

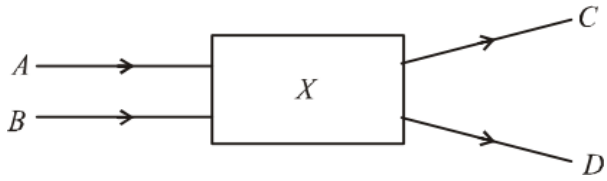


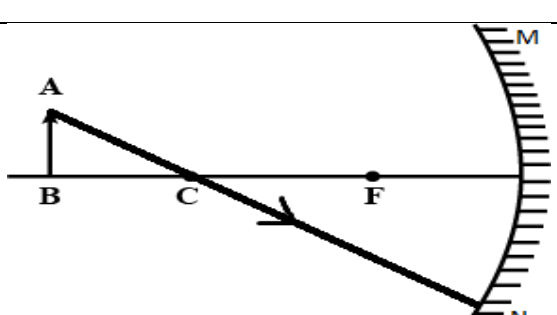
CLASS: X  
DATE: 20/09/2022

MAX MARKS: 80  
TIME: 3 HOURS

**General Instructions:**

- (i) The question paper comprises of four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
- (ii) Section A - question no. 1 to 27- These questions are very short answer questions, assertion - reason type questions, and competency based questions (multiple choice questions and case based questions) carrying one mark each.
- (iii) Section B - question no.28 is short answer type question, carrying 2 marks.
- (iv) Section C - question no.29 to 33 are short answer type questions, carrying 3 marks each.
- (v) Section D – question no.34 to 36 are long answer type questions carrying 5 marks each.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION – A		
1	Light rays A and B fall on optical component X and come out as C and D respectively. Identify optical component X and draw a ray diagram to show the formation of image in this case. 	1
2	What is the position and nature of the image formed by a concave mirror if the magnification produced by the mirror is +3?	1
3	Calculate the potential difference between the two terminals of a battery, if 100 joules of work is required to transfer 20 coulombs of charge from one terminal of the battery to the other.	1
4	The radius of curvature of a converging mirror is 40 cm. At what distance from the mirror should an object be placed so as to obtain a real inverted and diminished image? <b>OR</b> The absolute refractive indices of media X, Y and Z are 2.4, 1.5 and 1.3 respectively. Arrange the speed of light in these media in descending order.	1
5	Two solutions X and Y have pH value of 8.5 and 2.7 respectively. Which of these will turn litmus solution from blue to red and which will turn phenolphthalein from colourless to pink?	1
6	Write a balanced chemical equation for the following statement: Aluminium bromide and chlorine gas react to form aluminium chloride and bromine gas.	1
7	A student working in the laboratory prepared an aqueous solution of silver nitrate and kept it in a glass beaker overnight. Next morning, he found that the beaker has developed black turbidity. Why did the solution develop black turbidity?	1
8	Identify the compound of calcium which is yellowish white powder and is used for disinfecting drinking water. Write its chemical name and formula. <b>OR</b>	1

	Dhivyesb took a small piece of solid quick lime in a china dish and poured a small amount of water over it. List two changes he is likely to observe in the china dish immediately after pouring water.	
9	What would be the consequences of haemoglobin deficiency in our blood?	1
10	People living on the hills have slightly swollen neck compared to the people living in coastal regions? What might be the possible reason	1
11	Identify the process in human body which is similar to the cleansing action of soap. <b>OR</b> Name the gland which secrete hormone that regulates metabolism of carbohydrate, protein and fat.	1
	<b>Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</b> <b>(a) Both A and R are true and R is the correct explanation of A.</b> <b>(b) Both A and R are true but R is not the correct explanation of A.</b> <b>(c) A is true but R is false.</b> <b>(d) A is false but R is true.</b>	1
12	<b>Assertion (A):</b> The phenomenon of scattering of light by the colloidal particles gives rise to Tyndall effect. <b>Reason(R):</b> The colour of the scattered light depends on the size of the scattering particles.	
13	<b>Assertion (A):</b> Refractive index of glass with respect to air is different for red light and violet light. <b>Reason (R):</b> Refractive index of a pair of media depends on the wavelength of light used. <b>OR</b> <b>Assertion (A) :</b> Concave mirrors are used as make-up mirrors. <b>Reason (R) :</b> When the face is held within the focus of a concave mirror, then a diminished image of the face is seen in the concave mirror.	1
14	<b>Assertion (A) :</b> Chips manufacturers usually flush bags of chips with gas such as nitrogen. <b>Reason (R) :</b> Nitrogen gas prevents the oil and fats of the chips from being oxidized.	1
15	<b>Assertion (A) :</b> Structural and functional units of nervous system are called neurons. <b>Reason (R) :</b> Nerve impulses are carried by dendrites towards the cell body.	1
16	<b>Assertion (A) :</b> Haemodialysis can save the life of patients with kidney failure. <b>Reason (R) :</b> Harmful metabolic wastes like urea can be removed from the blood by haemodialysis.	1
17		1

