

TERM-1

SAMPLE PAPER

SOLVED

SCIENCE

Time Allowed: 90 Minutes

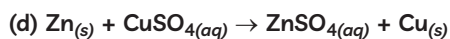
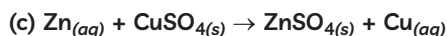
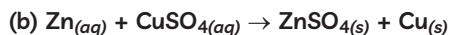
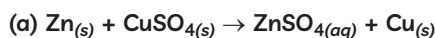
Maximum Marks: 40

General Instructions: Same instructions as given in the Sample Paper 1.

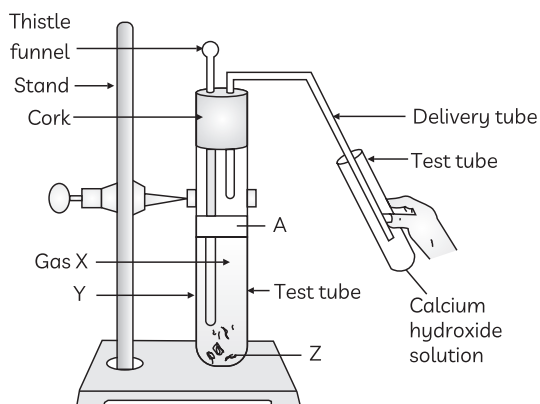
SECTION - A

(Section A consists of 24 questions. Attempt any 20 questions from this section.
The first attempted 20 questions would be evaluated.)

1. Identify the correct state of reactants and products from the following equations:



2. Suman's teacher took about 0.5 g of a salt Z in a test tube and added about 2 mL of a solution Y to it. The gas X produced turned lime water milky. The experimental setup is shown below with labels X, Y and Z.



Identify the substances X, Y and Z from the table below:

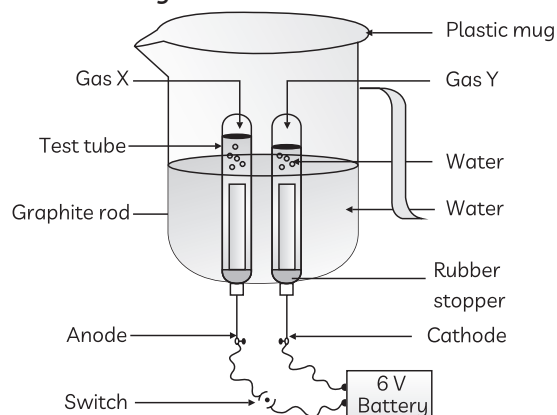
	X	Y	Z
(a)	H_2	Dil. NaOH	Metal carbonate or metal hydrogen carbonate
(b)	CO_2	Dil. HCl	Metal carbonate or metal hydrogen carbonate
(c)	CO_2	Dil. NaOH	Metal carbonate
(d)	O_2	Dil. HCl	Metal hydrogen carbonate

3. What happens when calcium is treated with water?

- (I) It does not react with water.
 (II) It reacts violently with water.
 (III) It reacts less violently with water.
 (IV) Bubbles of hydrogen gas formed stick to the surface of calcium.

- (a) (I) and (IV)
 (b) (II) and (III)
 (c) (I) and (II)
 (d) (III) and (IV)

4. An experiment was conducted by the science teacher in Raghav's school to demonstrate electrolysis of water. The teacher labelled the two gases evolved as X and Y.



5. The table below lists the change observed on adding the indicators shown to sample solutions of aerated drink, baking soda, hydrochloric acid and sodium hydroxide.

	Sample solution	Red litmus solution	Blue litmus solution	Phenolphthalein solution	Methyl Orange solution
(I)	Aerated drink	Blue	No Change	Red (Orange)	Colourless
(II)	Baking Soda	Blue	No Change	Pink	Yellow
(III)	Hydrochloric acid	Blue	No Change	Colourless	Red (Orange)
(IV)	Sodium hydroxide	Blue	No Change	Pink	Yellow

Select the row containing correct observations:

- (a) Both (I) and (III) (b) Both (II) and (IV)
 (c) Both (I) and (IV) (d) Both (II) and (III)
6. Study the chemical equation and find the values of the coefficients p , q , r , s in order to balance the equation.
 $p\text{PbS} + q\text{H}_2\text{O}_2 \rightarrow r\text{PbSO}_4 + s\text{H}_2\text{O}$
- | | p | q | r | s |
|-----|-----|-----|-----|-----|
| (a) | 1 | 2 | 1 | 2 |
| (b) | 1 | 4 | 1 | 4 |
| (c) | 2 | 1 | 2 | 1 |
| (d) | 4 | 2 | 4 | 4 |
7. Which of the following are exothermic reactions?
 (I) Burning of coal
 (II) Respiration
 (III) Decomposition of vegetable matter into compost
 (IV) Decomposition of silver chloride into silver
- Students were asked to identify the gases X and Y and note down their observations which are given below.
 Select the incorrect observations:
 (I) The gas X is hydrogen and gas Y is oxygen.
 (II) The gas X is Oxygen and gas Y is hydrogen.
 (III) Volume of hydrogen collected in test tube is twice the volume of oxygen collected.
 (IV) Volume of oxygen collected in test tube is twice the volume of hydrogen collected.
 (a) Both (I) and (III)
 (b) Both (II) and (III)
 (c) Both (I) and (IV)
 (d) Both (II) and (IV)
8. Which acid is present in honey bee sting?
 (a) Sulphuric acid
 (b) Hydrochloric acid
 (c) Nitric Acid
 (d) formic acid
9. How many molecules of water of crystallisation are there in:
 (I) plaster of Paris
 (II) washing soda crystals
 (a) $\frac{1}{2}$, 10 (b) 10, $\frac{1}{2}$
 (c) 9, 1 (d) 2, 9
10. There are many chemical processes around us such as respiration and photosynthesis which can be termed as redox reactions. Match the column I with the correct definitions given in column II in any oxidation-reduction reaction:

