

# Model Question Paper

Class-XII (Regular)

Subject-Physics (Session : 2020-21)

Time Allowed : 3 hrs

Maximum Marks : 60

### Special Instructions:

- (i) All questions are compulsory.
- (ii) 30% extra internal choice is being given in the questions.
- (iii) Answers should be brief and to the point.
- (iv) Question number (1-10) are MCQ carrying 1 mark each. Question number (11-17) are short answer type carrying 2 marks each, Q.No (18-25) are short answer type carrying 3 marks each. Q.No (26-28) are long answer type carrying 4 marks each.

1. The angle between dipole moment and net electric field due to an electric dipole on equatorial line is:  
(a)  $0^\circ$  (b)  $90^\circ$  1  
(c)  $120^\circ$  (d)  $180^\circ$
2. Kirchoff's first and second law are based on the law of conservation of  
(a) Charge and energy (b) Energy and charge  
(c) Momentum and energy (d) Mass and energy 1
3. The trajectory of a charged particle incident perpendicular to magnetic field is  
(a) Parabolic (b) Straight line  
(c) Circular (d) Helical 1

4. Direction of induced e.m.f produced due to changing magnetic flux is given by:  
 (a) Fleming's left hand rule (b) Lenj's law  
 (c) Fleming's right hand rule (d) Ampere's circuital law 1
5. Ratio of speed of violet colour to speed of red colour in vacuum is:  
 (a) = 1 (b) < 1  
 (c) > 1 (d) None of these 1
6. The phenomenon of Mirage is due to  
 (a) Dispersion of light (b) Interferene of light  
 (c) Scattering of light (d) Total internal reflection 1
7. Energy of photon having frequency  $10^{24}$  hertz is given by  
 (a)  $6.6 \times 10^{-10}$  J (b)  $3.3 \times 10^{-10}$  J  
 (c)  $6.6 \times 10^{58}$  J (d)  $3.3 \times 10^{-58}$  J 1
8. Lyman series in hydrogen spectrum belongs to  
 (a) Visible region (b) Infra red region  
 (c) Ultra violet region (d) Far infrared region 1
9. Energy gap between valence band and conduction band is highest in  
 (a) Conductor (b) Insulators  
 (c) Semiconductors (d) Super conductors 1
10. Which of the following is not a transducer ?  
 (a) Loud speaker (b) Microphone  
 (c) Amplifier (d) None of the above 1
11. Derive an expression for electric potential due to a point charge.

**Or**

Using Gauss theorem, calculate electric field due to line charge distribution. 2

12. State and prove Snell's law of refraction using Huygen's principle. 2

**Or**

Derive lens formula for convex lens when real image is formed. 2

13. Derive relation between mean value and peak value of alternating current. 2

14. Show that electromagnetic waves are transverse in nature.

**Or**

Give one use of each (i) Microwaves (ii) Gamma rays

15. State and prove Brewster's law.

**Or**

What is scattering of light? Why do clouds generally look white? 2

16. Explain Einstein's photoelectric equation. 2

17. Explain the working of half wave rectifier. 2

**Or**

Give the symbol, Boolean expression and truth table for AND gate.

18. State and explain Kirchhoff's laws. 3

19. Find the equivalent resistance for three resistors connected in parallel. 3

20. What are the elements of earth's magnetic field?

**Or**

Using Ampere's circuital law, derive an expression for magnetic field at the centre of a current carrying circular loop. 3

21. What is a toroid? Obtain an expression for magnetic field due to current carrying toroidal coil. 3

22. Prove that for a prism.

$$A + \delta = i + e$$

- where symbols have their usual meanings. 3
23. State laws of radioactive decay. Prove that  $N = N_0 e^{-\lambda t}$ , where symbols have their usual meanings.

**Or**

- Derive a relation between radius of nth orbit of hydrogen atom and principal quantum number. 3
24. With the help of a circuit diagram, explain the working of CE pnp transistor as amplifier.

**Or**

- What do you understand by biasing in semiconductors. Discuss I-V characteristics of semi conductor diode. 3
25. What is modulation of waves? Discuss the need for modulation of radio waves. 3
26. Define Capacitance. Derive expression for capacitance of a parallel plate capacitor on the introduction of dielectric slab. 4
27. Define Impedance of series LCR circuit. Derive expression for resonance in series L.C.R circuit.

**Or**

- What is Transformer ? Discuss its principle and types. What are losses of energy in a transformer. 4
28. Define fringe width. Derive expression for fringe width as per Young's double slit experiment.

**Or**

- With the help of ray diagram derive relation for magnifying power of a compound microscope. 4