Chapter Analysis & Weightage

Chapter Name	Average Weightage (Marks)	Primary Focus of Questions / Most Asked Topics
Electrostatic Potential and Capacitance	4 – 5	Equipotential surfaces, potential due to point charges, and energy stored in capacitor combinations.
Current Electricity	7	Drift velocity, Ohm's Law, Kirchhoff's rules, and power consumption in bulb circuits.
Moving Charges and Magnetism	6 – 7	Ampere's Law, force on current-carrying conductors, and the working/sensitivity of Moving Coil Galvanometers.
Magnetism and Matter	2 – 3	Classification of materials (dia, para, and ferro), relative permeability, and magnetic dipole moment.
Electromagnetic Induction	3 – 4	Lenz's Law, Faraday's Law, induced EMF in loops, and motional EMF calculations.
Alternating Current	5 – 6	LCR circuit impedance, resonance conditions, power in AC circuits, and phase relationships.
Electromagnetic Waves	3	Displacement current properties and identifying parts/uses of the EM spectrum.
Ray Optics and Optical Instruments	9	Total Internal Reflection (critical angle), lens/mirror magnification, and compound microscope magnifying power.
Wave Optics	6	Huygens Principle, Young's Double Slit Experiment (YDSE) fringe width, and diffraction patterns.
Dual Nature of Radiation and Matter	4	Einstein's photoelectric equation, stopping potential graphs, and de-Broglie wavelength for particles.

Atoms	3 – 4	Alpha-particle scattering (distance of closest approach) and Bohr's model of the hydrogen atom.
Nuclei	3 – 4	Nuclear density, binding energy per nucleon curve, and energy released in fission/fusion.
Semiconductor Electronics	7	p-n junction biasing (V-I characteristics), rectifiers, and the effect of doping on conductivity.

Top 15 Most Asked MCQs from Previous Year Papers (Physics)

Q1. Nuclear Density

Two nuclei have their mass numbers in the ratio **1 : 27**.
What is the ratio of their nuclear densities?

(a) 1 : 27
(b) 1 : 1
(c) 1 : 9
(d) 1 : 3

Q2. Assertion–Reason (Electric Power in Series)

Assertion (A):
When three electric bulbs of power 200 W, 100 W and 50 W are connected in series to a source, the power consumed by the 50 W bulb is maximum.

Reason (R):
In a series circuit, current is the same through each bulb, but the potential difference across each bulb is different.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false and (R) is true.

Q3. Moving Coil Galvanometer

The coil of a moving coil galvanometer is wound over a metal frame in order to:

(a) Reduce hysteresis
(b) Increase sensitivity
(c) Increase moment of inertia
(d) Provide electromagnetic damping

Q4. RMS and Maximum Current

An ammeter connected in series in an AC circuit reads **10 A**.
The maximum value of current at any instant in the circuit is:

(a) 102A
(b) 102A
(c) 10A
(d) 102A

Q5. Magnification of Mirror

The magnification produced by a spherical mirror is:

m=-2.0

The mirror used and the nature of the image formed will be:

(a) Convex and virtual
(b) Concave and real
(c) Concave and virtual
(d) Convex and real

Q6. Drift Velocity

Two copper wires P and Q of the same cross-sectional area are joined in parallel and connected across a battery of potential difference V.

If the lengths of wires P and Q are in the ratio **1 : 2**, the ratio of drift velocities of electrons in P and Q is:

(a) 1 : 2
(b) 2 : 1
(c) 1 : 1
(d) 1 : 4

Q7. Magnetic Permeability

Which one of the following has relative magnetic permeability between 0 and 1?

(a) Aluminium
(b) Alnico
(c) Water
(d) Sodium

Q8. Photoelectric Effect

Photons of energies **1 eV** and **2 eV** are successively incident on a metallic surface of work function:

φ=0.5 eV

The ratio of kinetic energy of the most energetic photoelectrons in the two cases will be:

(a) 1 : 2
(b) 1 : 1
(c) 1 : 3
(d) 1 : 4

Q9. Assertion–Reason (n-type Semiconductor)

Assertion (A):
n-type semiconductor is not negatively charged.

Reason (R):
Neutral pentavalent impurity atom doped in intrinsic semiconductor donates its fifth unpaired electron to the crystal lattice and becomes a positive donor.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).

(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

Q10. Displacement Current

Displacement current exists only when:

(a) Electric field is changing
(b) Magnetic field is changing
(c) Electric field is not changing
(d) Magnetic field is not changing

Q11. Critical Angle

The critical angle for two media A and B having refractive indices:

nA=2.0,nB=1.0

is:

(a) 0°
(b) 30°
(c) 45°
(d) 60°

Q12. Assertion–Reason (Young's Double Slit Experiment)

Assertion (A):
In Young's double slit experiment, if the separation dbetween coherent sources and the distance Dof the screen from the sources are both reduced to 13, the fringe width remains the same.

Reason (R):
Fringe width is proportional to dD.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false and (R) is also false.

Q13. Assertion–Reason (Hydrogen Atom)

Assertion (A):
The potential energy of an electron revolving in any stationary orbit in a hydrogen atom is positive.

Reason (R):
The total energy of a charged particle is always positive.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) Both (A) and (R) are false.

Q14. Reactance Ratio

The ratio of inductive reactance XLto capacitive reactance XCin an AC circuit is:

XL=ωL,XC=1ωC

(a) 2LC
(b) LC2
(c) LC2
(d) 2LC

Q15. Assertion–Reason (Photoelectric Current)

Assertion (A):
For radiation of frequency greater than the threshold frequency, photoelectric current is proportional to the intensity of radiation.

Reason (R):
Greater the number of energy quanta available, greater is the number of electrons absorbing energy quanta and hence greater is the number of electrons emitted.

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.