Column I	Column II
(I) Oxidation	(A) Addition of H or removal of O from a substance
(II) Reduction	(B) The substance which provides H for reduction or which removes O
(III) Oxidizing agent	(C) Addition of O or removal of H from a substance
(IV) Reducing agent	(D) The substance which provides O for oxidation or which removes H

- (a) (I) – (A); (II) – (C); (III) – (D); (IV) – (B)
 (b) (I) – (C); (II) – (A); (III) – (B); (IV) – (D)
 (c) (I) – (A); (II) – (C); (III) – (B); (IV) – (D)
 (d) (I) – (C); (II) – (A); (III) – (D); (IV) – (B)

11. Name the enzyme involved in the given reaction.

Proteins \xrightarrow{A} Peptones:

- (a) Pepsin (b) Bile juice
 (c) Salivary amylase (d) Lipase

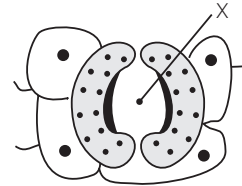
12. In which medium Pepsin and trypsin are active:

- (a) basic and acidic medium
 (b) acidic and basic medium
 (c) neutral medium
 (d) sometimes acidic sometimes basic medium

13. Which of the following statement(s) is correct about excretion in human beings?

- (I) Kidneys are the primary excretory organs.
 (II) Nitrogenous waste such as urea or uric acid are removed from blood in the kidneys.
 (III) The basic filtration unit in the kidneys is a cluster of very thin-walled blood Capillaries.
 (IV) Urine is stored in the urethra until the urge of passing it out.
 (a) Both (I) and (II)
 (b) Both (I) and (III)
 (c) (I), (III) and (IV)
 (d) (I), (II) and (III)

14. If the structure marked X in the diagram given below is blocked, then which of the processes will not occur?



- (a) Transpiration and respiration
 (b) Transpiration, photosynthesis and respiration
 (c) Respiration, transpiration and transportation
 (d) Respiration and photosynthesis

15. Major amount of water is selectively reabsorbed by the tubular part of nephron in humans. The factors on which the amount of water reabsorbed depends are:

- (I) How much of excess water there is in the body
 (II) How much of dissolved waste there is to be excreted
 (III) Body weight of the person
 (IV) Efficiency of diffusion process

The correct options are:

- (a) Both (I) and (II)
 (b) Both (II) and (III)
 (c) Both (III) and (IV)
 (d) (I), (II) and (IV)

16. Select the incorrect statements about the human circulatory system.

- (I) Blood transports only oxygen and not carbon dioxide.
 (II) Human heart has four chambers.
 (III) Valves ensure that the blood does not flow backwards.
 (IV) Both oxygen-rich and oxygen-deficient blood gets mixed in the heart.
 (a) Both (I) and (III)
 (b) Both (I) and (IV)
 (c) Both (II) and (III)
 (d) Both (II) and (IV)

17. An object is placed 40 cm from the concave mirror with a focal length of 20 cm. The image formed is:

- (a) behind the mirror
 (b) between the mirror and focus
 (c) at focus
 (d) centre of curvature of mirror

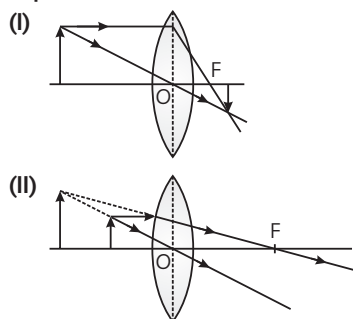
18. Velocity of light in air is 3×10^8 m/s and its velocity in a medium X is 1.0×10^8 m/s. Then, refractive index of medium X is:

- (a) 3 (b) 5
(c) 0.5 (d) 2

19. The letter appear to be raised when viewed through a glass slab placed over the document. What is the phenomenon called?

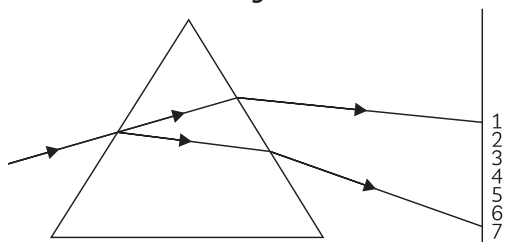
- (a) Reflection
(b) Refraction
(c) first reflection, then refraction
(d) first refraction then reflection

20. In which of the following cases, magnification is positive?



- (a) (I) (b) (II)
(c) Both (I) and (II) (d) Neither (I) or (II)

21. A beam of white light falling on a glass prism gets split up into seven colours marked 1 to 7 as shown in the diagram:



Select the row that correctly shows the colours approximately to (I) colour of a brinjal (II) Neel which is applied to clothes (III) danger signal and (IV) Colour of gold metal.

