<u>UNIT - 1</u>

- 1. What are the differences between Coulomb force and gravitational force?
- 2. Define electric dipole. Give the expression for the magnitude of its electric dipole moment and the direction.
- 3. What are the properties of an equipotential surface ?
- 4. Give the relation between electric field and electric potential.
- 5. Discuss the basic properties of electric charge.
- 6. Derive an expression for the torque experienced by a dipole due to a uniform electric field.
- 7. Derive an expression for electrostatic potential due to a point charge.
- 8. Obtain an expression for potential energy due to a collection of three point charges which are separated by finite distances.
- 9. Derive an expression for electrostatic potential energy of the dipole in a uniform electric field.
- 10. Obtain Gauss law from Coulomb's law.
- 11. Obtain the expression for electric field due to an charged infinite plane sheet.
- 12. Obtain the expression for electric field due to an uniformly charged spherical shell.
- 13. Obtain the expression for capacitance for a parallel plate capacitor.
- 14. Obtain the expression for energy stored in the energy stored in the parallel plate capacitor.
- 15. Derive the expression for resultant capacitance, when capacitor connected in series and in parallel.
- 16. Explain how charges are distributed in a conductor?
- 17. Explain about principle behind the lightning conductor.
- 18. Derive an expression for resultant capacitance when capacitors are connected in series and parallel.
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- 19. Obtain the expression for electric field due to an uniformly charged spherical shell.
- 20. Explain how charges are distributed in a conductor, the principle behind the lightning conductor.
- 21. Obtain the expression for electric field due to an charged infinite plane sheet.

<u>UNIT - 2</u>

- 1. Distinguish between drift velocity and mobility.
- 2. Write down the various forms of expression for power in electrical circuit.
- 3. State the applications of Seeback effect.
- 4. Explain the equivalent resistance of a cell using voltmeter.
- 5. State and explain Kirchhoff's rules.

UNIT - 3

- 1. Compare dia, para and ferro magnetism.
- 2. Compute the torque experienced by a magnetic needle in a uniform magnetic field.
- 3. Discuss the conversion of galvanometer into an ammeter.
- 4. Discuss the conversion of galvanometer into an voltmeter.
- 5. Give an account of magnetic Lorentz force.
- 6. Compare the properties of soft and hard ferromagnetic materials.

- 1. Mention the ways of producing induced emf.
- 2. What do you understand self induction of a coil? Give its physical significance.
- 3. List out the advantages of stationary armature rotating field system of AC generator.
- 4. Derive RMS value of an alternating current.
- 5. Give the uses of Foucault current.
- 6. Define self inductance of a coil in terms of i) magnetic flux ii) induced emf.
- 7. An inductor of inductance L carries an electric current i. How much energy is stored while establishing the current in it.
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- 8. How will you induce an emf by changing the area enclosed by the coil?
- 9. Mention the various energy losses in a transformer.
- 10. Find out the phase relationship between voltage and current in a pure inductive circuit.
- 11. Define inductive and capacitive reactance. Give their units.
- 12. Obtain an expression for average power of AC over a cycle.
- 13. Prove that the total energy is conserved during LC oscillations.

- 1. Give two uses of IR radiation.
- 2. Give two uses of micro waves.
- 3. Give two uses of UV radiation.
- 4. Write short notes on Radio waves.
- 5. Write short notes on visible spectrum.
- 6. Write down the properties of electromagnetic waves.

- 1. Derive the relation between f and R for a spherical mirror.
- 2. What are the Cartesian sign conventions for spherical mirrors?
- 3. What is optical path? Obtain the equation for optical path.
- 4. Obtain the equation for apparent depth.
- 5. What are critical angle and total internal reflection?
- 6. Obtain the equation for critical angle.
- 7. Explain the reason for glittering of diamond.
- 8. What are mirage and looming?
- 9. Write a short on the prisms making use of total internal reflections.
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- 10. What are the sign conventions followed for lenses?
- 11. Arrive at lens equation from lens maker's formula.
- 12. Obtain the equation for lateral magnification of thin lens.
- 13. Derive the equation for effective focal length for lenses in contact.
- 14. Obtain the equation for lateral displacement of light passing through a glass slab.
- 15. Derive the equations for thin lens and for magnifications.

