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° (b) 90°
   (c) 120° (d) 180° 1
2. Kirchhoff'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) 6.6×10^{-10} J (b) 3.3×10^{-10}J
   (c) 6.6×10^{58} J (d) 3.3×10^{-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.

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 torroidal 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 $N = N_o e^{-xt}$, 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 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