent sources?
6. What are the conditions for obtaining clear and broad interference bands?
7. What is diffraction?
8. Define grating element and corresponding points.
9. What is Rayleigh's criterion?
10. Define polarization.
11. Define angle of polarization.
12. Define double refraction.
13. Define Optic axis.
14. Define uniaxial crystal and biaxial crystal.
15. What is astigmatism?

Three mark short answer questions

1. Write a short note on quantum theory of light.
2. Distinguish between Fresnel and Fraunhofer diffraction.
3. Distinguish between interference and diffraction.
4. State and prove Malus' law.
5. List the uses of polaroids.
6. State and prove Brewster's law
7. Write a note on pile of plates.
8. Discuss about Nicol prism.
9. Distinguish between near point focusing and normal focusing.
10. What is hypermetopia and presbyobia? What is its remedy?

Five mark long answer questions

1. Prove laws of reflection using Huygens principle.
2. Prove laws of refraction using Huygen' principle.
3. Obtain the equation for resultant intensity due to interference of light.
4. Obtain the equation for band width in young's double slit method.
5. Obtain the equations for constructive and destructive interference for reflected waves in thin films.
6. Discuss the diffraction at a grating and obtain the condition for mth maximum.

Lesson - 8 Dual Nature of Radiation and Matter

Two mark very short answer questions

1. Define surface barrier.
2. Define work function of a metal. Give its unit.
3. Define electron volt (eV)
4. What is photo electric effect?
5. Define stopping potential.
6. Define threshold frequency.
7. Write the relationship of de Broglie wavelength λ associated with a particle of mass m in terms of its kinetic energy K.
8. An electron and an alpha particle have same kinetic energy. How are the deBroglie wavelengths associated with them related?
9. List the properties of X - rays.
10. What is Bremsstralung?

Three mark short answer questions

1. State the laws of photo electric effect.
2. What is called matter waves or de Broglie waves? Derive the expression of de Broglie wavelength.
3. Derive an expression for de Broglie wavelength of electrons.
4. Give the application of photo cells .
5. Write a note on continuous X - ray spectrum.
6. Write a note on characteristic X - ray spectra.
7. Explain the applications of X -rays.

Five mark long answer questions

1. Explain the effect of potential difference on photo electric current.
2. Explain how frequency of incident light varies with stopping potential.
3. Obtain Einstein's photoelectric equation with necessary explanation.
4. What is photo electric cell. Give its types. Explain the construction and working of photo emissive cell.
5. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.
6. Briefly explain the principle and working of electron microscope**.**

Lesson - 9 Atomic and Nuclear physics

Two mark very short answer questions

1. What are called cathode rays?
2. Define impact parameter.
3. Define ionization energy.
4. What is isotope? Give an example.
5. Define atomic mass unit.
6. What is mass defect?
7. Calculate the energy equivalent to one atomic mass unit (1 u). Give the answer in eV unit.
8. Define radioactivity.
9. State the properties of neutrino.
10. Define activity. Give its unit.
11. What is half life of nucleus. Give the expression.
12. What is mean life of nucleus? Give the expression.
13. What is meant by nuclear fission?
14. What is nuclear fusion?
15. What is radio carbon dating?

Three mark short answer questions

1. Give the properties of cathode rays.
2. What is distance of closest approach? Obtain expression for it.
3. What are the drawbacks of Rutherford atom model?
4. State the postulates of Bohr's atom model.
5. What are the drawbacks in Bohr atom model?
6. What is nuclear force? Give the properties of nuclear forces?
7. Give the symbolic representation of alpha decay, and beta decay.
8. List the properties of neutrons.
9. Calculate the energy released per fission.
10. Write a note on proton - proton cycle.

Five mark long answer questions

1. Explain the J.J. Thomson experiment to determine the specific charge of electron.
2. Discuss the Millikan's oil drop experiment to determine the charge of an electron.
3. Derive the expression for radius of the nth orbit of hydrogen atom using Bohr atom model.
4. Explain the spectral series of hydrogen atom.
5. Explain the variation of average binding energy with the mass number by graph and discuss its features.
6. Obtain the law of radioactivity (radioactive decay)
7. Describe the working of nuclear reactor with a block diagram

Lesson - 10 Electronics and Communication

Two mark very short answer questions

1. What is called intrinsic semiconductor?
2. Define doping.
3. What is extrinsic semiconductors?
4. Distinguish P-type and N – type semiconductors?
5. Differentiate forward bias and reverse bias.
6. What is called Zener diode? Give its circuit symbol.
7. Give the applications of LEDs.
8. Define forward current gain.
9. Give the Barkhausen conditions for sustained oscillations.
10. What are the application of integrated circuits (ICs)
11. What is called modulation? Give its types.
12. Define band width.

13. What are the three modes of propagation of electromagnetic waves through space.
14. Define skip distance.
15. Define fibre optical communication**.**

Three mark short answer questions
1. Write a note on Zener breakdown.
2. Draw the circuit diagram of common emitter configurations of NPN transistor.
3. Give the relation between α and β
4. Draw the block diagram of an oscillator
5. Distinguish between analog and digital signal.
6. Give the circuit symbol, Boolean expression, logical operation and truth table of NAND gate
7. Give the advantages and limitations of frequency modulation (FM)

Five mark long answer questions
1. Explain the classification of solids on the basis of energy band theory.
2. Elucidate the formation of a N –type and P –type semiconductors
3. Explain the construction and working of a full wave rectifier.
4. Explain the working of Zener diode as a voltage regulator.
5. Transistor functions as a switch. Explain.
6. State and prove De Morgan's First and Second theorems.
7. Explain the function of RADAR. Give its applications.

Lesson - 11 Recent Developments in Physics

Two mark very short answer questions
1. Distinguish between Nano science and Nano technology.
2. What is the difference between Nano materials and Bulk materials?
3. What is robotics?
4. Why steels are preferred to make robots?
5. Write a note on Cosmology.

Three mark short answer questions
1. Explain how nano structures are made in the laboratory?
2. What is artificial intelligence? What are its work?
3. Write a note on nano robots.
4. What are called gravitational waves?
5. Write a note on black holes.

Five mark long answer questions
1. Explain Nano structure in nature with examples.
2. Mention the advantages and disadvantages of Robotics.

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