

# Model Question Paper

For Kashmir Division 2010 Regular Exam Only

Roll No.....

Subject

Physics

Maximum Marks --- 60

Time Allowed – 3 Hours (Fifteen Minutes Extra to read the question paper)

Do questions from Part A or Part B or from both Part A and B Part of maximum 60 marks as per your preparation.

## Part A

(Long Answer Type Questions)

1. State and explain Coulombs law in Vector form. Define unit charge.

*Or*

State and prove Gauss's theorem in Electrostatics. Deduce Coulombs law from Gauss's theorem. 5

2. State Krichhoffs laws. Derive the condition for obtaining balance in Wheatstone bridge.

*Or*

State the principle of Potentiometer. How it can be used to compare the emf of two cells ? 5

3. Give the principle, construction and working theory of Moving Coil galvanometer.

*Or*

Explain with the help of labelled diagram the construction and working of Cyclotron. 5

4. State and explain Lenz's law. Show that it is inaccordance with the Law of Conservation of Energy.

*Or*

What is Transformer ? Explain its theory and working. 5

5. What are Dia, Para and Ferromagnetic materials ? Discuss their important properties.

**Or**

Derive an expression for the force experienced by a current carrying conductor, when placed in an uniform magnetic field. State the law used to find the direction of force.

5

**(Short Answer Type Questions)**

6. Calculate the Coulombic force between Electron and Proton separated by  $0.8 \times 10^{-15}$  m. 3
7. Write a short note on Seebeck effect. 3
8. How can a Galvanometer is converted into Ammeter ? 3
9. Write short history of Electromagnetic waves. 3
10. State and explain the phenomena of Self-induction. 3
11. A Potential difference of 250 volt is applied across the plates of  $25\mu\text{F}$  capacitor. Calculate the charge on the plates of a capacitor. 3
12. Derive Joule's law of Heating. 3

**(Very Short Answer Type Questions)**

13. The following very short answer type questions of two marks, each may be answered in a few words or a few sentences or as may be required.
- (a) Specific resistance of Copper, Silver and Constanian are  $1.78 \times 10^{-6} \Omega \text{ cm}$ ,  $10^{-6} \Omega \text{ cm}$  and  $48 \times 10^{-6} \Omega \text{ cm}$  respectively. Which is the best conductor and why ? 2

- (b) Give the properties of Electromagnetic waves. 2
- (c) Explain the principle of Capacitor. 2
- (d) State Faradays laws of Electromagnetic induction. 2

**(Objective Type Questions)**

14. Choose the correct/most appropriate answer and write it in your Answer-book :

(i) In a non-uniform electrical field, electric dipole experiences

- A. Torque only
- B. Torque as well as net force
- C. Force only
- D. None of these.

1

(ii) The resistance of an ideal Voltmeter is

- A. Zero
- B. Infinity
- C.  $100\ \Omega$
- D.  $1000\ \Omega$ .

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(iii) An electric bulb marked 40 W and 200 V is used in a circuit of supply voltage 100 V, its power would be

- A. 40 W
- B. 10 W
- C. 20 W
- D. 100 W.

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( 4 )

(iv) Energy dissipates in L-CR circuit in

- A. L only
- B. C only
- C. R only
- D. All the above.

(v) The wavelength of matter wave is independent of

- A. Mass
- B. Velocity
- C. Momentum
- D. Charge.

(vi) For high frequency capacitor offers

- A. less resistance
- B. more resistance
- C. zero resistance
- D. None of these.

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## Part B

### (Long Answer Type Questions)

1. Derive, analytically, the conditions for constructive interference and destructive interference.

*Or*

Describe the optical arrangement for a Compound microscope and obtain an expression for its magnifying power. 5

2. What is Photoelectric effect ? How does the photoelectric current change due to a change in frequency of the incident light ?

*Or*

What are Matter waves ? Obtain an expression for de Broglie wavelength associated with the matter particle. Why macroscopic body do not show this phenomenon ? 5

3. What do you mean by Half-life ? How is it connected with radioactive decay constant ?

*Or*

Describe the Postulates of Bohr's Atomic model and derive an expression for the energy of an electron of a hydrogen atom while revolving in a stable orbit. 5

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4. What is a NPN Transistor ? Discuss the working of Transistor as an Amplifier.

*Or*

What do you mean by a N-type and P-type semiconductor ? How are they formed ? 5

5. What is meant by Detection ? Discuss briefly the detection of an amplitude modulated wave.

*Or*

What do you understand by Ground wave and Sky wave ? Discuss their propogation. 5

**(Short Answer Type Questions)**

6. What are Spherical, cylindrical and plane wavefronts ? Give an example of each wavefront. 3
7. Two coherent sources are 0.18 mm apart and fringes are observed on a screen 80 cm away. It is found that with a certain source of light, the fourth bright fringe is situated at a distance of 10.8 mm from the central fringe. Calculate the wavelength of light. 3
8. What are Polaroids ? Give their two uses. 3
9. What is Potential barrier ? How it is formed ? 3
10. Discuss the working of a Transistor as an Oscillator. 3
11. Write a note on Modems. 3
12. What is a Carrier wave ? Why high frequency carrier waves are employed for Transmission ? 3



**(Very Short Answer Type Questions)**

13. The following very short answer type questions of two marks, each may be answered in a few words or a few sentences or as may be required.
- (a) Calculate the radius of the orbit of H-atom in ground state. 2
  - (b) State the Laws of Photoelectric emission. 2
  - (c) Calculate de Broglie wavelength of helium atoms ( $m = 6.65 \times 10^{-27}$  kg) having average velocity  $1.635 \times 10^3$  m/s. 2
  - (d) Give Boolean expression, Truth table and the Circuit symbol of AND gate. 2

**(Objective Type Questions)**

14. Choose the correct/most appropriate answer and write it in your Answer-book :
- (i) The field of view is maximum for
    - A. Convex mirror
    - B. Concave mirror
    - C. Plane mirror
    - D. Concave lens. 1
  - (ii) In which of the following cases total internal reflection cannot occur ? A ray going from
    - A. Glass to air
    - B. Glass to water
    - C. Water to glass
    - D. Water to air. 1

- (iii) The Phenomena of Photoelectric effect was explained by
- A. Huygen
  - B. Einstein
  - C. Planks
  - D. Faraday.
- (iv) The energy gap in intrinsic semi-conductor is approximately
- A. 0.5 eV
  - B. 1 eV
  - C. 5 eV
  - D. 10 eV.
- (v) In which region of e.m. spectrum does Lyman series of H-atom lies ?
- A. Ultraviolet
  - B. Infrared
  - C. Visible
  - D. X-rays.
- (vi) Modem is a device which performs
- A. Modulation
  - B. Demodulation
  - C. Rectification
  - D. Modulation and Demodulation.