	Colour of a brinjal	Neel which is applied to clothes	Danger signal	Colour of gold metal
(a)	6	7	1	3
(b)	3	1	6	7
(c)	7	6	1	3
(d)	3	1	7	6

22. An object is placed at a distance of 60 cm in front of a concave lens of focal length 30 cm. Select from the table below, the row containing correct values of image distance and magnification:

	Image distance	Magnification
(a)	-10 cm	$-\frac{1}{2}$
(b)	-20 cm	$-\frac{1}{3}$
(c)	+ 10 cm	$+\frac{1}{2}$
(d)	-20 cm	$+\frac{1}{3}$

23. What will be the colour of sky when it is observed in the absence of any atmosphere?

- (a) White (b) Blue
(c) Red (d) Black

24. Select the incorrect statements:

- (I) When viewed near the horizon, stars appear higher than they actually are
(II) When viewed near the horizon, stars appear closer than they actually are
(III) Starlight on entering the earth's atmosphere bends towards the normal
(IV) Starlight on entering the earth's atmosphere bends away from the normal
- (a) Both (I) and (III)
(b) Both (I) and (IV)
(c) Both (II) and (III)
(d) Both (II) and (IV)

SECTION - B

(Section B consists of 24 questions (S. No. 25 to 48). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.)

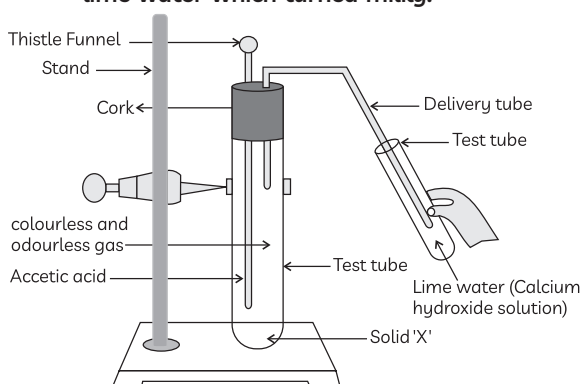
25. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following

correctly represents the type of reaction involved?

- (I) Displacement reaction
- (II) Precipitation reaction
- (III) Combination reaction
- (IV) Double displacement reaction
- (a) Only (I)
- (b) Only (II)
- (c) Only (IV)
- (d) (II) and (IV)

26. The pH values of three solutions P, Q and R respectively having equal molar concentrations are 5.0, 2.8 and 3.5 respectively at 298 K. Which represents the correct order of their acid strength?
- (a) $P < R < Q$
 - (b) $P < Q < R$
 - (c) $R < Q < P$
 - (d) $Q < R < P$

27. Acetic acid was added to a solid 'X' taken in a test tube. A colourless and odourless gas was evolved. The gas was passed through lime water which turned milky.



When evolved gas is passed through lime water, it turns milky due to formation of:

- (a) calcium hydroxide
 - (b) calcium bicarbonate
 - (c) calcium oxide
 - (d) calcium carbonate.
28. $\text{Fe} + \text{CuSO}_4 \rightarrow \text{FeSO}_4 + \text{Fe}$
 $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$
 $2\text{Al} + 3\text{ZnSO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{Zn}$
 Arrange Fe, Zn, Al and Cu in decreasing order of reactivity on the basis of above reaction.
- (a) Al, Zn, Fe, Cu
 - (b) Zn, Cu, Fe, Al
 - (c) Fe, Cu, Zn, Al
 - (d) Al, Zn, Cu, Fe
29. Which of the following can be used as olfactory indicators?
- (I) Vanilla
 - (II) Soap
 - (III) Onion
 - (IV) Litmus
 - (a) Both (I) and (II)
 - (b) Both (I) and (III)
 - (c) Both (II) and (III)
 - (d) Both (I) and (IV)

30. Baking powder is a mixture of:
- (a) Sodium carbonate and acetic acid
 - (b) Sodium carbonate and tartaric acid
 - (c) Sodium hydrogen carbonate and tartaric acid
 - (d) Sodium hydrogen carbonate and acetic acid

Question No. 31 to 34 consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

Options:

- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

31. Assertion (A): MgCl_2 is an ionic compound.
 Reason (R): Metals and non-metals react by mutual complete transfer of electrons.

32. Assertion (A): Magnesium ribbon is cleaned with water before burning.
 Reason (R): MgO layer is formed on magnesium ribbon, on exposure to atmosphere.

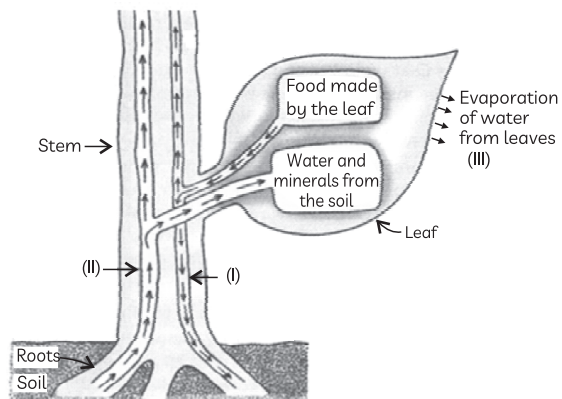
33. Assertion (A): Left ventricle of heart has a thinner wall than that of the right ventricle.
 Reason (R): Right ventricle pump blood to nearby lungs.

34. Assertion(A): Large concave mirrors are used to concentrate sunlight to produce heat in solar cookers.
 Reason(R): Concave mirror show both positive and negative magnifications.

