



Year: 2024-25
Std:- X ICSE

Practice Paper - 2
Physics

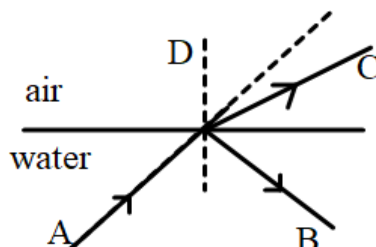
Marks - 80
Duration :- 2 Hrs

*Attempt **all** questions from **Section A** and **any four** questions from **Section B**.
The intended marks for question or parts of questions are given in brackets [].*

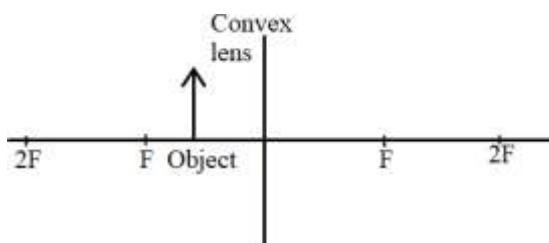
Section A (40 marks)

Question 1

- (a) Choose the correct statement with respect to Refraction of light [1]
- The colour always changes when light enters from one optical medium to another.
 - Absorption of light when it strikes the surface of a medium is refraction.
 - Speed of light changes when it enters from one optical medium to another of different optical density.
 - Speed of light does not change when it enters from one optical medium to another of different optical density.
- (b) When a light ray enters from a denser medium to a rarer medium [1]
- The light ray bends towards the normal.
 - Angle of incidence is less than angle of refraction.
 - Speed of light decreases.
 - Speed of light remains unchanged.
- (c) In the diagram shown below [1]



- B is incident ray and C is refracted ray.
 - A is incident ray and B is refracted ray.
 - C is incident ray and B is refracted ray.
 - A is incident ray and C is refracted ray.
- (d) From the diagram shown below, identify the characteristics of the image that will be formed. [1]

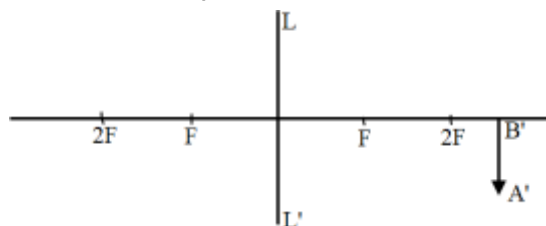


- Real.
 - Diminished.
 - Formed within the focal length.
 - Virtual.
- (e) The wavelength of light in a medium A is 600 nm. The wave enters medium B of refractive index 1.5 [1]
- Steps to find the wavelength of light in medium B are given below. Choose an option which has the correct sequence of steps, to find the wavelength.

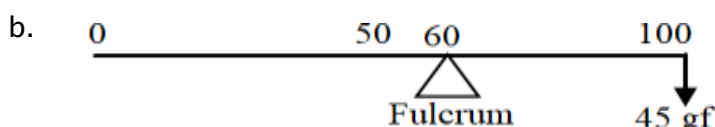
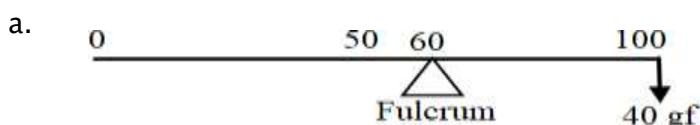
(i) $\lambda = 1.5 \times 600$ (ii) $\lambda = 600/1.5$ (iii) $\lambda = 400 \text{ nm}$ (iv) $\lambda = 900 \text{ nm}$ (v) $1.5 = \lambda/600$

