

PHYSICS UNIT 1 (ELECTROSTATICS)

3 MARKS:

- 1) **State Coulomb's law in electrostatics and represent it in vector form.**
- 2) **What is an electric dipole? Define electric dipole moment?**
- 3) **Distinguish between electric potential and potential difference.**
- 4) **What is an equipotential surface?**
- 5) **Define electric flux. Give its unit.**
- 6) **State Gauss's law.**
- 7) **What is a capacitor? Define its capacitance. & write the applications of capacitor.**
- 8) **What is meant by dielectric polarisation?**
- 9) **Why is it safer to be inside a car than standing under a tree during lightning?**
- 10) **Three small identical balls have charges $-3 \times 10^{-12}\text{C}$, $8 \times 10^{-12}\text{C}$ and $4 \times 10^{-12}\text{C}$ respectively. They are brought in contact and then separated. Calculate (i) charge on each ball.**
- 11) **A sample of HCl gas is placed in an electric field of $2.5 \times 10^4 \text{ N C}^{-1}$. The dipole moment of each HCl molecule is $3.4 \times 10^{-30} \text{ C m}$. Find the maximum torque that can act on molecule.**
- 12) **An infinite line charge produces a field of $9 \times 10^4 \text{ N C}^{-1}$ at a distance of 2 cm. Calculate the linear charge density.**
- 13) **What is corona discharge?**
- 14) **Distinguish between polar and non-polar molecule with suitable examples.**
- 15) **What is electric field intensity?**
- 16) **Define "one Coulomb".**

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PHYSICS UNIT 2 (CURRENT ELECTRICITY)

3 MARKS:

- 1) ***State Ohm's law.***
- 2) ***Define resistivity of a material.***
- 3) ***Distinguish between electric power and electric energy***
- 4) ***Why automobile batteries have low internal resistance?***
- 5) ***A 10Ω resistance is connected in series with a cell of emf 10V. A voltmeter is connected in parallel to a cell, and it reads. 9.9 V. Find internal resistance of the cell.***
- 6) ***The resistance of a nichrome wire at 0°C is 10Ω . If its temperature coefficient of resistance is $0.004/^\circ\text{C}$, find its resistance at boiling point of water. Comment on the result.***
- 7) ***state Faraday's laws of electrolysis***
- 8) ***Comparison of emf and potential difference***
- 9) ***state Kirchoff's second law (voltage law)***
- 10) ***what is superconducting transition temperature? What are the transition***
- 11) ***temperature the following changes are observed***
- 11) ***Define mobility. Give its units***

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PHYSICS UNIT 3 (EFFECT OF ELECTRIC CURRENT)

3 MARKS:

- 1) **State Joule's law**
- 2) **Define Peltier coefficient**
- 3) **Define Thomson coefficient**
- 4) **State Biot – Savart law**
- 5) **What is Ampere's circuital law?**
- 6) **Define ampere**
- 7) **Explain how you will convert a galvanometer into (i) an ammeter and (ii) a voltmeter.**
- 8) **STATE FLEMING LEFT HAND RULE.**
- 9) **What is seebak effect.**
- 10) **State tangent law.**

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PHYSICS UNIT 4 (Electromagnetic Induction and Alternating Current)
3 MARKS:

- 1) *What is electromagnetic induction?*
- 2) *State Faraday's laws of electromagnetic induction.*
- 3) *Define coefficient of mutual induction.*
- 4) *Define rms value of a.c.*
- 5) *State the methods of producing induced emf.*
- 6) *Mention the difference between a step up and step down transformer.*
- 7) *Define quality factor.*
- 8) *Why a d.c ammeter cannot read a.c?*
- 9) *State Lenz's law*
- 10) *What are eddy currents? Give their any 2 applications.*
- 11) *Define efficiency of transformer.*
- 12) *An aircraft having a wingspan of 20.48 m flies due north at a speed of 40 ms^{-1} . If the vertical component of earth's magnetic field at the place is $2 \times 10^{-5} \text{ T}$, Calculate the emf induced between the ends of the wings.*
- 13) *Write the equation of a 25 cycle current sine wave having rms value of 30 A.*

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PHYSICS UNIT 5 (Electromagnetic Waves and Wave optics)**3 MARKS:**

- 1) **What is fluorescence and phosphorescence?**
- 2) **What is Tyndal Scattering?**
- 3) **Give the conditions for sustained interference.**
- 4) **Distinguish between Fresnel and Fraunhofer diffraction.**
- 5) **Bring out the difference's between ordinary and extra ordinary light.**
- 6) **What is meant by optical rotation? On what factors does it depend?**
- 7) **In Newton's rings experiment the diameter of certain order of dark ring is measured to be double that of second ring. What is the order of the ring?**
- 8) **A plano – convex lens of radius 3 m is placed on an optically flat glass plate and is illuminated by monochromatic light. The radius of the 8th dark ring is 3.6 mm. Calculate the wavelength of light used.**
- 9) **In Young's double slit experiment two coherent sources of intensity ratio of 64 : 1, produce interference fringes. Calculate the ratio of maximum and minimum intensities.**
- 10) **Write any 3 uses of polaroids**
- 11) **What is absorption and emission spectra?**
- 12) **Why newton's nth dark ring is dark?**
- 13) **Write any 3 uses of UV radiation.**