35. Electrovalent compounds are usually solid and hard in nature. This is due to:
- (a) strong forces of attraction between the oppositely charged ions
 - (b) weak forces of attraction between the oppositely charged ions
 - (c) strong forces of attraction between the same charged ions
 - (d) weak forces of attraction between the similarly charged ions

36. An essential element used in the synthesis of proteins and other compounds is:
- (a) Phosphorus
 - (b) Nitrogen
 - (c) Iron
 - (d) Magnesium

37. Identifies the option that indicates the correct part or process labelled in the figure as (I), (II) and (III)



- (a) (I) – Xylem, (II) – Phloem, (III) – Transpiration
 (b) (I) – Phloem, (II) – Xylem, (III) – Translocation
 (c) (I) – Xylem, (II) – Phloem, (III) – Translocation
 (d) (I) – Phloem, (II) – Xylem, (III) – Transpiration

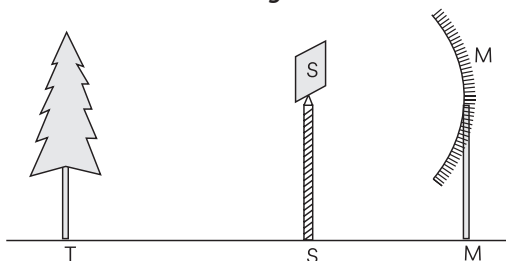
38. Study the table below and select the row that has the incorrect information.

		Aerobic	Anaerobic
(a)	Location	Cytoplasm	Mitochondria
(b)	End Product	CO ₂ and H ₂ O	Ethanol and CO ₂
(c)	Amount of ATP	High	Low
(d)	Oxygen	Needed	Not needed

39. Tyndall effect is the phenomenon of:

- (a) Reflection of light
 (b) Refraction of light
 (c) Scattering of light
 (d) Dispersion of light

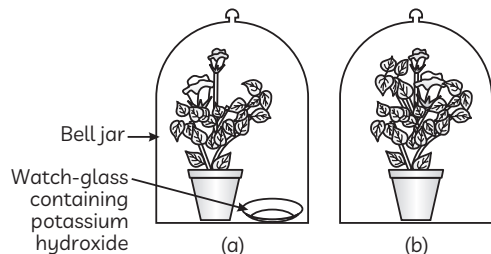
40. A student obtains a sharp image of the distant tree labelled as T of the school laboratory on the screen labelled S using the given concave mirror labelled M to determine its focal length.



The focal length of the above mirror is given by:

- (a) MS (b) ST
 (c) MT (d) $\frac{1}{2}$ MT
41. The oxygen rich blood from the lungs comes to which chamber of the human heart?
 (a) Left Atrium (b) Right Atrium
 (c) Left Ventricle (d) Right Ventricle
42. Carbon dioxide is an important element for production of food by plants. With a help of the below experiment, it is demonstrated

that photosynthesis cannot be possible without carbon dioxide.



What is the role of potassium hydroxide in the above demonstrated experiment?

- (a) Hygroscopic
 (b) Absorb Carbon dioxide
 (c) Absorb oxygen
 (d) Absorb water

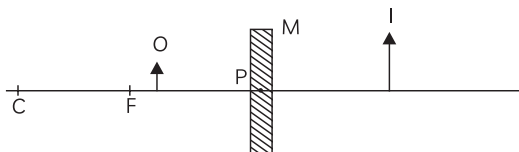
43. Focal length of two lenses are in the ratio 1 : 2. The ratio of power of lenses is given by:

- (a) 1 : 2 (b) 1 : 4
 (c) 2 : 1 (d) 4 : 1

44. The laws of reflection hold true in the following cases:

- (a) Plane mirrors only
 (b) Concave mirrors only
 (c) Convex mirrors only
 (d) All reflecting surfaces

45. In the figure below, M is a mirror and O is an object and I is its magnified image formed by the mirror.



Select from the table below the row identifying the correct type of mirror and its application for the position of object shown.

	Type of mirror	Application
(a)	Plane Mirror	Looking glass
(b)	Concave Mirror	Vehicle headlights
(c)	Convex Mirror	Rear view mirror
(d)	Concave Mirror	Shaving mirror

46. Select the correct statements from the statements given below regarding use of convex mirror as rear view mirrors:

- (I) Convex mirror always forms a virtual and erect image
- (II) Convex mirrors may form real or virtual image depending upon the position of object
- (III) Images formed by convex mirrors are usually larger than the object.

(IV) Convex mirrors provide a wider field of view as they are curved outwards.

- (a) Both (I) and (III)
- (b) Both (II) and (III)
- (c) Both (I) and (IV)
- (d) Both (III) and (IV)

47. An object at a distance of +15 cm is slowly moved towards the pole of a convex mirror. The image formed will become:

- (a) Shortened and real
- (b) Enlarged and real
- (c) Enlarged and virtual
- (d) Virtual and diminished

48. Ionic compounds are solids and hard because:

- (a) of the strong force of attraction between the positive and negative ions
- (b) they are formed between metals and non-metals
- (c) due to sharing of electrons
- (d) due to formation of strong hydrogen bonds between the compounds

SECTION - C

(Section C consists of three Cases followed by questions. There are a total of 12 questions in this section. Attempt any 10 questions from this section. The first attempted 10 questions would be evaluated.)

