2

# TERM-1
# SAMPLE PAPER
SOLVED

# SCIENCE

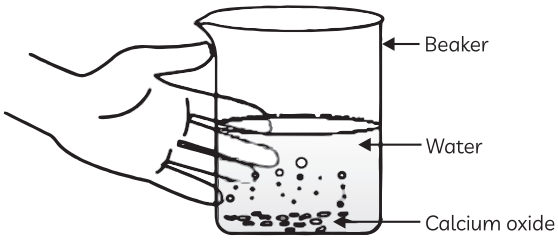
*Time Allowed: 90 Minutes* *Maximum Marks: 40*

**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 type of reaction in the following experiment:**




**(I) Combination Reaction**
**(II) Decomposition Reaction**
**(III) Exothermic Reaction**
**(IV) Endothermic Reaction**
**(a) Only (I)**
**(b) Only (II)**
**(c) Both (I) and (III)**
**(d) Both (II) and (IV)**

**2.** **A few drops of phenolphthalein indicator were added to an unknown solution A and it acquired pink colour. Then another unknown solution B was added to it drop by drop and the solution becomes colorless. Which of the given options correctly represents the nature of the solutions A and B?**

| Option | Nature of solution A | Nature of solution B |
|---|---|---|
| (a) | Acidic | Basic |
| (b) | Acidic | Neutral |
| (c) | Basic | Neutral |
| (d) | Basic | Acidic |

**3.** **Which of the following are not ionic compounds?**
**(I)** $AlCl_3$ **(II)** $HCl$
**(III)** $CCl_4$ **(IV)** $NaCl$
**(a) (I) and (II)** **(b) (II) and (III)**
**(c) (III) and (IV)** **(d) (I) and (III)**

**4.** **The value of *p*, *q*, *r* and *s* in balanced chemical equation :**
$p\ BaCl_2 + q\ Al_2(SO_4)_3 \rightarrow r\ AlCl_3 + s\ BaSO_4$ **are respectively.**
**(a) 3, 2, 2, 3** **(b) 3, 1, 2, 3**
**(c) 3, 1, 3, 3** **(d) 3, 1, 3, 2**

**5.** **Which of the following is acidic in nature?**
**(a) Milk**
**(b) Human blood**
**(c) Lime water**
**(d) Laundary detergents**

**6.** **Packed food items made up of oils and fats are generally flushed with inert gas :**
**(I) To protect them from corrosion.**
**(II) They protect their flavours.**
**(III) To protect them from being rancid.**
**(IV) To protect their taste.**

Which of the following statements are correct?

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

**7.** Which component is being reduced in the reaction ?

$CuO + H_2 \xrightarrow{\Delta} Cu + H_2O$

(a) Cu (b) $H_2$
(c) CuO (d) Both CuO and $H_2$

**8.** Soda acid extinguisher contains the chemical:

(a) $NaHCO_3$ (b) Na(OH)
(b) $Na_2CO_3$ (d) NaCl

**9.** Select the correct statments w.r.t. bases:

(I) Bases have bitter taste and soapy touch.
(II) With carbon dioxide, they form salt and water.
(III) The gas evolved with zinc metal extinguishes a lightning splinter.

(a) Statements (I) and (III) are correct
(b) Only Statement (I) is correct
(c) Statement (I) and (II) are correct
(d) Only statement (II) correct

**10.** On passing electric current through acidified water:

(I) Hydrogen gas is collected over cathode and oxygen gas is collected over anode.
(II) Oxygen gas is collected over cathode and hydrogen gas is collected over anode.
(III) Ratio of Volume of hydrogen gas : oxygen gas = 1 : 2
(IV) Ratio of Volume of hydrogen gas : oxygen gas = 2 : 1

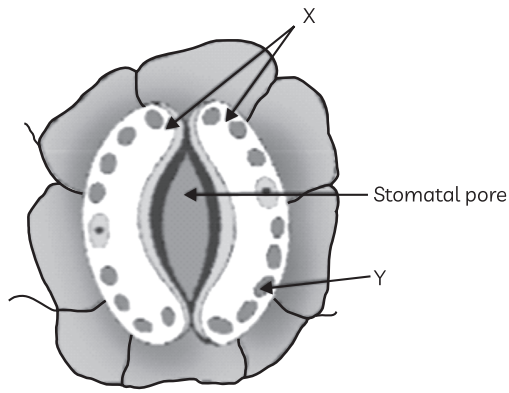
Select the correct statements:

