



**MALAR TRUST INDIA-EACHAMPALLAM (Chengalpattu Dist.,)  
12<sup>th</sup> STD PHYSICS QUESTION BANK**

5 Marks:

**UNIT-1:**

1. Calculate the electric field due to dipole on its axial line and equatorial plane.
2. Obtain Gauss law from Coulomb's law.
3. Derive an expression for electrostatic potential due to an electric dipole.
4. Explain in detail the construction and working of a Van de Graaff generator.
5. Derive the expression for resultant capacitance, when capacitors are connected in series and in parallel.
6. Obtain the expression for electric field due to a uniformly charged spherical shell.
7. Obtain the expression for energy stored in the parallel plate capacitor.

**UNIT-2:**

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

**UNIT-3:**

1. Discuss the working of cyclotron in detail.
2. Calculate the magnetic field at a point on the axial line of a bar magnet.
3. Obtain the magnetic field at a point on the equatorial line of a bar magnet.
4. Obtain a relation for the magnetic field at a point along the axis of a circular coil carrying current using Biot-Savart law.
5. Explain the principle and working of a moving coil galvanometer.
6. Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current using Biot-Savart law.

**UNIT-4:**

1. Explain the working of a single-phase AC generator with necessary diagram.
2. Explain the construction and working of transformer.
3. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.
4. Define self-inductance of a coil in terms of (i) magnetic flux and (ii) induced emf.
5. How the three different emf are's generated in a three-phase AC generator? Show the graphical representation of these three emfs.



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**UNIT-5:**

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

**UNIT-6:**

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

**UNIT-7:**

1. Discuss about astronomical telescope.
2. Obtain the equation for bandwidth in Young's double slit experiment.
3. Explain the Young's double slit experimental setup and obtain the equation for path difference.
4. Discuss the diffraction at single slit and obtain the condition for nth minimum.
5. Explain about compound microscope and obtain the equation for the magnification.

**UNIT-8:**

1. Obtain Einstein's photoelectric equation with necessary explanation.
2. Give the construction and working of photo emissive cell.
3. Briefly explain the principle and working of electron microscope.
4. Describe briefly Davisson – Germer experiment which demonstrated the wave nature of electrons.
5. Explain experimentally observed facts of photoelectric effect with the help of Einstein's explanation.

**UNIT-9:**

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 energy expression for an electron in the hydrogen atom using Bohr atom model.
4. Discuss the spectral series of hydrogen atom.



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5. Describe the working of nuclear reactor with a block diagram.

**UNIT-10:**

1. Draw the circuit diagram of a half wave rectifier and explain its working.
2. Explain the construction and working of a full wave rectifier.
3. Transistor functions as a switch Explain.
4. State and prove De Morgan's first and second theorem.
5. Explain the formation of depletion region and barrier potential in PN junction diode.
6. Sketch the static characteristics of a common emitter transistor and bring out the essential features of input and output characteristics.
7. Explain the basic elements of communication system with the necessary block diagram.
8. Give circuit symbol, logical operation, truth table, and Boolean expression of i) AND gate ii) OR gate iii) NOT gate iv) NAND gate v) NOR gate and vi) EX-OR gate.

**3 MARKS:**

**UNIT-1:**

1. Obtain the expression for electric field due to a charged infinite plane sheet.
2. Write a short note on superposition principle.
3. Write the properties of electric lines of forces.
4. Explain in detail the effect of a dielectric placed in a parallel plate capacitor.

**UNIT-2:**

1. State and explain Kirchhoff's rules.
2. Explain the determination of the internal resistance of a cell using voltmeter.
3. Explain the equivalent resistance of a series and parallel resistor network.
4. State the principle of potentiometer.
5. State the applications of Seebeck effect.

**UNIT-3:**

1. Compare the properties of soft and hard ferromagnetic materials.
2. Give the properties of dia / para / ferromagnetic materials.
3. Is an ammeter connected in series or parallel in a circuit? Why?
4. Write the special features of Magnetic Lorentz force.

**UNIT-4:**

1. Give the uses of Foucault current.
2. How will you induce an emf by changing the area enclosed by the coil?
3. Mention the various energy losses in a transformer.
4. Give the advantage of AC in long distance power transmission with an illustration.



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5. Prove that the total energy is conserved during LC oscillations.
6. Find out the phase relationship between voltage and current in a pure inductive circuit.
7. How is Eddy current produced? How do they flow in a conductor?

**UNIT-5:**

1. Write down the properties of electromagnetic waves.
2. Give two uses each of (i) IR radiation, (ii) Microwaves and (iii) UV radiation.
3. What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?
4. Explain the importance of Maxwell's correction.

**UNIT-6:**

1. What are critical angle and total internal reflection?
2. What is the reason for reddish appearance of sky during sunset and sunrise?
3. Obtain the equation for lateral magnification of thin lens.
4. Derive the equation for effective focal length for lenses in contact.

**UNIT-7:**

1. State Brewster's law.
2. Obtain the relation between phase difference and path difference.
3. Differentiate between Fresnel and Fraunhofer diffraction.
4. Mention the differences between interference and diffraction.
5. State and obtain Malus' law.
6. List the uses of polaroids.
7. Discuss about pile of plates.
8. Discuss about Nicol Prism.