Q. 49 to 52 are based on Case Study-1

Case 1:

S.No.	Name of process	Equation
(I)	Combustion	Calcium + Oxygen $\xrightarrow{\text{Heat}}$ Calcium dioxide
(II)	Photosynthesis	Carbon dioxide + Water $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ Glucose + Oxygen + Water
(III)	Combination	Iron + Sulphur $\xrightarrow{\text{Heat}}$ Iron sulphide
(IV)	Photodecomposition	Silver bromide $\xrightarrow{\text{Heat}}$ Silver + Bromine

49. Which of the following reactions is an example of combustion reaction?

- (a) $\text{C}_{(s)} + \text{O}_{2(g)} \rightarrow \text{CO}_{2(g)}$
- (b) $\text{Zn}_{(s)} + \text{H}_2\text{SO}_{4(aq)} \rightarrow \text{ZnSO}_{4(aq)} + \text{H}_2(g)$
- (c) $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \rightarrow \text{ZnCl}_{2(aq)} + \text{H}_2(g)$
- (d) $\text{KClO}_{3(s)} \rightarrow \text{KCl}_{(s)} + \text{O}_{2(g)}$

- (c) $2\text{H}_{2(g)} + \text{O}_{2(g)} \rightarrow 2\text{H}_2\text{O}_{(g)}$
- (d) $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$

50. Which of the following is not an example of combination reaction?

- (a) $\text{H}_{2(g)} + \text{Cl}_{2(g)} \xrightarrow{\text{Light}} 2\text{HCl}_{(g)}$
- (b) $\text{Fe}_{(c)} + \text{S}_{(s)} \rightarrow \text{FeS}_{(g)}$

51. The reaction in which two or more substances combine to form a single substance under suitable condition is:

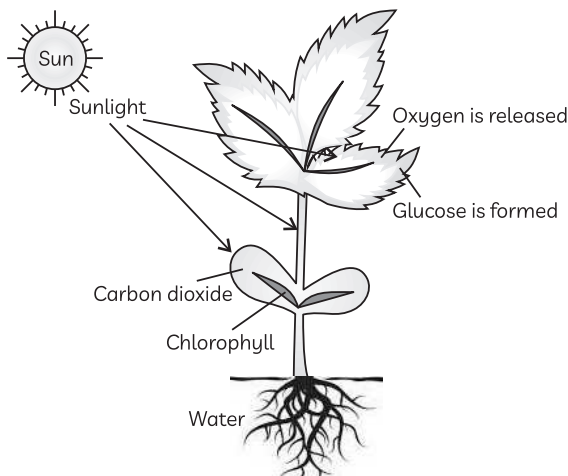
- (a) combination reaction
- (b) combustion
- (c) decomposition reaction
- (d) photosynthesis

52. When a chemical compound decomposes on absorbing light and energy, it is known as:
- photosynthesis
 - photodecomposition
 - combination
 - thermal decomposition

Q. 53 to 56 are based on Case Study-2

Case 2: Photosynthesis is the process by which autotrophs take in substances from the outside and convert them into stored forms of energy. The materials taken in are in the form of carbon dioxide and water which are converted into carbohydrates in the presence of sunlight and chlorophyll. The carbohydrates which are not used immediately are stored in the form of starch, which serves as the internal energy reserve to be used as and when required by the plant. The complex substances have to be broken down into simpler ones before they can be used for the upkeep and growth of the body.

53. The given figure represents plants taking in substances from the outside and converting them into stored forms of energy.



- $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
- $6\text{O}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_5 + 6\text{CO}_2$
- $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} \rightarrow 6\text{CO}_2 + 6\text{O}_2$
- $6\text{CO}_2 + 6\text{O}_2 \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O}$

54. Which of the following statements is true?
- Carbon and energy requirements of the autotrophic organism are fulfilled by photosynthesis.
 - Carbohydrates are utilised for providing energy to the plant.
 - Chlorophyll is essential for photosynthesis.
 - Autotrophs' survival depends directly or indirectly on heterotrophs.

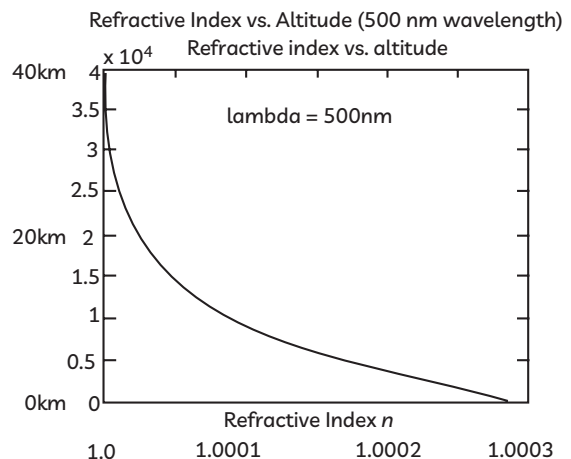
55. Heterotrophs depend for energy on:
- autotrophs
 - producers
 - herbivores
 - both (a) and (b)

56. Choose the correct combination of plots provided in the following table.

	Biocatalyst also termed as	Biocatalyst found in human saliva	Biocatalyst produced in human stomach
(a)	Enzymes	Amylase	Pepsin
(b)	Hormones	Amylase	Maltase
(c)	Enzymes	Trypsin	Pepsin
(d)	Energy	Pepsin	Chymotrypsin

Q. 57 to 60 are based on Case Study-3

Case 3: Ankit remarked that he has seen wavering of objects when seen through a stream of hot air rising above a tandoor or a fire. He said that the air just above the fire becomes hotter than the air further higher up. He further said that this wavering can also be seen in the earth's atmosphere as the earth's atmosphere is not evenly distributed and several observations can be explained on the basis of this phenomenon. To explain his point further, he plotted the variation of refractive index of the atmosphere with altitude.