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

**11.** When do the desert plants take up carbon dioxide?

(a) During early morning
(b) During day
(c) During night
(d) All the time

**12.** Study the diagram of a stomatal pore with labels X and Y and select the option which gives the correct identification and main function of X and Y.




| Option | X | Function of X | Y | Function of Y |
|---|---|---|---|---|
| (a) | Guard cells | Opening and closing of stomatal pore | Chloroplast | Responsible for photosynthesis |
| (b) | Guard cells | Transpiration | Chloroplast | Gaseous exchange |
| (c) | Chloroplast | Opening and closing of stomatal pore | Lower Epidermis | Gaseous exchange |
| (d) | Chloroplast | Transpiration | Guard cells | Opening and closing of stomatal pore |

**13.** Rings of cartilage, in the throat prevents:

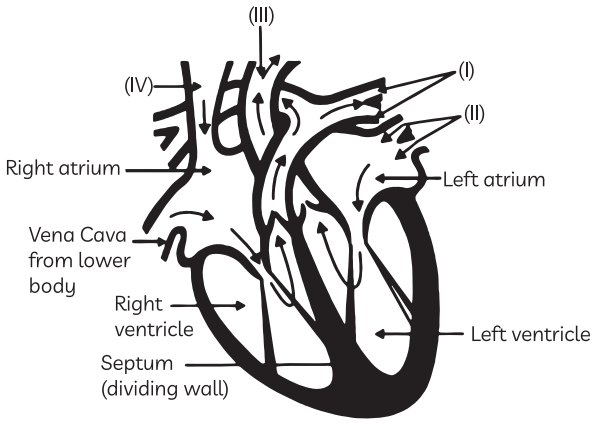
(a) Collapsing of air passage.
(b) Entering of food in wind pipe.
(c) Bacterial infection in the tract.
(d) Entering of microbes.

**14.** Which of the following factors influence ascent of sap?

(I) Root Pressure
(II) Diffusion
(III) Osmotic Pressure
(IV) Transpiration Pull
(V) Turgor pressure

(a) (I), (III), (IV), (V) (b) (I), (IV), (V)
(c) (III), (IV), (V) (d) (I), (IV)

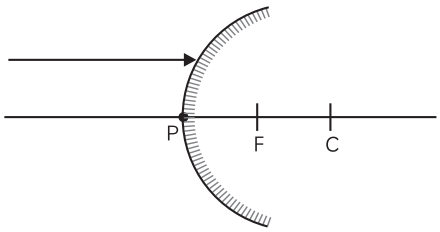
**15.** Carefully study the diagram of the human heart with labels (I), (II), (III) and (IV). Select the option which gives correct identification and its main function.




(a) (I) Pulmonary artery: Carry oxygenated blood from heart to lungs
(b) (II) Pulmonary veins: Carry oxygenated blood from lungs to the heart
(c) (III) Aorta: Carry deoxygenated blood from heart to lungs
(d) (IV) Vena Cava: Carry oxygenated blood from body parts to heart

**16.** What is the final product of protein, carbohydrate and fat digestion?
(a) Protein – Ammonia
Fats – Fatty Acid + Glycerol
Carbohydrates – Glucose
(b) Protein – Amino acid
Fats – Fatty Acid
Carbohydrates – maltose
(c) Protein – Amino acid
Fats – Fatty Acid + Glycerol
Carbohydrates – Glucose
(d) Protein – Ammonia
Fats – Chylomicrons
Carbohydrates – Glucose

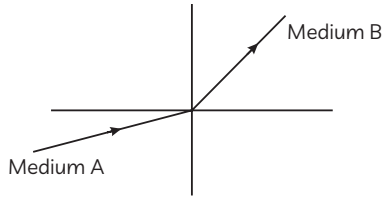
**17.** Study the ray diagram given below and select the correct option.