Neetu studied the given diagram and wrote the following statements.

(i) The image of the object will be a real one.  
 (ii) The reflected ray will travel along the same path as the incident ray but in opposite direction.  
 (iii) The image of the object will be erect.  
 (iv) This is a concave mirror and hence the focal length will be negative. Which of the above statements are correct?

(a) i and iii  
 (b) i, ii and iv  
 (c) ii, iii and iv  
 (d) i, ii, iii and iv

18 Which of the given options correctly represent the parent acid and parent base of Zinc sulphate? 1

OPTIONS	PARENT ACID	PARENT BASE
(a)	H <sub>2</sub> SO <sub>3</sub>	Zn (OH) <sub>2</sub>
(b)	H <sub>2</sub> CO <sub>3</sub>	Zn
(c)	H <sub>2</sub> SO <sub>4</sub>	ZnO
(d)	HNO <sub>3</sub>	Zn (OH) <sub>2</sub>

19 Which of the following statements about the given reactions are correct? 1

$\text{Cr}_2\text{O}_3 + 2\text{Al} \rightarrow 2\text{Cr} + \text{Al}_2\text{O}_3$

(i) Chromium oxide is getting reduced.  
 (ii) Aluminium is getting oxidised.  
 (iii) Chromium oxide is acting as reducing agent.  
 (iv) Chromium oxide is acting as oxidising agent.

(a) (i), (ii) & (iv)                      (b) (i), (ii) & (iii)                      (c) (i), (iii) & (iv)                      (d) (i) & (ii)

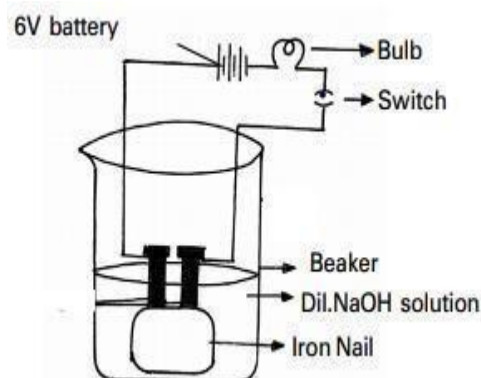
**OR**

To demonstrate electrical conductivity through an electrolyte, the following apparatus (figure) was set up.

Which among the following statement(s) is (are) correct?

- (i) Bulb will not glow because electrolyte is not acidic.  
 (ii) Bulb will glow because NaOH is a strong base and furnishes ions for conduction.  
 (iii) Bulb will not glow because circuit is incomplete.  
 (iv) Bulb will not glow because it depends upon the type of electrolytic solution.

(a) (i) and (iii)    (b) Only (i)    (c) (ii) and (iv)    (d) Only (iv)



20 The organs A of a person have been damaged completely due to which too much of a poisonous waste material B has started accumulating in his blood. In order to save this person's life, he should undergo a medical procedure C. 1

Identify A, B and C and choose the correct sequence.