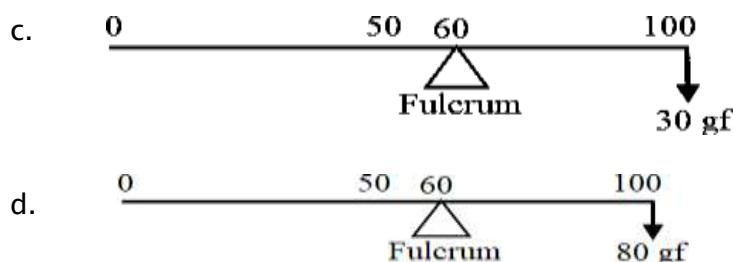
a. (i) then (iii) b. (ii) then (iii) c. (i) then (iv) d. (ii), (i) then (iv)

- (f) The diagram below shows an image formed at a distance 36 cm from the lens LL' of focal length 12 cm. With respect to this answer the questions that follow. [6]



- (i) The position of the object on the left-hand side should be
 a. between 12 cm to 30 cm from the lens. b. beyond 24 cm from the lens.
 c. between 12 cm to 24 cm from the lens. d. within 12 cm from the lens.
- (ii) Power of this lens is
 a. - 8.33 D b. + 8.4 D c. + 8.33 D d. - 8.4 D
- (iii) The object distance with sign convention is
 a. - 18 cm b. - 15 cm c. - 9 cm d. + 18 cm
- (iv) If the lens LL' is replaced by another lens of same type but focal length 15 cm then for the same object distance
 a. the size of the image decreases.
 b. the size of the image increases.
 c. the size of the image remains the same.
 d. information is insufficient to conclude.
- (iv) The position of the object on the left-hand side should be
 a. between 12 cm to 30 cm from the lens. b. beyond 24 cm from the lens.
 c. between 12 cm to 24 cm from the lens. d. within 12 cm from the lens.
- (v) Power of this lens is
 a. - 8.33 D b. + 8.4 D c. + 8.33 D d. - 8.4 D
- (vi) The object distance with sign convention is
 a. - 18 cm b. - 15 cm c. - 9 cm d. + 18 cm
- (g) The usable form of mechanical energy is [1]
 a. Elastic potential energy b. Kinetic energy
 c. Gravitational potential energy d. None of the given options.
- (h) One horsepower is equal to [1]
 a. 100 W b. 735 W c. 764 W d. 746 W
- (i) If A and B of the same mass can climb the third floor of the same building in 3 minutes and 5 minutes respectively, then the ratio of their powers of A is to B in an ideal situation is [1]
 a. 1:1 b. 3:5 c. The information is insufficient to form a conclusion. d. 5:3
- (j) If the centre of gravity of a metre scale of mass 80 g lies at the 45 cm mark, then which one of the following diagrams will show the balanced position of the scale. [1]

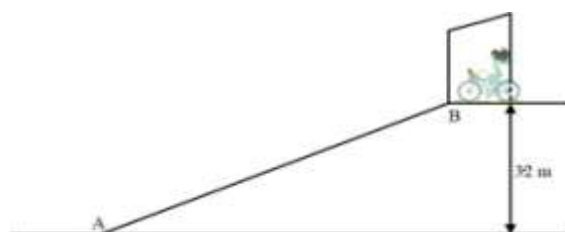




(k) A body has kinetic energy 250 J. If the mass of the body is 5 kg, then choose its velocity and momentum from the following options. [1]

- | | | |
|-----------|--------------|---------------|
| 1. 50 m/s | 2. 50 kg.m/s | 3. 20 kg.m/s |
| 4. 15 m/s | 5. 10 m/s | 6. 100 kg.m/s |

(l) A girl at rest at gate of her society which is 3.2 m above the road comes down the slope AB on a cycle without paddling. [$g = 10 \text{ N/kg}$] [4]



- The mechanical energy possessed by the girl at B is
 - Vibrational kinetic energy.
 - Translational kinetic energy
 - Elastic potential energy.
 - Gravitational potential energy.
- The velocity with which girl reaches point A is
 - 32 m/s
 - 10 m/s
 - 8 m/s
 - Insufficient information to calculate velocity.
- If the mass of the girl is 40 kg then the kinetic energy of the girl at A is [Assuming no loss of energy.]
 - 1280 J
 - 1600 J
 - 400 J
 - 3200 J
- The potential energy of the girl (of mass 40 kg) when she reaches the midpoint of the slope of AB
 - 800 J
 - 200 J
 - 1600 J
 - 640 J

