

Subject Enrichment

Physics

1. 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.
2. Under what condition in an arrangement of two plane mirrors, incident ray and reflected ray will always be parallel to each other, whatever may be angle of incidence. Show the same with the help of diagram.
3. Draw a ray diagram showing the path of rays of light when it enters with oblique incidence.
(i) From air into water (ii) from water into air.
4. Size of image of an object by a mirror having a focal length of 20 cm obtained on a screen is reduced to 1/3rd of its size. At what distance the object has been placed from the mirror? What is the nature of the image and the mirror? Draw the ray diagram. Ans. i) $u = -80\text{cm}$. ii) $v = -40\text{ cm}$.
5. What is the nature of the image formed by a concave mirror if the magnification produced by the mirror is + 3?
6. Between which two points of a concave mirror should an object be placed to obtain a magnification of - 3?
7. "The refractive index of carbon di-sulphide is 1.63". What is the meaning of this statement in relation to speed of light?
8. An object 2 cm in size is placed 30 cm in front of a concave mirror of focal length 15 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? What will be the nature and the size of the image formed? Draw a ray diagram to show the formation of the image in this case. Ans. $v = -30\text{ cm}$. $m = 1$
9. The refractive indices of four media A, B, C and D are given in the following table :

Medium	A	B	C	D
Refractive Index	1.33	1.50	1.52	2.40

If light travels from one medium to another, in which case the change in speed will be :

- (i) Minimum (ii) Maximum?

10. 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.
 - (c) Object is placed between infinity and device, image formed is diminished and between focus and optical center on the same side as that of the object.
 - (d) Object is placed between infinity and device, image formed is diminished and between pole and focus, behind it.

Biology

1. Explain the need of transporting system in plants.
2. Draw a neat labeled diagram showing the structure of the alimentary canal of man.
3. Why do multicellular animals need an efficient excretory system? How does excretion take place in plants?
4. Draw a neat labelled diagram showing the components of the human respiratory system. Mention the role of alveoli in the exchange of gases.
5. With the help of neat labeled diagram explain the structure of the human heart.
6. (a) Name the site where gaseous exchange takes place inside the lungs.
(b) What facilitates this structure to perform the gaseous exchange?
(c) What is the significance of residual volume in breathing cycle?
7. How is carbon dioxide transported in our blood?
8. (a) What is carried by the right and left chambers of the heart?
(b) Why do these two chambers separated?
(c) Where does blood go from the right ventricle and from left ventricle?
9. (a) Define translocation.
(b) Name the two components in phloem tissue that perform translocation?
10. Ramesh was absent when the teacher explained the activity to demonstrate that CO_2 is given out during respiration. The very next day he was having exam. So he approached his friend Rajesh and asked the following questions.
 - (i) What does the rising of water level indicate?
 - (ii) What is the significance of KOH in the experiments?
 - (iii) Where does the air move from the bent tube? Rajesh explained the answers for the above questions and told him to be regular in class. Ramesh understood the topic.
Write answers for the above questions and value shown by Rajesh.

Chemistry

1. Explain why a solution of glucose or alcohol does not conduct electricity.
2. Why chips packets are flushed with nitrogen gas?
3. Can silver nitrate solution be stored in an aluminium vessel? Explain and also write the equation involved.
4. In the electrolysis of water, why is the volume of a gas collected over one electrode double that of a gas collected over the other electrode?
5. Two drops of phenolphthalein indicator are added to a solution, the solution turns pink. What is the nature of the solution?
6. Write balanced equations for the following reactions;
 - i) Dilute sulphuric acid with Zinc granules
 - ii) Reaction of Quicklime with water
 - iii) Barium chloride solution is mixed with sodium sulphate solution.
 - iv) Thermal decomposition of Lead nitrate
7. Why do acids not show acidic behaviour in the absence of water?
8. A solution reacts with crushed egg shells to give a gas that turns lime water milky. Identify the solution and the colourless gas and also write the chemical equation involved.
9. Write the difference between displacement and double displacement reactions. Also write equations for these reactions.
10. What are redox reactions? Explain with an example.