- (a) A: Hemodialysis, B: Urea, C: Kidneys  
 (b) A: Kidneys, B: Urea, C: Hemodialysis  
 (c) A: Urea, B: Hemodialysis, C: Kidneys  
 (d) A: Kidneys, B: Urine, C: By-pass surgery

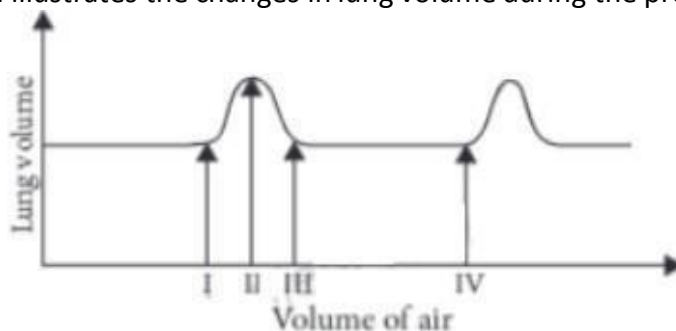
- 21 Draught tolerant genes have been identified in many of the desert plants. These xerophytes have a lot adaptation which help them to reduce the water loss.

Due to availability of less water, how does the plant cope up with lack of water in desert condition?

- (a) They open their stomata at night and the stomata remain closed during day time.  
 (b) They open their stomata at day time and stomata remain closed during night time.  
 (c) All the desert plant will shed their leaves to reduce transpiration.  
 (d) Always the stomata remain open throughout.

**OR**

The given graph illustrates the changes in lung volume during the process of breathing.



The change from II to III indicates the

- (a) Movement of diaphragm away from the lungs  
 (b) Expansion of the thoracic cavity  
 (c) Movement of air out of the lungs  
 (d) Expansion of ribs

- 22 The acidic behavior of acids is due to the presence of hydrogen ( $H^+$ ) ions in them. They produce hydrogen ions in the presence of water. A scale for measuring hydrogen ion concentration in a solution, called pH scale has been developed. The p in pH stands for 'potenz' in German, meaning power. On the pH scale we can measure pH generally from 0 to 14. pH should be thought of simply as a number which indicates the acidic or basic nature of a solution.

(i) The table provides the pH value of four solutions P, Q, R and S.

Solution	pH value
P	2
Q	9
R	5
S	11

Which of the following correctly represents the solutions in increasing order of their Hydronium ion concentration?


- (a)  $P > Q > R > S$                       (b)  $P > S > Q > R$                       (c)  $S < Q < R < P$                       (d)  $S < P < Q < R$

(ii) Which of the following compounds does not give  $H^+$  ions in aqueous solution?

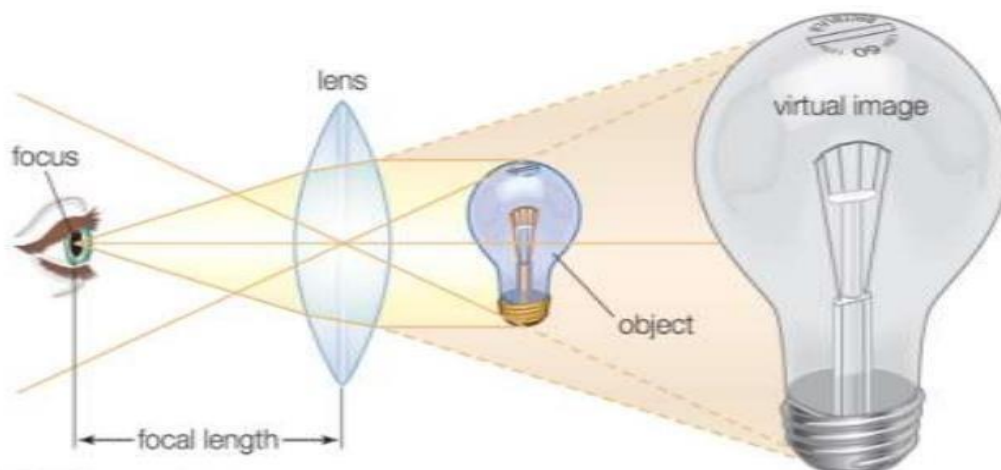
- (a)  $H_3PO_4$                       (b)  $C_2H_5OH$                       (c)  $H_2CO_3$                       (d)  $CH_3COOH$

(iii) The pH of soil X is 2.7, Y is 4.5 and Z is 7.5. Which of these three soils should be treated with Powdered chalk to adjust its pH?

