

FIITJEE

CBSE PART TEST – I

ALL XTH STUDYING BATCHES

SCIENCE

Time: 1:30 Hours

Max Marks: 40

Instructions:

1. The question paper comprises four sections A, B, C & D. There are 13 questions in the question paper.
2. Section – A consists of 3 questions of 1 mark. Q4 – Q 6 contain five sub – parts each. You are expected to answer any four sub – parts in these questions
3. Section – B contains 2 questions of 2 marks each. Section – C contains 2 questions of 3 marks each. Section – D contains 3 questions of 5 marks each.
4. There is no overall choice. However, internal choice have been provided in some questions.
5. Wherever necessary, neat and properly labeled diagram should be drawn.

Name of the Candidate :

Enroll Number :

Date of Examination :

SECTION – A

Very Short Answer type (1 mark each)

1. A ray of light is incident normally on the surface of water. Its angle of refraction in water is:
(A) 90° (B) 0°
(C) 180° (D) 45°
2. Name the pigment which gives the green colour to plants. Explain its role in photosynthesis.
3. $A + B^{2+} \longrightarrow A^{2+} + B$ represents
(A) combination reaction (B) displacement reaction
(C) redox reaction (D) decomposition reaction

Directions (Questions 4 – 6): Questions contain five sub – parts each. You are expected to answer any four sub – parts in these questions.

4. Metals and non-metals react with oxygen to give oxides at different rates. The oxides formed by metals are basic in nature while oxides formed by non-metals are acidic in nature. The nature of oxides can be determined by testing the aqueous solution of oxide with litmus paper.
 - (i). The oxides of non-metals are acidic oxides because they dissolve in water to give
(A) alkalies (B) acids
(C) carbonates (D) sulphates
 - (ii). Phosphorus is burnt in air to give phosphorus pentoxide. It is dissolved in water and tested with litmus paper. Mark the correct observation.
(A) red litmus paper turns blue
(B) blue litmus paper turns red
(C) there is not change is the litmus paper
(D) red litmus paper changes to green
 - (iii). Magnesium ribbon on burning in air gives a white powder which when dissolved in water turns red litmus blue. The reason for this change is that
(A) MgO is a basic oxide
(B) MgO is an acidic oxide
(C) MgO is a very reactive oxide
(D) MgO is not a reactive oxide
 - (iv). Which metal will not produce its hydroxide on reacting with water?
(A) Iron (B) Sodium
(C) Calcium (D) None of these
 - (v). An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be
(A) calcium (B) carbon
(C) silicon (D) iron.

5. Jaya returned from school and found that grandmother was scolding her maid, Rani as she did not come yesterday. The maid told that his son was passing a watery stool frequently that's why she didn't come. Jaya's mother who were listening the discussion came to them and told Rani not to come for coming 3-4 days. She also suggested her to give his son a solution of sugar and salt in clean water, many times a day for fast recovery. Jaya was surprised. She rushed to her mother and asked the scientific reason for it. Her mother smiled and explained her the importance of this solution.
- (i). Name the term used to describe the condition in which a person passes out watery stools.
 (A) diarrhoea. (B) constipation
 (C) vomiting (D) none of the above
- (ii). Hydrochloric acid is secreted by the stomach has the following functions
 (A) kills the microbes that enters the stomach
 (B) activates pepsinogen to active pepsin
 (C) helps in the digestion of protein
 (D) all of the above
- (iii). During the digestion of the food, saliva plays an important role. Which of the following events will be affected if salivary amylase is lacking in saliva?
 (A) Starch breaking down into sugar
 (B) Proteins breaking down into amino acids
 (C) Absorption of the vitamins
 (D) Fats breaking down to fatty acids and glycerol
- (iv). In the above passage, with the onset of the symptom ORS can be given to the patient. How is it beneficial for the patients.
 (A) it replaces the fluid loss
 (B) it provides various minerals to the body
 (C) prevents dehydration and thus saving the life of the patient.
 (D) all of the above
- (v). There are many children who don't get enough food or right kind of food. They suffer from Malnutrition. What are the causes of malnutrition?
 (A) inappropriate dietary choices
 (B) a low income
 (C) both (A) & (B)
 (D) none
6. There is a relationship between the object distance (u), image distance (v) and the focal length (f) of lens, which is known as lens formula and it is given by $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ and power of lens (p) = $\frac{1}{f(\text{in metre})}$
- (i) An object is placed at a distance of 10 cm from a convex lens of focal length 15 cm. Find the position of image formed.
 (A) 30 cm (B) 20 cm
 (C) 15 cm (D) 10 cm