57. Name the phenomenon about which Ankit remarked.
- Dispersion of light
 - Atmospheric refraction
 - Scattering of light
 - Diffusion of light
58. The two observations which can be explained by the above phenomenon are:
- Twinkling of stars
 - Formation of rainbow
 - Advance sunrise
 - Reddish appearance of sun at sunrise

- (a) Both (I) and (II) (b) Both (II) and (III)
(c) Both (I) and (III) (d) (I), (III) and (IV)
- 59.** The air layer of atmosphere whose temperature is less than the hot layer behaves as optically
- (a) denser medium
(b) rarer medium
(c) inactive medium
(d) either denser or rarer medium
- 60.** After analysing the graph a student writes the following statements.

- (I) The refractive index of the atmosphere decreases with altitude
(II) The refractive index of the atmosphere increases with altitude
(III) Atmosphere will bend starlight towards the normal
(IV) Atmosphere will bend starlight away from the normal

Choose from the following which of the following would be the correct statement(s).

- (a) Only (I) (b) Both (I) and (III)
(c) Both (II) and (III) (d) Both (I) and (IV)



SOLUTION

SECTION - A

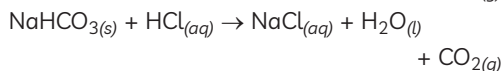
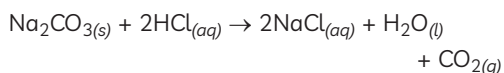
1. (d) $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

Explanation: Zinc metal (solid) reacts with copper sulphate solution (aqueous) to give aqueous zinc sulphate and solid copper.

2. (b) X : CO_2 ; Y : Dil.HCl ; Z : Metal carbonate or metal hydrogen carbonate

Explanation: As the gas X turns lime water milky, it is CO_2 . A metal carbonate or hydrogen carbonate produces CO_2 gas on reacting with a dilute acid.

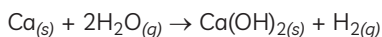
Metal carbonate or hydrogen carbonate + Acid \rightarrow Salt + carbon dioxide + water



Therefore, Y is dilute HCl (or any acid) and Z is a metal carbonate or hydrogen carbonate.

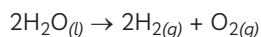
3. (d) (III) and (IV)

Explanation: Calcium reacts with cold water but the reaction with cold water is not as violent as Na or K. When calcium is treated with water, it reacts vigorously with water produces hydrogen gas, which stick to the surface of calcium due to which calcium floats.



4. (c) Both (I) and (IV)

Explanation: When electricity is passed through acidified water as shown in the apparatus given, water undergoes decomposition and forms hydrogen gas and oxygen gas. The equation of the reaction taking place is:



The oxygen gas is collected over the anode and the hydrogen gas is collected over the cathode.

The electrolysis of water produces 2 volumes of hydrogen gas and 1 volume of oxygen gas. It can therefore be concluded that the ratio of hydrogen and oxygen elements in water is 2 : 1 by volume.

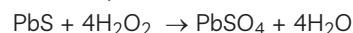
5. (b) Both (II) and (IV)

Explanation: Acids turn blue litmus red, phenolphthalein solution colourless and methyl orange red (orange). Whereas, bases turn red litmus blue, phenolphthalein solution pink and methyl orange yellow.

Aerated drink and hydrochloric acid are acidic whereas baking soda and sodium hydroxide are basic in nature. Therefore, (I) and (III) are incorrect whereas (II) and (IV) are correct observations.

6. (b) p : 1; q : 4; r : 1; s : 4

Explanation: A balanced chemical equation has equal number of atoms of each element on both the reactant side and the product side. The balanced equation is:



Option (b) is the correct answer as the number of atoms of each element are balanced as shown below:

Element	Number of atoms on Reactant side	Number of atoms on Product side
Pb	1	1
S	1	1
H	8	8
O	8	8

7. (c) (I), (II) and (III)

Explanation: Respiration is an exothermic process as energy is produced by the oxidation of glucose. Similarly, burning of coal is also an exothermic process as large amount of heat is produced. Decomposition of vegetable matter into compost is an exothermic process. However, decomposition of silver chloride into silver in the presence of sunlight is an endothermic process.

8. (d) Formic acid

Explanation: Honey bee sting and hair of nettle leaves consist of formic acid.

9. (b) $10, \frac{1}{2}$

Explanation: (I) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$

(II) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$



Related Theory

Only half a water molecule is attached as water of crystallisation in plaster of Paris. It is written in this form because two formula units of CaSO_4 share one molecule of water.

10. (d) (I) – (C); (II) – (A); (III) – (D); (IV) – (B)

Explanation: Oxidation is the addition of O to a substance or removal of H from a substance. Reduction is the addition of H to a substance or the removal of O from a substance.

Oxidising agent is the substance which provides O for oxidation or the substance which removes H.

Reducing agent is the substance which gives H for reduction or the substance which removes O.

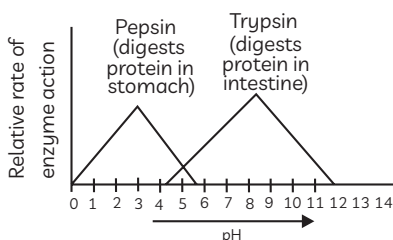
The substance which gets oxidised is the reducing agent and the substance which gets reduced is the oxidising agent.

11. (a) Pepsin

Explanation: Proteins present in food are converted to peptones with the help of pepsin enzyme. It is secreted by gastric glands found in stomach wall.