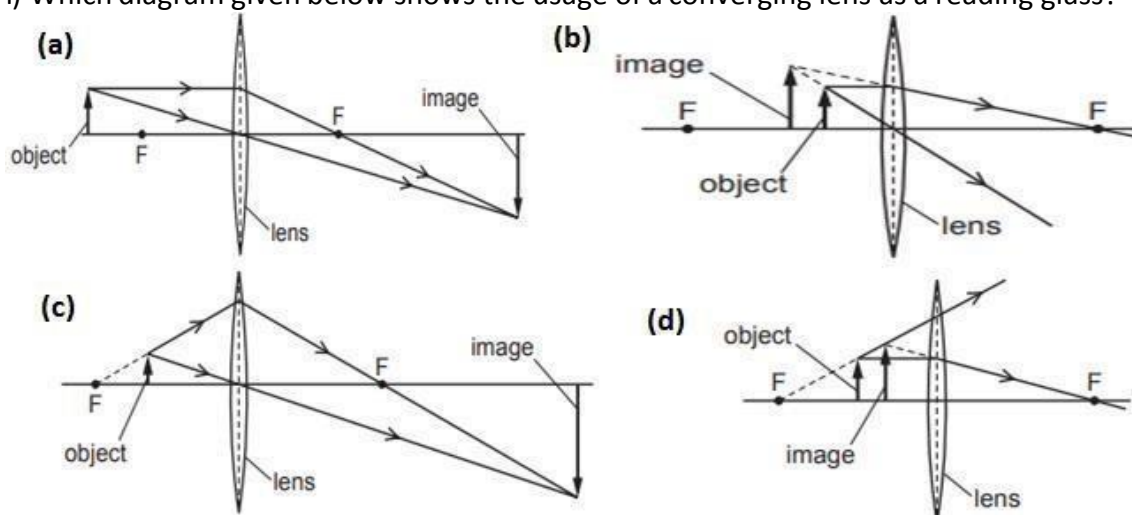
- (a) X and Y                      (b) X only                      (c) Y and Z                      (d) X and Z

	<p>(iv) P is an aqueous solution of acid and Q is an aqueous solution of base. When these two are diluted separately, then</p> <p>(a) The pH of P and Q increases  (b) The pH of P and Q decreases  (c) The pH of P decreases, the pH of Q increases  (d) The pH of P increases, and the pH of Q decreases</p>	
23	<p>Oxygen rich blood from the lungs comes to the thin-walled upper chamber of the heart on the left. The thin walled upper chamber (A) then relaxes. It then contracts and the blood is allowed to enter the next chamber (B), as it expands. When the muscular left lower chamber of heart contracts the blood is pumped out to the body via aorta. Deoxygenated blood reaches from the body to the upper chamber on the right side of heart (C) and it expands. As this part contracts, the corresponding lower chamber (D) dilates. This transfers the blood to right ventricle, which in turn pumps it to the lungs for oxygenation.</p> <p>(i) Which of these correctly represent the label A, B, C and D in the above passage?  (a) A-Left atrium, B-Left ventricle, C-Right atrium, D-Right ventricle  (b) A- Right ventricle, B- Left atrium, C- Left ventricle, D- Right atrium  (c) A- Right atrium, B- Right ventricle, C- Left atrium, D- Left ventricle  (d) A- Left ventricle, B- Right atrium, C- Right ventricle, D- Left atrium</p> <p>(ii) How the backward flow of blood is prevented inside the heart during contraction?  (a) Valves in heart  (b) Thick muscular walls of ventricles  (c) Thin walls of atria  (d) Blood pressure exerted on the walls of vessels</p> <p>(iii) Given are the sections of two pipes A and B, if you need to represent blood vessels with these, which of the pipes would correspond to the artery and which one to the vein.</p>  <p>(A) A is best defined as the vessel which,  (a) Always supply oxygenated blood to the different organs.  (b) Always carry blood away from the heart to different organs  (c) Always break up into capillaries that reunite to form a vein.  (d) Always carry blood from different body parts to heart.</p> <p>(B) Which of the following statements is incorrect?  (a) A has typically larger lumen than B.  (b) Walls of B are elastic enabling them to stretch and string during changes in blood pressure.  (c) Flow of blood is slower in A than in B.  (d) Always oxygenated blood flows through A.</p>	4
24	<p>A magnifying glass is a converging lens of small focal length. The most familiar present day example is a reading glass. It is instinctive, when one wishes to examine the details of an object, to bring it as near as possible to the eye. The closer the object is to the eye, the larger the angle it subtends at the eye, and thus larger the object appears. If an object is brought too close, however, the eye can no longer form a clear image. The use of the magnifying lens between the observer and the object enables the formation of a “virtual image” that can be viewed in</p>	4