<u>UNIT - 7</u>

- 1. What are salient features of corpuscular theory of light?
- 2. What are the important points of wave theory of light?
- 3. What is the significance of electromagnetic wave theory of light /
- 4. Write a short note on quantum theory of light.
- 5. How does wavefront division provide coherent sources?
- 6. What is intensity or amplitude division?
- 7. How do source and images behave as coherent sources?
- 8. Differentiate between Fresnel and Fraunhofer diffraction.
- 9. Discuss the special cases on first minimum in Fraunhofer diffraction.
- 10. What is Fresnel's distance? Obtain the equation for Fresnel's distance.
- 11. Mention the difference between interference and diffraction.
- 12. List the uses of polaroids.
- 13. What is angle of polarisation and obtain the equation for angle of polarisation.
- 14. Discuss about pile of plates.
- 15. Discuss about Nicol prism.
- 16. How is polarisation of light obtained by scattering of light?
- 17. What are the advantages and disadvantages of reflecting telescope?

- 1. What is photo cell? Mention the types of photo cells.
- 2. Write the expression for the de Broglie wavelength associated with a charged particle of charge q and mass m when it is accelerated through a potential V.
- 3. A proton and an electron have same kinetic energy. Which one has greater de Broglie wavelength. Justify.
- 4. Write the relationship of de Broglie wavelength λ associated with a particle of mass m in terms of its kinetic energy.
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- 5. An electron and an alpha particle have same kinetic energy. How are the de Broglie wavelength associated with them related.
- 6. Mention the two features of x ray spectra not explained by classical electromagnetic theory.
- 7. What is Bremssstralung?
- 8. List out the laws of photo electric effect.
- 9. Explain why photo electric effect cannot be explained on the basis of wave nature of light.
- 10. Explain the quantum concept of light.
- 11. Explain experimentally observed facts of photo electric effect with the help of Einstein's explanation.
- 12. List out the characteristics of photons.
- 13. Give the applications photocell.
- 14. How do we obtain characteristics x ray spectra?
- 15. Write the applications of x ray.

- 1. What are the properties of cathode rays.
- 2. Give the results of Rutherford alpha scattering experiment.
- 3. Write down the postulates of Bohr atom model.
- 4. Write down the draw backs of Bohr atom model.
- 5. Show that nuclear density is almost constant for nuclei Z > 10.
- 6. Explain in detail the nuclear force.
- 7. Discuss the alpha decay process with example.
- 8. Discuss the beta decay process with example.
- 9. Discuss the gamma emission with example.
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- 10. Discuss the properties of netrino and its role on beta decay.
- 11. Discuss the process of nuclear fusion and how energy is generated in stars?
- 12. Explain in detail the four fundamental forces in nature.
- 13. Briefly explain the elementary particles present in nature.

- 1. Distinguish between intrinsic and extrinsic semiconductors.
- 2. Draw the input and output waveforms of a full wave rectifier.
- 3. Distinguish between avalanche breakdown and Zener breakdown.
- 4. Give the Barkhausen conditions for sustained oscillations.
- 5. What is meant by biasing? Mention its types.
- 6. Why can't we interchange the emitter and collector even though they are made up of the same type semiconductor material?
- 7. List the applications of light emitting diode.
- 8. Write notes on photo diode .
- 9. Transistor functions as a switch. Explain.
- 10. List out the advantages and limitations of frequency modulation.

ALL THE BEST !!!!!

<u>UNIT - 1</u>

- 1. Calculate the electric field due to a dipole on its axial line and equatorial plane.
- 2. Derive an expression for electrostatic potential due to an electric diploe.
- 3. Obtain the expression for electric field due to an infinitely long charged wire.
- 4. Explain in detail the effect of dielectric placed in a parallel plate capacitor.
- 5. Explain in detail the construction and working of Van de Graff generator.