12. (b) acidic and basic medium

Explanation: Pepsin works in the acidic medium and trypsin works in the basic medium to digest the proteins in stomach and in the intestine respectively.



13. (d) (I), (II) and (III)

Explanation: The only incorrect statement is that urine is stored in the urethra, as urine is actually stored in the urinary bladder, which is a muscular organ and under our nervous control.

14. (b) Transpiration, photosynthesis and respiration

Explanation: Here, the structure marked as X is stomata.

Stomata are responsible for gaseous exchange in the plant. If they are blocked, the gaseous exchange will not take place.

Hence, the two important processes of the plant: photosynthesis and respiration do not take place. Stomata are also responsible for removing extra water present in the plants.

Hence, if blocked, the process of transpiration will also be affected.

15. (a) Both (I) and (II)

Explanation: Re-absorption of useful substances such as glucose, amino acids, salts and a major amount of water into the blood capillaries takes place. The amount of water reabsorbed depends on how much excess water there is in the body, and on how much of dissolved waste there is to be excreted.

16. (b) Both (I) and (IV)

Explanation: The human heart has four chambers and valves ensure that the blood does not flow backwards. The separation of left side and right side of the heart ensures that the oxygenated and deoxygenated blood do not mix. The blood transports both oxygen and carbon dioxide gases.

17. (d) centre of curvature of mirror

Explanation: Given focal length of concave mirror, $f = -20$ cm

Distance of object from concave mirror, $r = -40$ cm

From the mirror formula

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

$$\Rightarrow \frac{1}{-40} + \frac{1}{v} = \frac{1}{-20}$$

$$\frac{1}{v} = \frac{1}{-20} + \frac{1}{40}$$

$$= \frac{-2+1}{40}$$

$$= \frac{-1}{40}$$

$$v = -40$$

Hence, image is formed at the centre of curvature of the mirror.

18. (a) 3

Explanation: Refractive index of medium with respect to air,

$${}^a n_m = \frac{\text{Speed of light in air}}{\text{Speed of light in medium}}$$

$${}^a n_m = \frac{3 \times 10^8}{1.0 \times 10^8} = 3$$

19. (b) Refraction

Explanation: Due to refraction of light through the water medium a virtual image of the object is produced nearer to the glass slab surface and hence, it appears to be raised by some height above the surface of the paper on which slab is kept.

20. (b) (II)

Explanation: Magnification is positive in case II as image formed is virtual, erect and magnified.



Related Theory

As object moves from infinity towards optical centre of the convex lens image is shifted away from its focal point and towards infinity.

21. (c) Colour of 9 brinjal: 7; Neel which is applied to clothes: 6; Danger signal: 1; colour of gold metal: 3.

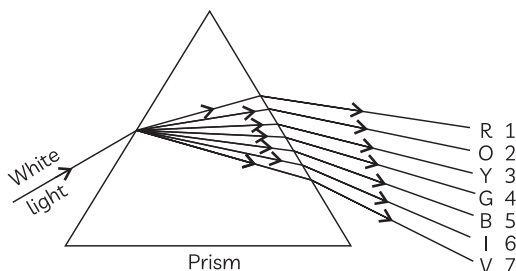
Explanation: When white light is incident on a glass prism, it gets split into its component colours and a spectrum is formed as shown. Violet colour (labelled 7) is deviated the most while red colour (marked 1) is deviated the least.

Colour of brinjal: Violet

Neel which is applied to clothes: Indigo

Danger signal: Red

Colour of gold metal: Yellow



22. (d) Images distance -20 cm, Magnification $\frac{1}{3}$

Explanation: Here, u = object distance = -60 cm, f = focal length = -30 cm

Let v = image distance

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

$$\frac{1}{-30} = \frac{1}{v} + \frac{1}{-60}$$

$$\frac{1}{v} = -\frac{1}{30} - \frac{1}{60}$$

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

$$v = -\frac{60}{3} \text{ cm} = -20 \text{ cm}$$

\therefore distance of image from the lens = 20 cm in front of the lens

$$\text{Magnification, } m = \frac{v}{u} = \frac{-20}{-60} = \frac{1}{3}$$

23. (d) Black

Explanation: If the earth had no atmosphere, there would not have been any scattering then the sky would look dark.

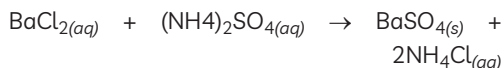
24. (d) Both (II) and (IV)

Explanation: The stars appear slightly higher than its actual position when viewed near the horizon due to the phenomenon of atmospheric refraction. When the star light enters the earth's atmosphere, where its refractive index is increasing gradually, the star light is bent towards the normal.

SECTION - B

25. (d) (II) and (IV)

Explanation: The reaction of barium chloride with ammonium sulphate is a double displacement reaction as exchange of ions takes place between the reactants.



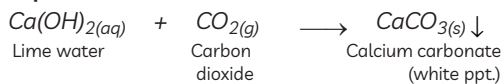
It is also a precipitation reaction as an insoluble substance, BaSO_4 is formed.

26. (a) $P < R < Q$

Explanation: As pH value decreases, acidic strength increases.

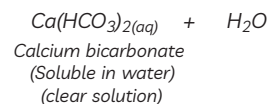
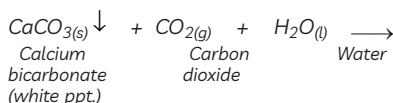
27. (d) calcium carbonate

Explanation:



Related Theory

When excess of CO_2 gas is passed through lime water, the white ppt. of CaCO_3 bicarbonate.



