

SEMESTER-ONE

PHYSICS

Class XII

Sample Paper–2

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. For light going from air to water, ${}^a n_w = 4/3$. Then ${}^w n_a$ has value
 - (a) $\frac{16}{9}$
 - (b) $\frac{3}{2}$
 - (c) 1
 - (d) $\frac{3}{4}$.
2. In case of refraction of light from a rectangular glass slab, if i = angle of incidence and e = angle of emergence, then
 - (a) $e < i$
 - (b) $e = i$
 - (c) $e > i$
 - (d) no definite relation.

3. A lens is thick in the middle and thin at the edges. The lens is
(a) concave (b) convex
(c) plane (d) prism.
4. Dimensions of resistance in an electrical circuit, in terms of dimension of mass M , of length L , of time T and of current I , would be :
(a) ML^2T^{-2} (b) $ML^2T^{-1}I^{-1}$ (c) $ML^2T^{-3}I^{-2}$ (d) $ML^2T^{-3}I^{-1}$
5. Three resistors 1 W, 2 W and 3 W are connected to form a triangle. Across 3 W resistor, a 3 V battery is connected. The current through 3 W resistor is
(a) 0.75 A (b) 1 A (c) 2 A (d) 1.5 A
6. The density of copper is $9 \times 10^3 \text{ kg m}^{-3}$ and its atomic mass is 63.5 u. Each copper atom provides one free electron. Estimate the number of free electrons per cubic metre in copper.
(a) 10^{19} (b) 10^{23} (c) 10^{25} (d) 10^{29}
7. When current flows clockwise in a loop, the polarity of its face is
(a) east (b) south
(c) west (d) north
8. When current flows anticlockwise in a loop the magnetic polarity of the face is
(a) east (b) south
(c) west (d) north
9. For a solenoid carrying a current I and having n turns per unit length, wrapped on a core of permeability μ , the correct expression for magnetic field intensity (B) is
(a) $B = \frac{\mu_0}{\mu} nI$ (b) $B = \frac{\mu_0 \mu I}{n}$
(c) $B = \mu_0 \mu n I$ (d) $B = \frac{\mu_0 \mu n}{I}$
10. Magnets having temporary magnetism are called
(a) electromagnets (b) bar magnets
(c) circular magnets (d) horse-shoe magnets.

Section B

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

11. In case of refraction from a rectangular glass slab, angle of emergence e is angle of incidence i .
12. A convex lens rays.
13. Rays are diverged by a lens.
14. A galvanometer connected with an unknown resistor and two identical cells in series each of emf 2 V shows a current of 1 A. If the cells are connected in parallel, it shows 0.8 A. Then the internal resistance of the cell is
15. The percentage error in measuring resistance with a metre bridge can be minimised by adjusting the balancing point close to
16. To have north polarity at a face, the current in loop must flow in _____ direction.
17. To have south polarity at a face, the current in loop must flow in _____ direction.
18. In electromagnets, magnetism is _____ .
19. In an electric motor _____ energy is converted into mechanical energy.
20. In electromagnetic induction, motion of a _____ in a fixed coil produces electric current.

Section C

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

21. Is Light a form of energy which produces in us the sensation of vision.
22. Is Ray of light a straight line along which light travels from a point source.
23. Is Pencil of light not a formed by the rays associated with a point source.
24. Is Beam of light not a formed by the rays associated with a broad source.

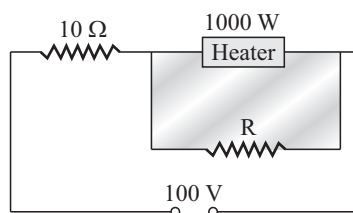
25. Is Optical medium (Medium) the substance surrounding a source of light.
26. Reflection of light is a phenomenon due to which rays of light incident on a polished opaque surface are returned back in the same medium.
27. Mirror is not a polished surface used in the study of reflection of light.
28. Real Image is a point at which incident rays coming from a point source and after reflection from a mirror, actually meet.
29. Virtual Image is not a point from which incident rays, coming from a point source and after reflection from the mirror, appear to come from.
30. Linear Magnification is the ratio of the size of the image as formed by reflection from the mirror to the size of the object.

Section D

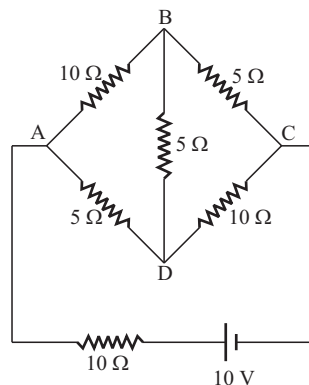
Answer each of the questions 31 – 40.

31. A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the pencil appear to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine. Support your answer with reason.
32. How is the refractive index of a medium related to the speed of light? Obtain an expression for refractive index of a medium with respect to another in terms of speed of light in these two media?
33. At room temperature (27.0°C), the resistance of a heating element is $100\ \Omega$. What is the temperature of the element if the resistance is found to be $117\ \Omega$, given that the temperature coefficient of the material of the resistor is $1.70 \times 10^{-4}\ ^{\circ}\text{C}^{-1}$.
34. A silver wire has a resistance of $2.1\ \Omega$ at 27.5°C , and a resistance of $2.7\ \Omega$ at 100°C . Determine the temperature coefficient of resistance of silver.
35. What is frequency of a direct current?
36. A pond of depth 20 cm is filled with water of refractive index $4/3$. Calculate apparent depth of the tank when viewed normally.

- 37.** An object of size 7.0 cm is placed at 27 cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror, should a screen be placed, so that a sharp focussed image can be obtained? Find the size and nature of the image?
- 38.** A heater is designed to operate with a power of 1000 W in a 100 volt line [see figure]. It is connected to two resistances of $10\ \Omega$ and $R\ \Omega$. If the heater is now operating with a power of 62.5 W, calculate the value of R .



- 39.** Determine the current in each branch of the network shown in figure.



- 40.** What does the divergence of magnetic field lines near the ends of a current-carrying straight solenoid indicate?