(a) Parallel to the incident ray
(b) Pass through F
(c) Appear to diverge from F
(d) Appear to diverge from C

**18.** Harsh is standing in front of a unique mirror he finds the image of head smaller the middle portion of her body of the same size and that of the legs bigger. Which of the following is the order of combination for such mirror from the top?
(a) plane, convex and concave
(b) concave, plane and convex
(c) convex, plane and concave
(d) convex concave and plane

**19.** A light ray from medium A to medium B as shown in the given figure. The refractive index of medium B relative to medium A is:




(a) more then one (b) less than one
(c) one (d) zero

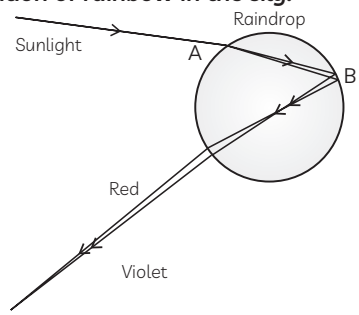
**20.** Shreya is at the distance 15 cm moves slowly towards the pole of a convex mirror. What will be the image in the mirror?
(a) shortened and real
(b) enlarged and real
(c) enlarged and virtual
(d) diminished and virtual

**21.** Planets do not twinkle because:
(a) Planets are not a source of light.
(b) The shift in their position (as compared to stars) is smaller.
(c) they reflect high intensity light reaching them.
(d) both (a) and (b) are true.

**22.** Dispersion of light takes place by a glass prism because:
(a) the light of different colours have different intensities.
(b) the light of different colours have different energies.
(c) the light of different colours have different speed in a medium.
(d) different colours have different frequencies.

**23.** Which colour of light is mainly scattered by large sized particles?
(a) Blue (b) Red
(c) White (d) Violet

**24.** Study the given diagram explaining the formation of rainbow in the sky:




*Rainbow formation*

Select the correct statements w.r.t. the diagram above.

(a) Dispersion occurs at point A

(b) Internal refraction occurs at point B

(c) Internal reflection occurs at point A

(d) Dispersion occurs at point B

## SECTION - B

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

**25.** Which two metals do not corrode easily?

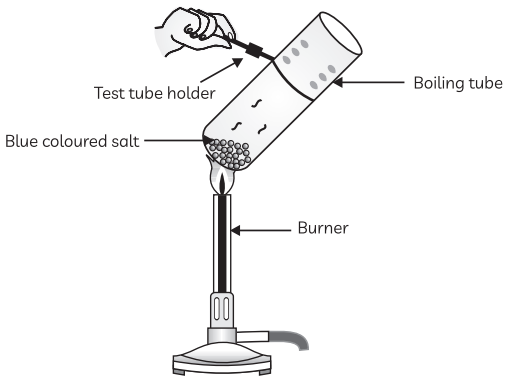
(a) Gold and Platinum

(b) Gold and Iron

(c) Zinc and Iron

(d) Aluminium and Zinc

**26.** A blue coloured salt turns white when heated but regains its blue colour when moistened with water as shown in figure below:




The salt is:

(a) $FeSO_4.7H_2O$

(b) $CuSO_4.5H_2O$

(c) $Na_2CO_3.10H_2O$

(d) $CaSO_4.2H_2O$

**27.** Why is sodium metal never left open in air?

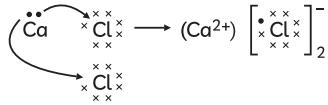
(a) It melts at room temperature.

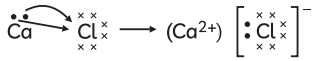
(b) It reacts with moisture present in air violently.

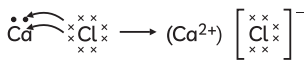
(c) It reacts with oxygen present in air violently.

(d) Both (b) and (c).

**28.** Which of the following option is/are the correct representation of the formula for the compound $CaCl_2$?

(a) 

(b) 

(c) 

(d) Cl—Ca—Cl

**29.** Name the substance obtained by the action of chlorine on dry slaked lime.

(a) Washing soda (b) Hypochloride

(c) Baking soda (d) Bleaching powder

**30.** A salt is obtained using common salt as a raw material. It is used in glass, soap and paper industries and also used in the manufacture of sodium compounds such as borax.

Identify the salt.