UNIT - 2

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

<u>UNIT - 2</u>

- 1. Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current using Biot Savart law.
- 2. Obtain a relation for the magnetic field at a point along the axis of a circular coil carrying current using Biot Savart law.
- 3. Calculate the magnetic field at a point on the axial line of a bar magnet.
- 4. Obtain the magnetic field at a point on the equatorial line of bar magnet.
- 5. Find the magnetic field due to a long straight conductor using Ampere's circuital law.
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- 6. Discuss the working of cyclotron in detail.
- 7. What is tangent law? Discuss in detail.
- 8. Derive the expression for the torque on a current carrying coil in a magnetic field.
- 9. Calculate the magnetic field inside and outside of the long solenoid using Ampere's circuital law.
- 10. Derive the expression for the force between two parallel, current carrying conductors.
- 11. Derive the expression for the force on a current carrying conductor in a magnetic field.
- 12. Explain the principle and working of a moving coil galvanometer.

- 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. Show that the mutual inductance between a pair of coils is same $M_{12} = M_{21}$
- 4. How will you induce an emf by changing the area enclosed by the coil?
- 5. Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
- 6. Elaborate the standard construction details of AC generator.
- 7. Explain the working of a single phase AC generator with necessary diagram.
- 8. How are the three different emfs generated in a three phase AC generator? Show the graphical representation of these three emfs.
- 9. Explain the construction and working of transformer.
- 10. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
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<u>UNIT - 5</u>

- 1. Write down Maxwell equations in integral form.
- 2. Explain the Maxwell's modification of Ampere's circuital law.
- 3. Explain the importance of Maxwell's correction.
- 4. Discuss the source of electromagnetic waves.
- 5. Explain the types of emission spectrum.
- 6. Explain the types of absorption spectrum.

UNIT - 6

- 1. Derive the mirror equation and the equation for lateral magnification.
- 2. Describe the Fizeau's method to determine the speed of light.
- 3. Obtain the equation for radius of illumination or Snell's window.
- 4. Derive the equation for acceptance angle and numerical aperture of optical fibre.
- 5. Derive the equation for refraction at single spherical surface.
- 6. Obtain lens maker's formula and mention its significance.
- 7. Derive the equation for angle of deviation produced by a prism and thus obtain the equation for refractive index of material of the prism.
- 8. What is dispersion? Obtain the equation for dispersive power of a medium.

- 1. Prove law of reflection using Huygen's principle.
- 2. Prove law of refraction using Huygen's principle.
- 3. Obtain the equation for resultant intensity due to interference of light.
- 4. Explain the Young's double slit experimental set up and obtain the equation for path difference.
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- 5. Obtain the equation for bandwidth in Young's double slit experiment.
- 6. Discuss the diffraction at single slit and obtain the condition for nth minimum.
- 7. Discuss the diffraction at a grating and obtain the condition for mth maximum.
- 8. Obtain the equation for resolving power of optical instruments.
- 9. Obtain the equation for resolving power of microscope.
- 10. Discuss about the simple microscope and obtain the equations for magnification for near point focusing and normal focusing.
- 11. Explain about compound microscope and obtain the equation for the magnification.

- 1. What do you mean by electron emission? Explain briefly various methods of electron emission.
- 2. Obtain Einstein's photoelectric equation with necessary explanation.
- 3. Give the construction and working of photo emissive cell.
- 4. Derive an expression for de Broglie wavelength of electrons.
- 5. Briefly explain the principle and working of electron microscope.
- 6. Describe briefly Davisson Germer experiment which demonstrated the wave nature of electrons.
- 7. How do we obtain characteristics x-ray spectra?

- 1. Explain the J.J.Thomson experiment to determine to specific charge of electron.
- 2. Discuss the Millikan's oil drop experiment the charge of an electron.
- 3. Derive the energy expression for an electron is te hydrogen atom using Bohr atom model.
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- 4. Discuss the spectral series of hydrogen atom.
- 5. Explain the variation of average binding energy with the mass number using graph and discuss about its feature.
- 6. Obtain the law of radio activity.
- 7. Describe the working of nuclear reactor with a block diagram.