comfort. To obtain the best possible image, the magnifier should be placed directly in front of the eye. The object of interest is then brought towards the eye until a clear image of the object is seen.



i) Which diagram given below shows the usage of a converging lens as a reading glass?



ii) What would be the nature and size of the image formed by a reading glass?

- (a) real, inverted and diminished in size
- (b) real, inverted and enlarged in size
- (c) virtual, erect and diminished in size
- (d) virtual, erect and enlarged in size

iii) What is the value and sign of magnification (according to the new Cartesian sign convention) of the image formed by a reading glass?

- (a) Value = Less than 1 and Sign = Positive
- (b) Value = More than 1 and Sign = Positive
- (c) Value = Less than 1 and Sign = Negative
- (d) Value = More than 1 and Sign = Negative

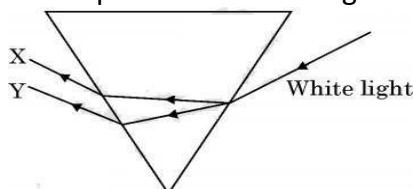
iv) A student observed an object of height 2mm placed at a distance of 5cm from the optical centre of a magnifying glass having focal length of 10cm. Find the height of the image.

- (a) 4 cm
- (b) 6.67 mm
- (c) 4 mm
- (d) 3.33 mm

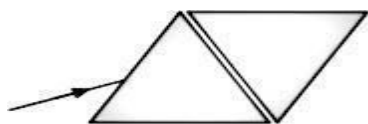
25 Rohan conducted an experiment to demonstrate dispersion of white light. He kept a glass prism on a table in a dark room and allowed a narrow beam of white light to fall on the prism. He was surprised to see a pattern of various colours on the screen kept on the other side of the prism. He repeated the experiment using a second prism in inverted position with respect to the first, but the result was not the same.

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- (i) When a beam of white light is passed through a triangular prism, it gets dispersed into its seven colour components. In the diagram given below, X and Y are the end colours of the spectrum of white light. Identify X and Y.



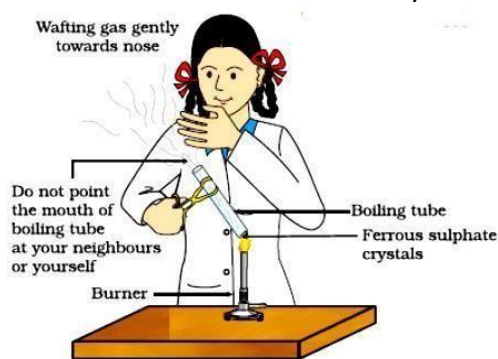
- (ii) Rohan repeated the experiment using the second prism in an inverted position with respect to the first as shown below, but he was not able to observe a spectrum on the screen. Why?



- (ii) A student observes the splitting of white light into its component colours in a dark room as the light passes through a prism. Why do the different components of white light bend through different angles with respect to the incident beam of light?
- (iii) Rohan told his friend that; rainbow is an example of dispersion of sunlight. He replied that two other optical phenomena can also be observed during rainbow formation. Which are they? Arrange the rainbow colours according to the order of increasing wavelength.

26 Sanjana performed an experiment of heating ferrous sulphate crystals in a boiling tube. She smelt fumes of a pungent gas and observed that the ferrous sulphate crystals lose water when heated and the colour of the crystal's changes.