- Q.2 A)**
- Why do string instruments have a hollow sound box ? [1]
 - Define kgf and state its relation to newton. [1]
 - Which physical quantities do the following unit represent ? [1]
 - Diopter
 - eV
 - Give two advantages of connecting resistances in parallel. [1]
 - Give the relation between force and momentum of a body [1]
- B)**
- What are free and forced vibrations ? Briefly explain the difference between them. [1]
 - Refractive index of water w.r.t. air is $\frac{4}{3}$ while that of glass is $\frac{3}{2}$. [1]

Find refractive index of glass w.r.t water.
 - Why should the internal resistance of a cell be low ? [1]
 - Explain, why the temperature in hot summer falls sharply after a sharp shower. [1]
 - Define resistance and state the changes taking place in resistance if the

length of the conductor is doubled.

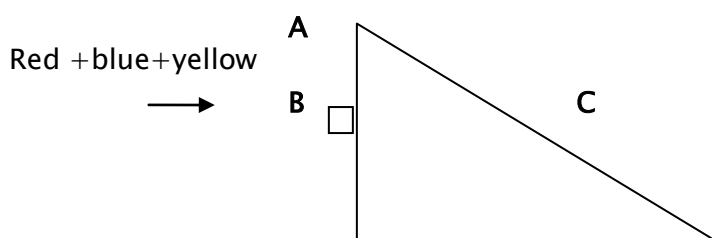
[1]

- Q.3** a)i) What characteristics must a heating wire and a fuse wire have? [1]
ii) A current of 2 ampere passes through a conductor and produces 90 J of heat in 15 Seconds. Find the resistance of the conductor. [1]
b) Explain the meaning of the term Earthing. Give its use. [2]
c) Resonance is a special case of _____vibrations when the frequency of the driving force is _____to the natural frequency of the body. [2]
d) i) The minimum value of absolute refractive index is _____. [1]
ii) The absolute rarefractive index of water is _____. [1]
e) State the factors on which the refractive index of a medium depends. [2]

Section B (Attempt any 4)

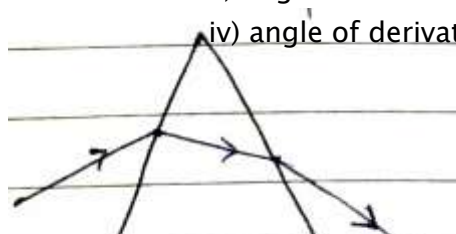
- Q.4** a) Give two examples each of ohmic and non-ohmic resistors. (2)
b) What is meant by an ideal machine ? (2)
c) Why should radioactive substances not be touched by hand ? (2)
d) Give any two characteristics of the image produced by a concave lens. (2)
e) An electric kettle is rated 2.4 KW, 240 V. Find the cost of running the kettle for 2 hours at 75 paise per unit. (2)
- Q.5** a) Define Specific latent heat of fusion of a substance and give its S. I. Unit ? (2)
b) i) Draw a diagram of a block and tackle system of pulleys having a velocity-ratio of 5. In your diagram indicate clearly the points of applications and the directions of the load L and effort E. Also mark the tension T in each strand. (3)
ii) In case of block and tackle system, the mechanical advantage increases with the increases in the number of pulleys. Explain. (1)
c) An electric heater of power 1000 W raises the temperature of 5 kg of a liquid from 25°C to 31°C in 2 minutes. Calculate:
i) the heat capacity. ii) the specific heat capacity of liquid. (4)

- Q.6 A)** A beam consisting of red, blue and yellow colours is incident normally on the face AB of an isosceles right angled prism ABC, as shown in figure.



