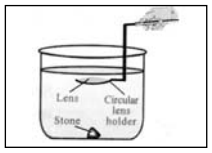
TENTH

Physical Science

4 Marks Questions

Q: How do you say experimentally that the focal length of a convex lens is increased when it is kept in water?



A: ★ Take a convex lens whose focal length is known.

★ Take a cylindrical vessel such as a glass tumbler, whose height must be nearly four times the focal length of the lens.

★ Keep a black stone inside the vessel at its bottom.

★ Now pour water into the vessel upto a height such that the height of the water level from the top of the stone is greater than focal length of the lens.

★ Now dip the lens horizontally using a circular lens holder as shown in the figure.

★ Set the distance between stone and the lens that is equal to or less than focal length of lens.

★ Now look at the stone through the lens.

★ We can see the image of the stone in air if the distance between lens and stone is less than the focal length of the lens.

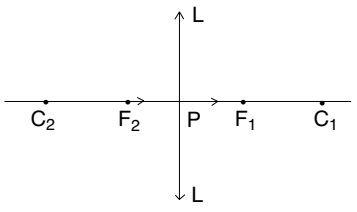
★ Now increase the distance between lens and stone until we cannot see the image of the stone.

★ We have dipped the lens to a certain height which is greater than the focal length of the lens in air but still we can see the image. This shows that the focal length of the lens has increased in water.

Q: Explain the behaviour of light rays in any four situations of their incidence on a convex lens.

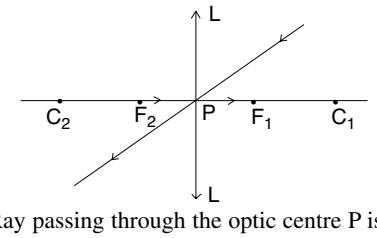
A:

1.



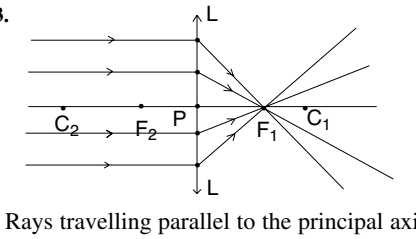
Ray passing along the principal axis undeviated.

2.



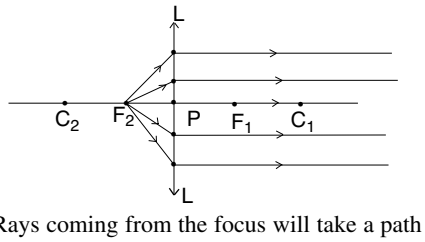
Ray passing through the optic centre P is also undeviated

3.



Rays travelling parallel to the principal axis converge at focus.

4.



Rays coming from the focus will take a path parallel to the principal axis after passing through the lens.

Q: A convex lens is made up of three different materials as shown in the figure. How many images of an object does it form? *(1 Mark)*

A: ★ As the lens is made up of three different materials they have three different refractive indices.

★ Due to this the lens will have three different focal lengths. As such the lens forms three different images of an object.

What is the pH of common salt?

Q: a) What is common salt?

b) Write two methods of preparation of common salt.

c) Write some substances which are made by common salt.

d) What is the pH of common salt?

A: a) Sodium Chloride is known as common salt.

b) Preparation of common salt:

Method-1: Salt is produced when an acid and a base undergoes neutralisation reaction.

Eg: $HCl + NaOH \longrightarrow NaCl + H_2O$

(acid) (base) (salt) (water)

Method-2: Sea water stored in the beds evaporates and sodium chloride ($NaCl$) is obtained as a residue.

c) Common salt is used as a raw material in the preparation of the following substances.

Sodium hydroxide (NaOH)

Baking Soda ($NaHCO_3$)

Washing Soda (Na_2CO_3)

Bleaching Powder ($CaOCl_2$)

d) The pH value of common salt ($NaCl$) is 7.

Q: Write the chemical equation of preparation of baking soda. What are the uses of baking soda?

A: ★ Baking Soda (Sodium hydrogen carbonate) $NaHCO_3$ is prepared as per the chemical equation given below.

$NaCl + H_2O + CO_2 + NH_3 \longrightarrow NH_4Cl + NaHCO_3$

✪ **Uses of baking soda:**

★ It is added for fast cooking.

★ Used as an ingredient in antacids.

★ Used as a mild antiseptic.

★ Used in Soda-acid fire extinguishers.

★ Used in the preparation of bread to make it soft and spongy.