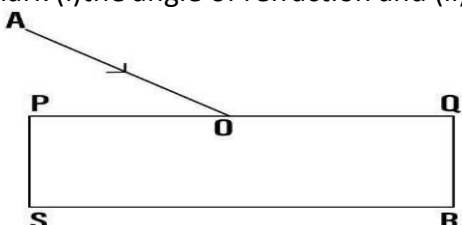
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- (i) When ferrous sulphate crystals heated in a test tube for some time, state the change in colour of ferrous sulphate crystals before heating and after heating.
- (ii) Sanjana was asked to carry out an experiment between aqueous solution of sodium sulphate and barium chloride. State any two observations that she could notice.
- (iii) Students in a chemistry lab felt choking when ferrous sulphate crystals heated. Write the chemical formula of the gas released.

	(iv) Why some salts are called hydrated salt? Give two examples of hydrated salt which are white in colour.	
27	<p>Read the passage and answer the following questions.</p> <p>Some experiments were carried out using <i>Croton</i> sp. plants to understand the process of photosynthesis. It was observed that the leaves of the plant exposed to light for longer duration accumulated more starch. However, due to presence of pre-formed starch in the leaves, it was difficult to find the net productivity on a fixed exposure to light source. Therefore, it was necessary to obtain starch free leaves in the plant before starting the experiment.</p> <p>(i) <i>Croton</i> leaves are very fragile and it will lose its form after treating with chemicals. Suggest a simple laboratory procedure which would help obtain starch free leaves in the plants.</p> <p>(ii) During the day time, using a fine blade, an incision was made to the leaves such that the phloem tissue was cut open. It was observed that a liquid oozed out. Analysis of the liquid oozing out was found to contain high amount of factor 'X'. Identify the factor 'X' and give reason behind the presence of 'X'.</p> <p>(iii) 'Chloroplasts can be considered as energy convertors'. Substantiate this statement by analysing the events occur during the process of photosynthesis.</p> <p>(iv) Leaves of a healthy potted plant were coated with petroleum jelly. How will it affect the plant? Give any one reason.</p>	5

**SECTION - B**

28	<p>Given below shows the path of a ray of light incident obliquely on one face of a rectangular glass slab. Complete the ray diagram to show the refraction of light through the glass slab and mark (i) the angle of refraction and (ii) lateral displacement.</p> 	2
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**SECTION - C**

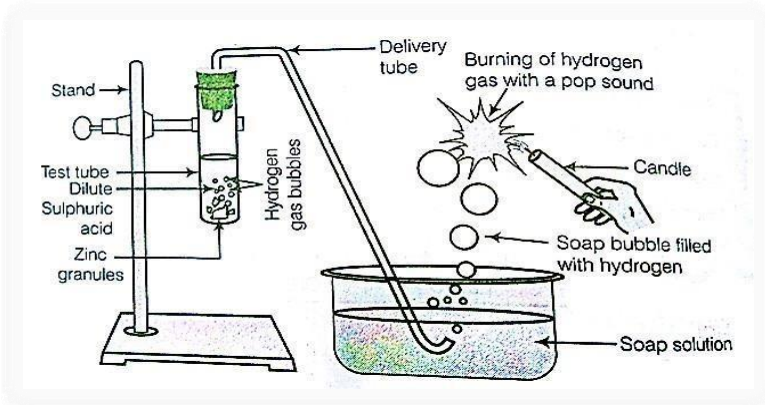
29	<p>An object 4cm in size is placed 25cm in front of a converging mirror of focal length 15cm.</p> <p>(a) At what distance from the mirror should a screen be placed in order to obtain a sharp image?</p> <p>(b) Find the size of the image.</p> <p>(c) Draw a ray diagram to show the formation of image in this case.</p>	3
30	<p>a) What is observed when a solution of potassium iodide is added to a solution of lead nitrate taken in a test tube?</p> <p>(b) Define the above type of reaction.</p> <p>(c) Write a balanced chemical equation involved in the above case.</p>	3
31	<p>(i) For making cake, baking powder is used. If at home your mother uses baking soda instead of baking powder in cake,</p>	3



- (a) How will it affect the taste of the cake and why?  
 (b) How can baking soda be converted into baking powder?  
 (ii) When electricity is passed through a common salt solution, sodium hydroxide is produced along with the liberation of two gases A and B. Identify A and B.