- (ii) Find the nature of the image formed by the convex lens when object is placed between its optical centre and focus.
(A) Real and inverted (B) Virtual and erect
(C) Real and erect (D) Virtual and inverted
- (iii) Find the nature of the image formed by the convex lens when an object is placed between its focus and centre of curvature.
(A) Virtual and erect (B) Real and erect
(C) Real and inverted (D) Virtual and inverted
- (iv) A lens has negative focal length. Find the nature of the lens.
(A) Concave lens (B) Convex lens
(C) Both (A) and (B) (D) None of these
- (v) An object is placed at a distance of 20 cm from a concave lens of focal length 20 cm. Find the nature of image formed by the lens.
(A) Real and inverted (B) Virtual and erect
(C) Real and erect (D) Virtual and inverted

SECTION – B

Short Answer type-I (2 marks each)

7. In single celled organisms diffusion is sufficient to meet all their requirements of food, exchange of gases or removal of wastes but it is not in case of multicellular organisms. Explain the reason for this difference.
8. (a) Give an equation for thermite process. 2 marks
(b). Write the electron dot structures for sodium, oxygen and magnesium.

SECTION – C

Long Answer type-I (3 marks each)

9. Explain the process of nutrition in Amoeba, with the help of diagram.
10. A ray of light travelling in air enters obliquely into water. Does the light ray bend towards the normal or away from the normal? Why?

SECTION – D

Long Answer type-I (5 marks each)

11. (a) Write and balanced the chemical equations for the reaction take place when
- a piece of calcium metal is placed in water
 - Steam is passed over red hot iron
 - Zinc sulphide is heated in air
- (b). Identify the following chemical equations and identify the type of chemical reaction.
- $\text{Mg(s)} + \text{Cl}_2(\text{g}) \longrightarrow \text{MgCl}_2(\text{s})$
 - $\text{H}_2\text{O}_2(\text{l}) \xrightarrow{\text{UV}} \text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g})$
- (c). Identify the substances oxidized and the substances reduced in the following reaction:
- $4\text{Na(s)} + \text{O}_2(\text{g}) \longrightarrow 2\text{Na}_2\text{O(s)}$
 - $\text{CuO(s)} + \text{H}_2(\text{g}) \longrightarrow \text{Cu(s)} + \text{H}_2\text{O(l)}$
12. Discuss the various associated glands of digestive system and their role in digestion.

OR

12. Read the following passage carefully and answer the questions that follow it.

Bile juice is stored in a sac called, gall bladder, located near its organ of secretion, liver. The gall bladder releases the bile juice into the small intestine whenever food reaches there. Though bile juice is devoid of any digestive enzymes, it is required for the digestion of fats. The fats cannot be digested easily because they are insoluble in water and are present as large globules. Bile juice breaks down big fat droplets into smaller droplets. These are then easily digested by the enzymes released from the pancreas

- Which organ secretes the bile juice?
 - Why is digestion of fats difficult as compared to that of other nutrients?
 - How does bile juice help in digestion of that of other nutrients?
 - Where is the digestion of fat completed?
 - Does bile juice digest fat completely?
13. (a) Calculate the distance at which an object should be placed in front of convex lens of focal length 15 cm to obtain an image triple of its size?
- (b) A convex mirror used for rear-view on an automobile has a radius of curvature of 2.00 m. If a bus is located at 4.00 m from this mirror, find the position, nature and size of the image.

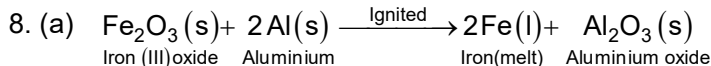
OR

- (a) Light enters from air to glass having refractive index 1.50. What is the speed of light in the glass? The speed of light in vacuum is $3 \times 10^8 \text{ ms}^{-1}$.
- (b) An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of the image.

