SEMESTER-ONE

PHYSICS

Class XII

Sample Paper–1

Max. Marks: 50 **Time Allowed: 90 minutes**

General Instructions:

(i) This question paper consists of 40 questions in 4 sections.

(ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

(iii) Section A consists of 10 Objective type questions carrying 1 mark each.

(iv) Section B consists of 10 Fill in the blanks type questions carrying 1 mark each.

(v) Section C consists of 10 True or False statement type questions carrying 1 mark each.

(vi) Section D consists of 10 Short answer and Numerical type questions carrying 2 marks each.

Section A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 10.

1. Bending of a ray of light, when it enters obliquely from one medium to other is called

(*a*) reflection (*b*) refraction

(*c*) dispersion (*d*) interference.

2. The relation, $\frac{\sin i}{\sin r} = n$, is called

(*a*) Snell's law (*b*) Newton' law

(*c*) Joule's law (*d*) Boyle's law.

3. When light enters from first rarer medium to a second denser medium, then $^1\mu_2$ has value

(*a*) < 1 (*b*) 1

(*c*) > 1 (*d*) no definite relation

4. The mean free path of electrons in a metal is 4×10^{-8} m. The electric field which can give on an average 2 eV energy to an electron in the metal will be in unit of V m^{-1}

(*a*) 8×10^{7} (*b*) 5×10^{-11} (*c*) 8×10^{-11} (*d*) 5×10^{7}

5. A quantity X is given by $\varepsilon_0 L(\Delta V/\Delta t)$ where ε_0 is permittivity of free space, L is length, ΔV is potential difference and Dt is time interval. The quantity X is same as

(*a*) resistance (*b*) charge (*c*) voltage (*d*) current

6. The temperature coefficient of resistance of the material of a wire is 0.001 per °C. Its resistance at 300 K is 1 ohm. At what temperature will the resistance of the wire be 2 ohm ?

(*a*) 781 K (*b*) 1027 K (*c*) 1054 K (*d*) 1327 K

7. The fact that magnetic field is produced around a wire carrying a current, was discovered by

(*a*) Faraday (*b*) Oersted

(*c*) Maxwell (*d*) Joule

8. When current is straight, the associated magnetic field is

(*a*) straight (*b*) elliptical

(*c*) circular (*d*) parabolic

9. When current is circular, the associated magnetic field is

(*a*) straight (*b*) elliptical

(*c*) circular (*d*) parabolic

10. When current flows clockwise in a loop, the polarity of its face is

(*a*) east (*b*) south

(*c*) west (*d*) north

Section B

Fill in the blanks with a suitable word for each of the questions 11 – 20.

11. In refraction, a ray of light ..... when it enters obliquely in some other medium.

12. The quantity, $\frac{\sin i}{\sin r} = n$ is called the ..... of the medium.

13. If ${}^{a}n_{g} = 3/2$, then ${}^{g}n_{a}$ = ...

14. Two batteries of emfs 2 V and 1 V of internal resistances 1 W and 2 W respectively are connected in parallel. The effective emf of the combination is ..... .

15. A battery of emf 8 V with internal resistance 0.5 W is being charged by a 120 V dc supply using a series resistance of 15.5 W. The terminal voltage of the battery is ..... .

16. The resistances in the four arms of a Wheatstone network in cyclic order are 5 Ω, 2 Ω, 6 Ω and 15 Ω. If a current of 2.8 A enters the junction of 5 Ω and 15 Ω, then the current through 2 Ω resistor is ..... .

17. The phenomenon of production of magnetic field round a current carrying conductor is called _____ effect of current.

18. The rule which relates direction of deflection of magnetic needle with direction of field is called _____ rule.

19. When a wire is wrapped into many close turns over a cylindrical core, it forms a _____ .

20. To have north polarity at a face, the current in loop must flow in _____ direction.

Section C

State whether the following statements are true or false for each of the questions 21–30.

21. Surrounding objects become visible in presence of light.

22. A black object is visible in a dark room.

23. Water is transparent to light.

24. Glass is not transparent to light.

25. Angle of incidence and angle of reflection are equal.

26. In some cases angle of reflection may be different from angle of incidence.

27. A concave mirror forms a real as well as a virtual image.

28. A convex mirror can never form a real image.

29. A concave mirror forms an enlarged as well as a diminished image.

30. A convex mirror always forms an enlarged image.

Section D

Answer each of the questions 31 – 40.

31. Identify the device used as a spherical mirror or lens in following cases, when the image formed is virtual and erect in each case.

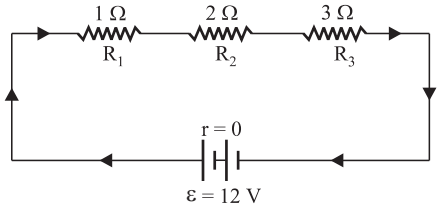
(*a*) Object is placed between device and its focus, image formed is enlarged and behind it.

(*b*) Object is placed between the focus and device, image formed is enlarged and on the same side as that of the object.

32. Why does a light ray incident on a rectangular glass slab immersed in any medium emerges parallel to itself? Explain using a diagram.

33. (*a*) Three resistors 1 Ω , 2 Ω and 3 Ω are combined in series. What is the total resistance of the combination ?

(*b*) If the combination is connected to a battery of emf 12 V and negligible internal resistance, obtain the potential drop across each resistor.



34. In a potentiometer arrangement, a cell of emf 1.25 V gives a balance point at 35.0 cm length of the wire. If the cell is replaced by another cell and the balance point shifts to 63.0 cm, what is the emf of the second cell?

35. A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that

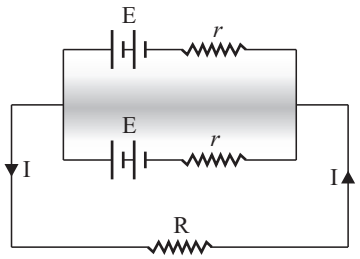
(i) the direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are interchanged.

(*ii*) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor. Which of the above observations of the student is incorrect and why?

36. How much time will light take to cross 2 mm thick glass pane if refractive index of glass is 3/2?

37. A concave lens of focal length 15 cm forms an image 10 cm from the lens. How far is the object placed from the lens? Draw the ray diagram.

38. Two batteries, each of emf E and internal resistance *r*, are connected in parallel. The current from this combination is sent through an external resistance R. For what value of R, maximum power will be obtained? What will be this maximum power?



39. What does the direction of thumb indicate in the right-hand thumb rule? In what way this rule is different from Fleming's left-hand rule?

40. Meena draws magnetic field lines of field close to the axis of a current-carrying circular loop. As she moves away from the centre of the circular loop, she observes that the lines keep on diverging. How will you explain her observation?