2 Marks Questions

Q: Why the flow of acid rains into a river make the survival of aquatic life in a river difficult?

A: ★ Acid rains contain Carbonic acid, Sulphuric acid and Nitric acid.

★ Acid rains normally have pH value less than 5.6.

★ Living organism can survive only in a narrow range of pH values of water. (pH = 7)

★ The acid rains flowing into a river lowers the pH value of rain water. So the river water becomes acidic and the aquatic life in such waters becomes difficult.

Q: Your friend is suffering from acidity. What remedy do you suggest? Why?

A: ★ Our stomach produces Hydrochloric acid. This helps in digestion of food without any damage to the stomach.

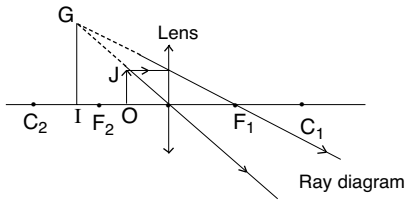
★ When the stomach produces too much acid, then it causes pain and irritation. This is acidity.

★ To get rid of this acidity generally antacids are used.

★ These antacids neutralise the excess acid in the stomach. Milk of magnesia (Magnesium hydroxide) a mild base is often used as antacid.

Q: Which type of lens is used as a magnifying glass. Draw the ray diagram to show that the object is magnified.

A: A single convex lens is used as a magnifying lens.



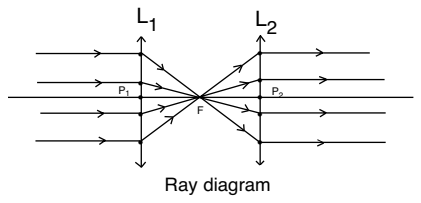
Ray diagram

★ OJ is the object placed in between the focus and optic centre of a convex lens.

★ IG is the magnified, virtual and erect image of the object formed as shown in the ray diagram.

Q: Two converging lenses are to be placed in the path of parallel rays so that the rays remain parallel after passing through both lenses. How should the lenses be arranged? Draw the ray diagram.

A:



Ray diagram

★ L_1 and L_2 are the two converging lenses. P_1 and P_2 are their optic centres respectively. F is the focus of the two lenses.

★ The two lenses are kept at a distance equal to twice the focal length of each lens. The two lenses are having the focal length.

★ As shown in the ray diagram, the incident parallel rays remain parallel after passing through both the lenses.

Part-B

1. If a base dissolves in water by what name is it better known .....

A) Neutral B) Base C) Acid D) Alkali

2. The colour of methyl orange indicator in acidic medium is .....

A) Yellow B) Green

C) Orange D) Red

3. pH = 7 is for .....

A) an acid B) water

C) for both acid and base D) base

4. Tooth decay starts when the pH of the mouth is .....

A) Less than 5.5 B) 5.5

C) Greater than 5.5 D) All the above

5. Which of the following material cannot be used to make a lens?

A) Glass B) Clay

C) Water D) Plastic

6. The air bubble in water behaves like a ..... lens.

A) Concave B) Plano concave

C) Convex D) All the above

7. Two convex lenses each of focal length 15 cm are put in contact. The focal length of the system is...

A) 30 cm B) 15 cm

C) 7.5 cm D) 45 cm

8. Convex lens is also called as .....

A) Converging lens

B) Diverging lens

C) Negative lens

D) Plano concave lens

Answers

1-D	2-D	3-B	4-A	5-B
6-C	7-C	8-A.		

1 Mark Questions

Q: Fresh milk has a pH of 6. Explain why the pH changes as it turns to curd?

A: ★ Due to bacterial action milk turns to curd which is sour to taste. The curd contains lactic acid.

★ The pH value of curd is therefore less than 6 due to the presence of latic acid.

Q: Write two differences between acids and bases.

A:

Acids	Bases
1) Acids turn blue litmus paper into red.	Bases turn red litmus paper into blue.
2) Substances which produce H^+ ions in water solutions are called acids.	The substances which produce OH^- ions in water solutions are called bases.

Q: Where will be the image formed, when an object is placed at 30 cm before a convex lens of 20 cm focal length.

A: Given: Distance of the object u = – 30 cm

Focal length of the convex lens f = 20 cm

Distance of the image v = ?

2) **Formula:** $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u}$$

3) Substituting the values: $\frac{1}{v} = \frac{1}{20} - \frac{1}{30}$

$$= \frac{3-2}{60} = \frac{1}{60}$$

$\therefore$ Distance of the image v = 60 cm