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PHYSICS UNIT 6 (ATOMIC PHYSICS)

3 MARKS:

- 1) *What are the drawbacks of Rutherford atom model?*
- 2) *What is meant by energy level diagram?*
- 3) *What are hard X-rays and soft x-rays?*
- 4) *State : Moseley's law.*
- 5) *Write the differences between spontaneous emission and stimulated emission.*
- 6) *What are the important characteristics of laser?*
- 7) *How does the laser light differ from ordinary light?*
- 8) *What are various applications of laser in medical field?*
- 9) *Write the condition of active laser action.*
- 10) *Write the applications of mosleys law.*
- 11) *What is Excitation and ionization potential of an atom*
- 12) *The Rydberg constant for hydrogen is $1.097 \times 10^7 \text{ms}^{-1}$. Calculate the short and long wavelength limits of Lyman series.*

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PHYSICS UNIT 7(Dual Nature of Radiation and Matter and Relativity)
3 MARKS:

- 1) **What is photoelectric effect?**
- 2) **Define threshold frequency.**
- 3) **What are matter waves?**
- 4) **Mention the applications of electron microscope.**
- 5) **If a body moves with the velocity of light, what will be its mass? Comment on your result.**
- 6) **Find the accelerating potential of the electron, when its de Broglie wavelength is 1\AA .**
- 7) **What is the de Broglie wave length of an electron of kinetic energy 120 eV ?**
- 8) **Calculate the de Broglie wave length of an electron, if the speed is 10^5 ms^{-1} . (Given $m = 9.1 \times 10^{-31}\text{ kg}$; $h = 6.626 \times 10^{-34}\text{ Js}$)**
- 9) **The work function of zinc is $6.8 \times 10^{-19}\text{ J}$. What is the threshold frequency for emission of photoelectrons from zinc?**
- 10) **Write the example of Lorentz - Fitzgerald contraction.**
- 11) **State the postulates of special theory of relativity.**

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PHYSICS UNIT 8(NUCLEAR PHYSICS)

3 MARKS:

- 1) Define radioactivity.
- 2) Define curie.
- 3) What do you mean by artificial radioactivity?
- 4) What are the applications of radio-isotopes?
- 5) The half-life of $^{84}\text{Po}_{218}$ is 3 minute. What percentage of the sample has decayed in 15 minutes?
- 6) Calculate the radius of $^{13}\text{Al}_{27}$ nucleus.
- 7) Write a short note on lepton particle.
- 8) What is α -decay, β -decay. write the equation for both decay.
- 9) What is mass defect?
- 10) Write any 3 properties of neutrons.
- 11) What are the precautions to be taken in hazardous area.?

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PHYSICS UNIT 9(SEMICONDUCTOR DEVICES AND ITS APPLICATIONS)**3 MARKS:**

- 1) Distinguish between intrinsic semiconductor & extrinsic semiconductor.
- 2) Draw the circuit diagram for NPN transistor in common emitter (CE) mode.
- 3) Mention any three advantages of integrated circuit.
- 4) Define input impedance of a transistor in CE mode.
- 5) When the negative feedback is applied to an amplifier of gain 50, the gain falls to 25. Calculate the feedback ratio.
- 6) Draw circuit diagram for OR gate using diodes.
- 7) What is Zener breakdown?
- 8) The voltage gain of an amplifier without feedback is 100. If negative feedback is applied with feedback fraction 0.1, calculate the voltage gain with feedback.
- 9) Draw circuit diagram for AND gate using diodes and resistors.
- 10) What is rectification?
- 11) What is light emitting diode? Give any one of its uses.
- 12) Collector current $I_c=20$ mA and base current $I_b = 50$ A. Find current gain β of a transistor.
- 13) Draw the circuit diagram for NPN transistor in common collector (CC) mode.
- 14) State de Morgan's theorem.
- 15) What is meant by doping? Name the different methods of doping in a semiconductor.
- 16) What is a zener diode? Draw its symbol.
- 17) Prove the Boolean equation $(A + B) (A + C) = A + BC$
- 18) Draw the circuit diagram of difference amplifier using operational amplifier.
- 19) Draw the circuit for summing amplifier.
- 20) What the Barkhausen conditions for oscillations?

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PHYSICS UNIT 10(Communication Systems)

3 MARKS:

- 1) Define: modulation factor in amplitude modulation.
- 2) Write any three applications of RADAR.
- 3) What is FAX? Give its uses.
- 4) What is meant by skip distance?
- 5) Define : bandwidth or channel width in Amplitude modulation.
- 6) What are the advantages of frequency modulation?
- 7) What is MODEM?
- 8) What are the advantages of digital communication?
- 9) Give any three advantages of optical fiber communication.
- 10) What is the necessity of modulation?

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