Complete the diagram to show the refracted and the emergent rays. Given that the critical angle of glass-air interface for yellow colour is 45° (3)

- b) Figure shows a prism and refraction of a monochromatic ray through it. Complete the diagram to show: (3)
i) angle of incidence
ii) angle of refraction
iii) angle of emergence.
iv) angle of deviation.



c) To a fish underwater viewing obliquely, a fisherman standing on the bank of the lake will appear longer or shorter? Explain drawing a ray diagram. (4)

Q.7 (a) An object is placed in front of a lens between its optical centre and focus. The image formed is virtual erect and magnified. (4)

i) Name the lens used.

ii) Draw a ray diagram to show the formation of image.

iii) Write one use of such a lens.

(b) A lens forms the image of an object placed at a distance of 45 cm from it on a screen placed at a distance of 90 cm on the other side. (4)

a) Name the lens

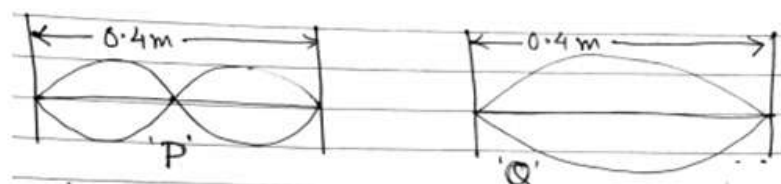
b) Find:

i) focal length of lens

ii) magnification of image.

(c) Calculate the power of a convex lens of focal length 20 cm. (2)

Q.8 A) A stretched wire 0.4m long is made to vibrate in two different modes as shown. What is the wavelength of the wave in :



i) mode P

ii) mode Q

iii) in which case does the note becomes louder? (3)

(b) (i) What is meant by sound ranging? What is SONAR? (2)

(ii) A sound wave produces compressions and rarefactions as it passes through air. How would the distance between successive compressions changes, if sound were of higher pitch ? (1)

(c) A, B, C and D represent test tubes, each of height 20 cm. They are filled with water up to heights of 12 cm, 14 cm, 16 cm and 18 cm respectively. If a vibrating tuning fork is placed over the mouth of test tube D, a loud sound is heard.

i) Describe the observations with tubes A,B and C when the vibrating fork is placed over the mouth of these tubes.

ii) Give the reasons for your observation in each tube.

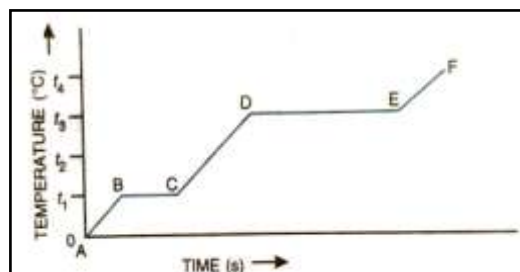
iii) State the principle illustrated by the above experiment. (4)

Q.9 a) The temperature of 600g of cold water rises by 15°C when 300 g of hot water at 50 °C is added to it ? What was the initial temperature of the cold water? [specific heat capacity of water is 4200 J kg⁻¹ K⁻¹]. (4)

b) Explain, why water is considered as the best liquid for quenching thirst . (2)

c) i) Define boiling point of water (1)

ii) The diagram below shows the change of phases of a substance on a temperature–time graph on heating the substances at a constant rate . (3)



- What do the parts AB, BC, CD and DE represent ?
- What is the melting point of the substance ?
- What is the boiling point of the substance ?

Q. 10 A) i) What are background radiations ?

ii) What are its sources? Give examples (3)

b) A certain nucleus A (mass no.238 and atomic number 92) is radioactive and becomes a nucleus B (mass no.230 and atomic no.90) by the emission of α and β -particles.

i) Find the number of α and β -particles emitted.

ii) Explain how you arrived at your answer. (3)

c) Why fuse is connected in live wire ? Explain with figure showing:

i) Fuse connected in neutral wire and ii) Fuse connected in live wire. (4)