**UNIT-8:**

1. Derive an expression for de Broglie wavelength of electrons.
2. List out the characteristics of photons.
3. Give the applications photocell.
4. How do we obtain characteristic x-ray spectra?
5. A proton and an electron have same kinetic energy. Which one has greater de Broglie wavelength? Justify.

**UNIT-9:**

1. Obtain the law of radioactivity.
2. Discuss the alpha decay process with example.
3. Give the account of four fundamental forces.
4. Explain the idea of carbon dating.



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5. What is half-life of a radia active nucleus? Give the expression.

**UNIT-10:**

1. Fiber optic communication is gaining popularity among the various transmission media - justify.
2. Give applications of RADAR.
3. What is an LED? Give the principle of its operation with a diagram.
4. List out the advantages and limitations of frequency modulation.
5. What is meant by satellite communication? Give its applications.
6. Write a note on photodiode.
7. Distinguish between avalanche breakdown and Zener breakdown.

**2 Marks:**

**UNIT-I**

1. Define 'electric dipole'. Give the expression for the magnitude of its electric dipole moment and the direction.
2. What are the differences between Coulomb force and gravitational force?
3. Write a short note on superposition principle.
4. Define 'electrostatic potential'.
5. Give the relation between electric field and electric potential.
6. Define 'electric flux'.
7. Write a short note on 'electrostatic shielding'.
8. Define 'capacitance'. Give its unit.
9. What is corona discharge?
10. Define 'electric field' and what is mean by 'electric field lines'?

**UNIT-II**

1. Distinguish between drift velocity and mobility.
2. What are ohmic and non ohmic devices?
3. Write a short note on superconductors?
4. Define temperature coefficient of resistance.
5. State Joule's law of heating.
6. What is Seebeck effect?
7. What is Thomson effect?
8. What is Peltier effect?

**UNIT-3:**

1. State Fleming's left hand rule.
2. Is an ammeter connected in series or parallel in a circuit? Why?



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3. Define magnetic dipole moment.
4. State Ampere's circuital law.
5. State Biot-Savart's law.
6. Define magnetic declination and inclination.
7. What is resonance condition in cyclotron?
8. What is meant by hysteresis?

**UNIT-4:**

1. State Faraday's laws of electromagnetic induction.
2. State Fleming's right hand rule.
3. State Lenz's law.
4. How will you define the unit of inductance?
5. List out the advantages of stationary armature-rotating field system of AC generator.
6. How will you define Q-factor?
7. What are step-up and step-down transformers?
8. What are LC oscillations?
9. What is meant by wattles current?
10. Define electric resonance.

**UNIT-5:**

1. What is displacement current?
2. What are electromagnetic waves?
3. Write notes on Gauss' law in magnetism.
4. Why are e.m. waves non-mechanical?
5. Write notes on Ampere-Maxwell law.

**UNIT-6:**

1. State Snell's law/law of refraction.
2. What is optical path? Obtain the equation for optical path.
3. Explain the reason for the glittering of diamond.
4. What are mirage and looming?
5. What is angle of minimum deviation?
6. What is dispersion?
7. What is Rayleigh's scattering?
8. Why does sky appear blue?
9. Why do clouds appear white?
10. Why do stars twinkle?

**UNIT-7:**

1. Define wavefront.



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2. State Huygens' principle.
3. What are the uses of spectrometer?
4. What is astigmatism? What is its remedy?
5. Why is oil immersed objective preferred in a microscope?
6. Differentiate between polarised and unpolarised light
7. What is polarisation?
8. What are coherent sources?

**UNIT-8:**

1. What is photoelectric effect?
2. How will you define threshold frequency?
3. Why we do not see the wave properties of a baseball?
4. A proton and an electron have same kinetic energy. Which one has greater de Broglie wavelength? Justify.
5. Define stopping potential.
6. What is Bremsstrahlung?
7. What is surface barrier?
8. An electron and an alpha particle have same kinetic energy. How are the de Broglie wavelengths associated with them related?

**UNIT-9:**

1. Write the properties of cathode rays.
2. Define the ionization energy and ionization potential.
3. Define Isotope, Isotones and Isobars with examples.
4. Define atomic mass unit u.
5. Calculate the energy equivalent of 1 atomic mass unit.
6. What is binding energy of a nucleus? Give its expression.
7. Define curie.
8. What are the constituent particles of neutron and proton?
9. What is half-life of a radia active nucleus? Give the expression.
10. What is mass defect?

**UNIT-10:**

1. What do you mean by doping?
2. Distinguish between intrinsic and extrinsic semiconductors.
3. Draw the input and output waveforms of a full wave rectifier.
4. Give the Barkhausen conditions for sustained oscillations.
5. What are logic gates?
6. What is meant by biasing? Mention its types.
7. Why are NOR and NAND gates called universal gates?



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8. Define barrier potential.
9. What is rectification?
10. List the applications of light emitting diode.
11. What do you mean by skip distance?
12. What is mobile communication?
13. What does RADAR stand for?
14. Give the principle of solar cells.
15. A diode is called as a unidirectional device. Why.

வாய்ப்புக்காக  
காத்திருக்காதே...  
உனக்கான  
வாய்ப்பை நீயே  
ஏற்படுத்தி கொள்...



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