HINTS AND SOLUTIONS

1. B
As light ray incident normally on the surface so angle of incidence and angle of refraction both will be 0° .
2. Chlorophyll, it traps the light energy of the Sun and converts carbon dioxide and water into glucose and oxygen.
3. B
- 4.
- (i). B
Sol. Non-metal oxides form acids when dissolved in water e.g.
 $\text{CO}_2 + \text{H}_2\text{O} \longrightarrow \text{H}_2\text{CO}_3$ (Carbonic acid)
- (ii). B
Sol. Phosphorus is a non-metal, hence phosphorus pentoxide is acidic in nature
 $\text{P}_4\text{O}_{10} + 6\text{H}_2\text{O} \longrightarrow 4\text{H}_3\text{PO}_4$ (Phosphoric acid)
- (iii). A
Sol. MgO is basic in nature and gives a basic solution
 $\text{MgO} + \text{H}_2\text{O} \longrightarrow \text{Mg}(\text{OH})_2$
- (iv). A
Sol. Iron will not produce its hydroxide on reacting with water.
- (v). A
Sol. The element is calcium.
- 5.
- (i). A
- (ii). D
- (iii). A
- (iv). D
- (v). C
- 6.
- (i). A
Given that, $u = -10$ cm, $f = 15$ cm
Using Lens formula, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$
 $\frac{1}{15} = \frac{1}{v} - \frac{1}{-10}$ or $\frac{1}{v} = \frac{1}{15} - \frac{1}{10}$
or $v = -30$ cm
Thus, image is formed at 30 cm on the same side as that of object
- (ii). B
Image is virtual and erect.
- (iii). C
Image is real and inverted.
- (iv). A
A concave lens has negative focal length.
- (v). B
Image formed by a concave lens is always virtual and erect.
7. Unicellular organisms can absorb sufficient oxygen because of its complete contact with the atmosphere, but in multicellular organisms the rate of absorption and diffusion becomes very

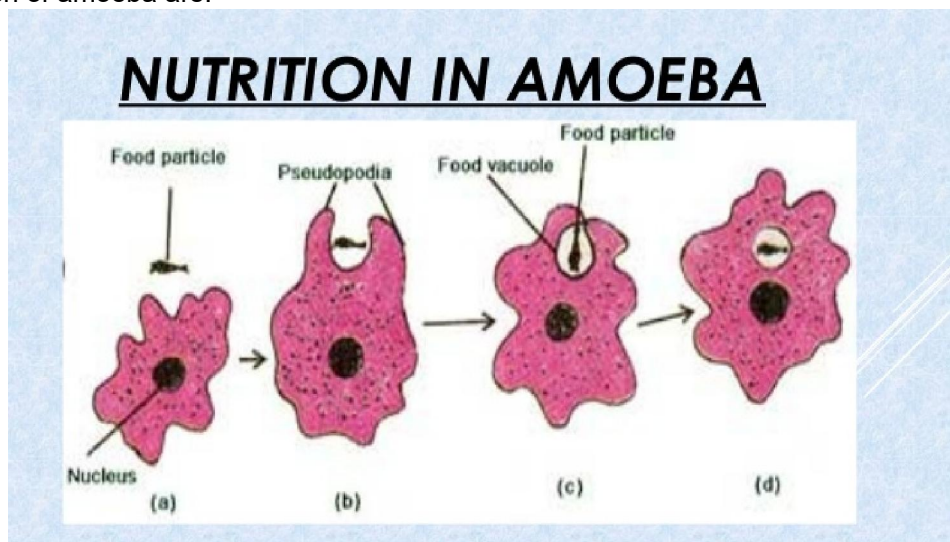
less because all cells are not in direct contact with the atmosphere. Multicellular organisms require greater amount of oxygen to sustain life processes which cannot be fulfilled by the process of diffusion.



8. (b))

Element	Sodium (Na)	Oxygen (O)	Magnesium (Mg)
Electron dot structure	Na 2, 8, 1	$\cdot\ddot{\text{O}}\cdot$ 2, 8, 6	Mg 2, 8, 2

9. Amoeba is an important protozoa found in fresh water. It feeds on microscopic plants and animals present in water. The mode of nutrition in amoeba is Holozoic. And the process of obtaining food by amoeba is called phagocytosis. The different processes involved in the nutrition of amoeba are:



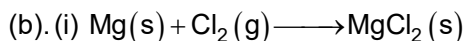
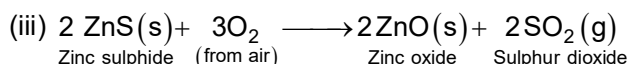
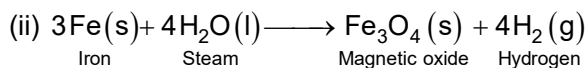
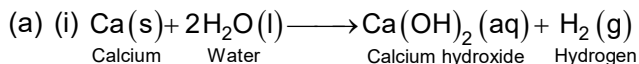
10. The light ray bends towards the normal. When a ray of light travels from an optically rarer medium to an optically denser medium, it gets bent towards the normal. Since water is optically denser than air, a ray of light travelling from air into the water will bend towards the normal.