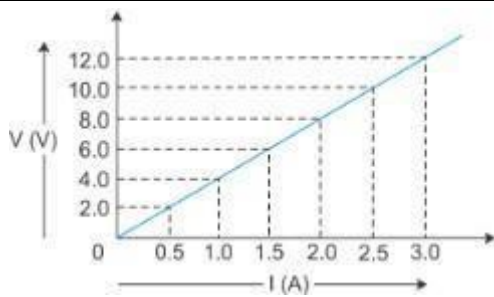
**OR**

In the following schematic diagram for the preparation of hydrogen gas as shown in Figure. What would happen if following changes are made?



- (a) In place of zinc granules, same amount of zinc dust is taken in the test tube.  
 (b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.  
 (c) In place of zinc, copper turnings are taken.  
 (d) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated. Write the equation involved.

32	<p>How does auxin promote phototropism? Explain it with the help of a suitable diagram.</p> <p><b>OR</b></p> <p>Hormones are the chemical messengers which are secreted by endocrine glands. Hormones helps in the chemical coordination in animal body. They have a significant role in control and coordination.</p> <p>(a) How do the hormones reach the organs they control?            (b) How does our body respond when adrenaline is secreted in large amounts into the blood?            (c) Name the disease which occurs in adults due to deficiency of iodine in the diet. What is the main symptom of the disease?</p>	3
33	<p>When you smell a favourite food, your mouth begins to water (that is you secrete saliva). Write down what the following are examples of?</p> <p>(a) The smell of food.            (b) The cells in your nasal passages which perceive the smell.            (c) The gland which is stimulated to secrete saliva.</p>	3
<b>SECTION – D</b>		
34	<p>A person uses spectacles of focal length -2.5m.</p> <p>(a) Name the defect of vision the person is suffering from and list its two possible causes.            (b) Draw a ray diagram to show the defect in the above case.            (c) Mention the type of lens used by him for the correction of the defect and calculate its power.            (d) Draw a labelled diagram for the correction of the defect in the above case.</p> <p><b>OR</b></p> <p>A V-I graph for a nichrome wire is given below.</p>	5



- What do you infer from this graph?
- Draw a labelled circuit diagram to obtain such a graph.
- Calculate the value of resistance of the resistor from the graph.
- Write any two differences between a voltmeter and an ammeter.

35	<p>A metal carbonate X, and a metal bicarbonate Y on reacting with an acid gives a gas which turns lime water milky.</p> <ol style="list-style-type: none"> <li>Identify the compound X and Y</li> <li>Write the chemical equations for the reaction of X and Y with the acid.</li> <li>Write the chemical equation on passing the above gas through lime water.</li> <li>What would happen if you pass excess of this gas through lime water?</li> </ol> <p style="text-align: center;"><b>OR</b></p> <ol style="list-style-type: none"> <li>What is the formula of Plaster of Paris?</li> <li>How is it prepared? State the common and the chemical names of the compound formed when Plaster of Paris is mixed with water.</li> <li>What is called as dead burnt plaster?</li> <li>Give any three important uses of Plaster of Paris.</li> </ol>	5
36	<ol style="list-style-type: none"> <li>How do plants get rid of their excretory products? Explain briefly.</li> <li>Draw a neat diagram of human excretory system and label the following parts.               <ol style="list-style-type: none"> <li>The blood vessel which brings blood to kidneys.</li> <li>The blood vessel which takes blood away from the kidneys.</li> <li>The part which stores urine.</li> <li>The small duct which connects kidney and urinary bladder.</li> </ol> </li> </ol> <p style="text-align: center;"><b>OR</b></p> <ol style="list-style-type: none"> <li>We can observe in the society that short as well as tall people exists. The shortness as well as tallness is actually due to the action of a particular hormone.           <ol style="list-style-type: none"> <li>Name the hormone, which is responsible for tallness and dwarfness in human beings.</li> <li>Mention the gland which secretes this hormone.</li> <li>What is the inbuilt arrangement in our body which controls the timing and amount of hormones released by the endocrine glands?</li> <li>Phytohormones can be called as plant growth regulators. By taking the examples of two plant hormones. Justify the above statement.</li> </ol> </li> </ol>	5

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