

The Jammu and Kashmir State Board of School Education
Academic Division New Campus Bemina Srinagar

PHYSICS

PAPER A

Model Question paper.

Time 2:30 hrs

Section A (Long answer type)

Max. Marks:60

5 marks each

1. Define electric dipole and electric dipole moment. Find an expression for electric field at a point on the axial line/equatorial line of an electric dipole.

Or

State Gauss's law in electrostatics. Derive expression for the electric field due to an infinite line/plane sheet of charge.

2. Define capacitance of a capacitor. Give its units. Derive an expression for the capacitance of a parallel plate capacitor when a dielectric slab/conducting slab is introduced between its plates.

Or

Describe the principle, construction and working of Van de generator.

3. State Kirchhoff's law. How will you find the unknown resistance of a wire using Wheatstone bridge in balanced mode?

Or

Give the principle and construction of potentiometer. How is potentiometer used to compare e.m.f. of two cells

4. Explain principle, construction and working of a cyclotron. What are its limitations?

Or

Give the principle, construction and working of a moving coil galvanometer. Explain the purpose of radial magnetic field.

5. Derive an expression for the average power in an LCR circuit. Hence define power factor.

Or

Define self/mutual induction. Derive an expression for coefficient of self induction/mutual induction. State the units of coefficient of self/mutual induction.

Section B (Short Answer type Questions)

3 marks each

6. Two charges of $+25 \mu\text{C}$ are placed 1 m apart. A test charge of $+\mu\text{C}$ is placed midway between them. Calculate the force exerted by each charge and net charge on the test charge.
7. Briefly explain resistance, resistivity, conductance and conductivity. Give their units.
8. Define drift velocity. Write down the expression for drift velocity. Derive relation between current and drift velocity.

9. Derive an expression for the magnetic field at the centre of a circular current carrying coil using Biot Savart law.
10. A galvanometer with a coil of resistance 12 ohm shows full scale deflection for a current of 2.5 mA. How can it be converted in an ammeter of range 7.5 A and voltmeter of range 7.5 volt.
11. State Lenz's law . How is it in accordance with law of conservation of energy?
12. What are electromagnetic waves. Give the characteristics of e.m. waves.

Section C (Very Short Answer Type Questions) 2 marks each

13. A wire of resistance 5Ω is drawn out so that its length is increased to twice its original length. What is its new resistance?
14. A horizontal overhead power line carries a current of 90 A in an east to west direction. What is magnitude and direction of magnetic field due to current 1.5 m above and below the line?
15. Give two properties each of diamagnetic, paramagnetic and ferromagnetic substances.
16. Write down use of gamma ray, X-ray, microwave and radio waves.

Section D (objective type) 1 mark each

17. The S. I unit of surface integral is -----
18. A wire carrying current is electrically neutral because-----
19. Electrons in a conductor have no motion in the absence of potential difference across it (True/False)
20. The instrument use for the measurement of a.c. is known as
21. Write the electromagnetic waves in the increasing order of their frequencies.
22. Transformer is used in a.c and not d.c because of -----

PAPER B

Model Question Paper.

Time 2:30 hrs

Max. Marks:60

Section A (Long answer type)

5 marks each

1. Derive mirror formula /lens formula for a concave lens/convex mirror /lens/
State the sign conventions used

Or

Derive lens makers formula for a thin convex lens . State the sign conventions and assumptions used.

2. Trace the course of rays through a compound microscope /astronomical telescope. Derive the expression for the magnifying power. Give its units. .

Or

Define interference of light. Describe Young's double slit experiment to obtain fringe width in case of interference pattern.

3. State the basic postulates of Bohr's theory of atomic spectra. Derive an expression for the radius and energy of an electron in the n th orbit of a hydrogen atom?

Or

Explain mass defect, binding energy and binding energy per nucleon. Discuss graphically the variation of Binding energy per nucleon with mass number.

4. Define photoelectric effect. Establish Einstein's photoelectric equation.
Hence, explain law of photoelectric emission on the basis of this equation.

Or

Describe Davison and Germer experiment to establish the wave nature of electron.

5. Discuss energy band theory of solids, Hence; classify solids into conductor, insulators and semiconductors.

Or

Define rectification. Explain how a pn junction diode is used as a half wave and full wave rectifiers.

Section B (Short Answer type Questions)

3 marks each

6. Define polarization. Explain Brewster's law.
7. Write down the radioactive disintegration law in mathematical form. Hence, half life period of a radioactive substance. Derive the relation between half life period and decay constant.
8. What are matter waves. Derive expression for de Broglie wave length of a material particle.
9. Give the truth table and logic symbol of OR, AND, NOT, NOR and NAND gate.
10. Distinguish between p-type and n-type extrinsic semiconductor.
11. Explain analog and digital communication. What are merits of digital communication?
12. What does 'modem' stand for? Briefly discuss its working and other features.
- 13.

Section C (Very Short Answer Type Questions)

2 marks each

14. Two coherent sources of intensity in the ratio of 4:1 interfere. What is the ratio of intensity of maxima to the minima in the interference pattern? Also find the fringe visibility.
15. in an npn – transistor circuit, the collector current is 10 mA. If 90% of electrons reach the collector. Find the emitter and base current.
16. What is meant by 'Fax'. Give its block diagram to explain its working.
17. Briefly describe Satellite communication. Give its merits and demerits.

Section D (objective type)

1 mark each

18. What is the energy range (minimum and maximum energy) of visible light?
19. What is de Broglie wavelength of an electron with a speed of 6×10^5 m/s.
20. There is no emergent ray then angle of prism is greater than twice the critical angle.
21. Atoms having the same-----but different-----are called isotopes.
22. PAM stands for_____
23. The upper limit of a repeater spacing for a twisted pair of wires is
 - a. 6 km
 - b. 60 km
 - c. 600 km
 - d. 6000 km