Using, Snell's law $n_2/n_1 = \sin i / \sin r$

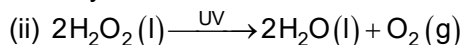
As, $n_2 > n_1$.

So, $i > r$

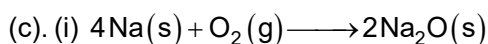
- 11.



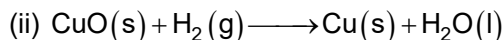
Already balanced: It is a combination reaction.



It is a photodecomposition reaction



Here, Na has gained oxygen to form Na_2O . Hence, Na has been oxidized to Na_2O . Obviously O_2 has been reduced.



Here, CuO has lost oxygen to form Cu. Hence, CuO has been reduced to Cu. H_2 has gained from H_2O . Hence H_2 has been oxidized to H_2O .

12. The various associated glands of digestive system and their role in digestion are as follows:-

1. Salivary gland digestion of starch in mouth. (1.5)
2. Liver secretes bile juices which help in the digestion of fats.(1.5)
3. Pancreas secretes pancreatic juices which act on carbohydrate, fats and proteins and change them into simpler compounds.(2)

12.

- (a) Bile juice is secreted by liver.
- (b) Digestion of fats is difficult as compared to that of other nutrients because of insolubility of fat in water.
- (c) Bile juice helps in digestion of fat by breaking down big fat droplets into smaller droplet.
- (d) Digestion of fat is completed in small intestine.
- (e) No, fat is not completely digested by bile juice.

13. (a) According to problem, $m = \pm 3$

$$\text{if } m = -3 = \frac{v}{u} \Rightarrow v = -3u$$

$$\text{Using lens formula, } \frac{1}{v} - \frac{1}{u} = \frac{1}{f}$$

$$\Rightarrow \frac{1}{-3u} - \frac{1}{u} = \frac{1}{15}$$

$$\frac{-4}{3u} = \frac{1}{15} \Rightarrow u = -20 \text{ cm}$$

$$\text{if } m = 3 = \frac{v}{u} \Rightarrow v = 3u$$

$$\therefore \frac{1}{3u} - \frac{1}{u} = \frac{1}{15} \Rightarrow \frac{1-3}{3u} = \frac{1}{15} \Rightarrow u = -10 \text{ cm}$$

Thus image will be triple in size of object if object is placed at 20 cm or 10 cm from its optical centre.

(b) $f = \frac{R}{2} = \frac{2}{2} = 1 \text{ m}$ and $u = -4 \text{ m}$

$$\text{Using mirror formula, } \frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v} + \frac{1}{-4} = \frac{1}{1} \Rightarrow \frac{1}{v} = 1 + \frac{1}{4} = \frac{5}{4} \Rightarrow v = \frac{4}{5} = 0.8 \text{ m}$$

Thus image is formed at 0.8 m from mirror behind it; the image is virtual and erect.

$$m = \frac{h'}{h} = \frac{-v}{u}$$

$$\Rightarrow m = \frac{-(0.8)}{-4} = 0.2$$

Image size is smaller than object by a factor of 0.2.

OR

- (a) Refractive index of a medium $n_m = c/v$
Speed of light in vacuum, $c = 3 \times 10^8 \text{ ms}^{-1}$.
Refractive index of glass, $n_g = 1.50$
Speed of light in the glass, $v_g = c/n_g$

$$v = \frac{c}{n} = \frac{3 \times 10^8}{1.5} \text{ m/s} = 2.0 \times 10^8 \text{ m/s}$$

- (b) Focal length of convex mirror $f = +15 \text{ cm}$, object distance $u = -10 \text{ cm}$

According to the mirror formula, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$

$$\frac{1}{15} = \frac{1}{v} + \frac{1}{-10}$$

or $\frac{1}{v} = \frac{1}{10} + \frac{1}{15}$ or $v = 6 \text{ cm}$

The positive value of v indicates that the image is formed behind the mirror.

Magnification = $-v/u = -6/(-10) = 0.6$

The positive value of magnification indicates that the image formed is virtual and erect.