43. (c) 2 : 1

Explanation: Power of a lens is given by

$$\frac{1}{f(\text{in m})}$$

If the focal length of the two lenses is given by f_1 and f_2 , and their power given by P_1 and P_2 , then,

$$f_1 = \frac{1}{P_1}; f_2 = \frac{1}{P_2}$$

$$\Rightarrow f_1 : f_2 = P_2 : P_1$$

As $f_1 : f_2 = 1 : 2$,

$$P_1 : P_2 = 2 : 1$$

44. (d) All reflecting surfaces

Explanation: Laws of reflection hold true for all reflecting surfaces, whether plane or spherical.

The reflection of light from mirrors takes place according to the following laws of reflection:

The angle of incidence (i) is equal to the angle of reflection (r).

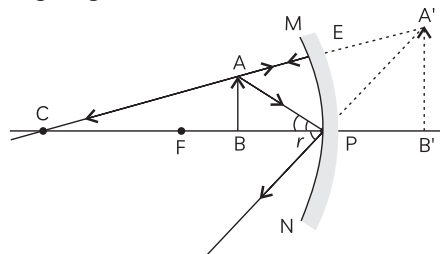
The incident ray, the reflected ray and the normal to the mirror at the point of incidence, all lie on the same plane.

45. (d) Type of mirror: Concave mirror; Application : Shaving mirror

Explanation: Image formed by a plane mirror is virtual, erect and of same size as the object. Image formed by a convex mirror is virtual, erect but diminished.

The mirror is a concave mirror as it forms a virtual, erect and magnified image of an object placed between its Pole and Focus. This is used as a shaving mirror or by dentists to see large images.

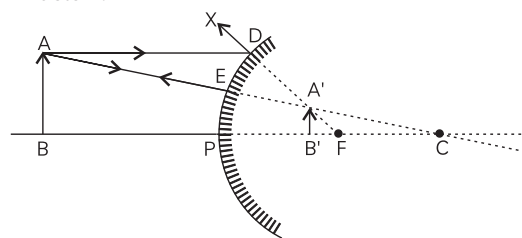
Ray diagram is shown below:



46. (c) Both (I) and (IV)

Explanation: Convex mirrors are used as rear view mirrors in cars because they always form virtual and erect image and provide a wider field of view as they are curved outwards.

Ray diagram for formation of image is given below:



47. (d) virtual and diminished

Explanation: Image formed by a convex mirror is always virtual erect and diminished irrespective of the position of the object.

48. (a) of the strong force of attraction between the positive and negative ions

Explanation: Ionic compounds are solids and hard because of the strong force of attraction between the positive and negative ions, due to transfer of electrons between the elements.



Related Theory

Electrovalent compounds are generally soluble in water and insoluble in solvents such as kerosene, petrol, etc.

SECTION - C

49. (a) $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$

Explanation: When a compound is heated in presence of oxygen, it is a combustion reaction.



Related Theory

When carbon is heated in abundant supply of oxygen, it forms carbon-dioxide. However, in limited supply of oxygen, carbon monoxide is formed.

50. (d) $Pb_{(s)} + CuCl_{2(l)} \rightarrow PbCl_{2(l)} + Cu_{(s)}$

Explanation: $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$ is a displacement reaction.

51. (a) combination reaction

Explanation: Combination reaction occurs when two or more reactants combine to form one product.

52. (b) Photodecomposition

Explanation: Photo decomposition reaction is a type of decomposition reaction in the presence of light.

53. (a) $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

54. (c) chlorophyll is essential for photosynthesis.

Explanation: Heterotrophs survival depends directly or indirectly on autotrophs.

55. (d) both (a) and (b)

Explanation: The autotrophs, i.e., producers or green plants, manufacture energy rich food materials by capturing the solar energy, while the heterotrophs depend on the energy supply on the autotrophs.

56. (a) Biocatalyst also termed as : Enzymes;
Biocatalyst found in human saliva: Amylase
Biocatalyst produced in human stomach pepsin.

Explanation: Biocatalysts are also termed as enzymes. Human saliva contains an enzyme called salivary amylase which digests the starch into sugars and an enzyme called pepsin is produced in human stomach that acts in acidic medium only.

57. (b) Atmospheric refraction

Explanation: The phenomenon is "Atmospheric refraction" which is the refraction of light by the earth's atmosphere due to the decrease of refractive index with decreasing density or increasing temperature of air.



Related Theory

- Dispersion of light is the separation of visible light into its different colors.
- Scattering of light is the phenomenon in which light rays get deviated from its straight path on striking an

obstacle like dust or gas molecules, water vapours etc.

- Diffusion occurs when a ray of light strikes a surface and the light is scattered.

58. (c) Both (I) and (III)

Explanation: The two observations which can be explained by atmospheric refraction are: Twinkling of stars and advance sunrise.



Related Theory

- Formation of rainbow is due to refraction of light, dispersion, total internal reflection and again refraction.
- Reddish appearance of sun at sunrise and sunset is due to the scattering of light by atmospheric gases and particles

59. (a) denser medium

Explanation: The cold air layer of the atmosphere acts as an optically denser medium than hot air because the molecules are closely packed together.

60. (b) Both (I) and (III)

Explanation: The refractive index of the atmosphere decreases with altitude, that is, the air in the upper atmosphere is rarer as compared to the air below. As the starlight travels from a rarer medium to a denser medium, it will be bent towards the normal.