<u>UNIT - 10</u>

- 1. Elucidate the formation of n type extrinsic semiconductors.
- 2. Explain the formation of depletion region and barrier potential in PN junction diode.
- 3. Draw the circuit diagram of a half wave rectifier and explain its working.
- 4. Explain the construction and working of a full wave rectifier.
- 5. What is an LED? Give the principle of its operation with a diagram.
- 6. Explain the working principle of a solar cell. Mention its application.
- 7. Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output waveforms.
- 8. Give circuit symbol, logical operation, Boolean expression i) AND gate ii) OR gate iii) NOT gate iv) NOR gate v) NAND gate
- 9. State and prove De Morgon's first and second theorem.
- 10. Explain the amplitude modulation with necessary diagrams.
- 11. Explain the basic elements of communication system with the necessary block diagram.

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XII PHYSICS

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- 1. Coulomb's law (Pg No: 4)
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- 3. Kirchhoff's law (Pg No: 104)
- 4. Joules law (Pg No: 112)
- 5. Seeback effect (Pg No: 114)
- 6. Peltier effect (Pg No: 115)
- 7. Thomson effect (Pg No: 115)
- 8. Coulomb's inverse square law (Pg No: 135)
- 9. Meissner effect (Pg No: 144)
- 10. Curie's law (Pg No : 145)
- 11. Curie Weiss law (Pg No: 147)
- 12. Biot Savart's Law (Pg No: 154)
- 13. Tangent law (Pg No : 158)
- 14. Gyro magnetic ratio (Pg No : 161)
- 15. Bohr magneton (Pg No : 162)
- 16. Ampere circuital law (Pg No: 162)
- 17. Lorentz force (Pg No : 168)
- 18. Fleming's left hand rule (Pg No: 177)
- 19. One Ampere (Pg No : 179)
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- 21. Faraday's law (Pg No : 200)
- 22. Lenz law (Pg No : 202)
- 23. Fleming's right hand rule (Pg No: 204)
- 24. Eddy current / Foucault current (Pg No : 208)
- 25. Q factor (Pg No : 247)
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- 30. Fraunhofer lines (Pg No : 277)

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- 32. Snell's window (Pg No : 22)
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- 3. Polar / non polar molecules (Pg No: 51)
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- 2. How galvanometer converted into an ammeter? (Pg No: 184)
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- 2. Why is it safer to be inside a car than standing under a tree during lightning ? (Pg No: 49)
- 3. Balloon sticks to the wall. Why? (Pg No: 53)
- 4. Electric current is a scalar . Why? (Pg No: 86)
- 5. Why is temperature co efficient negative for semiconductor ? (Pg No : 96)
- 6. Why nichrome is used as heating element in electric heater? (Pg No:112)
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- 13. Why does sky appear blue ? (Pg No: 44)
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- 17. Why we do not see the wave properties of a base ball?
- 18. Proton and electron have same de Broglie wavelength? (Pg No: 129)
- 19. Why diode is an unidirectional?
- 20. Emitter and collector of a transistor can't be interchanged why?
- 21. Why are NOR and NAND gates called universal gates?
- 22. Why steel are preferred to make robots?
- 23. Why are the possible harmful effects of usage of nanoparticles?

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- 1. What is meant by quantisation of charge? (Pg No: 4)
- 2. What is meant by electric field lines? (Pg No: 17)
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45. What is the reason for reddish appearance of sky during sunset and

Definitions:

sunrise? (Pg No: 44)

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49. Define electric flux. (Pg No: 36)
50. Define capacitance. (Pg No: 54)
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76. Define Curie . (Pg No : 175)
77. Define half life. (Pg No: 175)
78. Define mean life . ( Pg No : 175 )
79. Define forbidden energy gap . (Pg No : 197)
80. Define rectification . (Pg No : 207)
81. Define modulation. (Pg No: 234)
82. Define skip area. Define Curie. (Pg No: 239)
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ALL THE BEST !!!!!!!!