(a) Caustic soda

(b) Bleaching powder

(c) Baking soda

(d) Washing soda

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): Baking soda solution is applied on the area stung by bee or ant.

Reason (R): Baking soda is base and neutralises formic acid injected into the area by the insect.

**32.** Assertion (A): Silver bromide is used on photographic and *X*-ray film.

Reason (R): Silver bromide is photosensitive and change to silver and bromine in presence of sunlight and undergoes decomposition reaction.

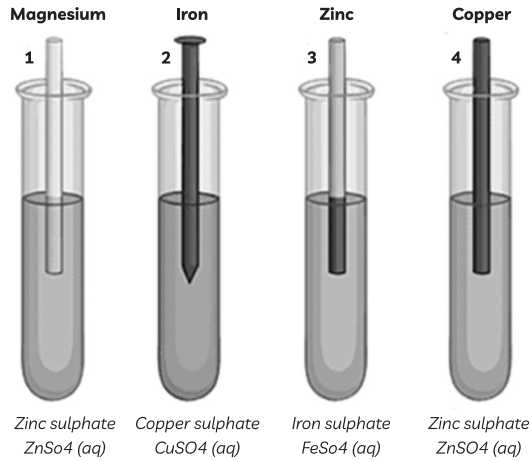
**33.** Assertion (A): When we blow into a test-tube containing lime water, it turns milky.

Reason (R): This shows the presence of $CO_2$ in the exhaled air.

**34.** Assertion (A): The twinkling of starts is due to the fluctuation in the refractive index of the earth's atmosphere.

Reason (R): When light propagates from one medium to another the direction of propagation deviates.

**35.** A student performed an experiment by taking different metals and dipping them in salt solutions in test tubes marked 1, 2, 3 and 4 as shown in the figure below:




Indicate the correct option from the given table which represents any reaction taking place in the test tubes:

| Option | Test Tube-1 | Test Tube-2 | Test Tube-3 | Test Tube-4 |
|---|---|---|---|---|
| (a) | Yes | Yes | No | Yes |
| (b) | Yes | No | Yes | No |
| (c) | Yes | Yes | Yes | No |
| (d) | No | Yes | Yes | No |

**36.** The products of anaerobic respiration in yeast are:

(I) Ethanol

(II) Lactic acid

(III) Carbon dioxide

(IV) Water

(a) Both (I) and (II)

(b) Both (II) and (III)

(c) Both (II) and (IV)

(d) Both (I) and (III)

**37.** Which is the basic filtration unit present in the kidneys.

(a) Neuron (b) Bowman's capsule

(c) Nephrons (d) DCT

**38.** The exchange of material between the blood and surrounding cells takes place through:

(a) Arteries

(b) veins

(c) Capillaries

(d) Nephrons

**39.** 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

**40.** What is the magnification of the images formed by plane mirror?

(a) $m > 1$ (b) $m < 1$

(c) $m = 1$ (d) $m = \infty$

**41.** Four statements on blood are given below. Select the incorrect statements:

(I) Blood is a fluid connective tissue.

(II) Blood consists of a solid medium called plasma in which the cells are suspended.

(III) Plasma transports food, carbon dioxide and nitrogenous wastes in gaseous form.

(IV) Many other substances like salts, are transported by the blood.

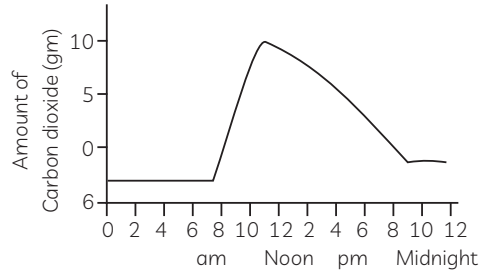
(a) Both (I) and (II)

(b) Both (II) and (III)

(c) Both (III) and (IV)

(d) Both (I) and (IV)

**42.** The given graph show how the amount of carbon dioxide taken in by a plant varies though a 24 hours period.




At what time the rate of photosynthesis is greatest?

(a) 4 pm (b) 10 am

(c) 6 am (d) 12 pm

**43.** The nature of image formed by a spherical mirror for an object OA placed as shown in the figure will be:

(a) Real, inverted and enlarged

(b) Virtual, erect and enlarged

(c) Real, inverted and diminished
(d) Virtual, erect and diminished

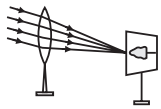
**44.** **Two thin lenses of power + 2.5 D and – 0.5 D are placed in contact. The power and focal length of the lens combination is:**

| Option | Power of Combination | Focal length of Combination |
|---|---|---|
| (a) | +2.0 D | + 50 cm |
| (b) | - 2.0 D | - 50 cm |
| (c) | +3.0 D | + 33.33 cm |
| (d) | - 3.0 D | - 33.33 cm |

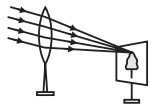
**45.** *Students were asked to determine the focal length of the given concave lens. Four students performed an experiment and obtained an image of a tree, position at same distance from the lens.*

**Which diagram is the correct representation for the formation of the image?**

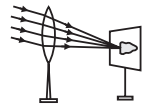
(a)



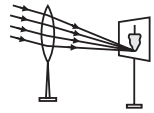
(b)



(c)



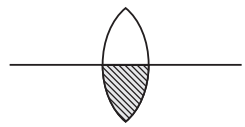
(d)



**46.** **An object is placed at a large distance in front of a convex mirror of radius of curvature 40 cm. What is the distance of image from the mirror?**

(a) 40 cm (b) 20 cm
(c) 60 cm (d) 80 cm

**47.** **The lower half of the lens is covered with black paper. What will be the effect on the image formed on screen?**



(a) the lower half of the image disappears.
(b) the upper half of the image disappears.
(c) the image remains same.
(d) the image becomes less brighter than before.

**48.** **Which metals do not react with water at all?**

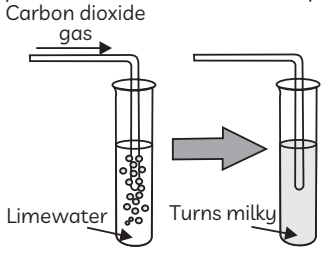
(a) Pb (b) Zn
(c) Cu (d) Both (a) and (c)

## 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:*** *Apoorna took a lime solution and passed a gas 'X' through it. The solution becomes turgid. This solution was then divided into two parts. In the first part, more of gas 'X' was passed. While in the second part concentrated sulphuric acid was added. A white precipitate was formed in second part.*




**49.** **The gas mentioned in above passage is:**

(a) $O_2$ (b) $H_2S$
(c) $CO_2$ (d) $H_2$

**50.** **$Ca(HCO_3)$ is:**

(a) soluble in water
(b) partly soluble in water
(c) insoluble in water
(d) partly insoluble in water

**51.** **Lime water and chlorine reacts to form:**

(a) $CaCl_2$ (b) $CaOCl_2$
(c) $Ca(ClO_3)_2$ (d) $CaO_2Cl_2$

**52.** **Lime water turns milky in the reaction due to the:**

(a) Formation of calcium carbonate
(b) $CO_2$ gas evolved
(c) Formation of calcium bicarbonate
(d) Oxygen gas is evolved

***Q. 53 to 56 are based on Case Study–2***

***Case 2:*** *The biological process involved in the removal of harmful metabolic wastes from the body is called excretion. Different organisms use varied strategies to do this. Many unicellular*

*organisms remove these wastes by simple diffusion from the body surface into the surrounding water while complex multicellular organisms use specialised organs to perform the same function.*

**53.** **The excretory system of human beings include:**

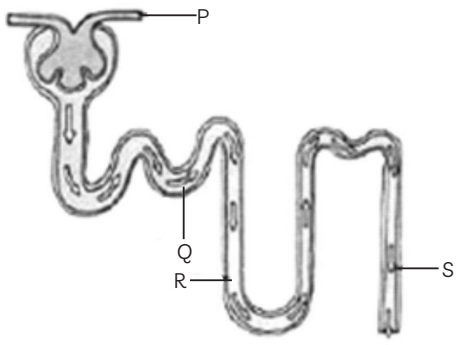
**(a) a pair of kidney, a pair of urinary bladders, a ureter, and a urethra.**

**(b) a kidney, a ureter, a urinary bladder and a urethra.**

**(c) a pair of kidney, a pair of ureters, a pair of urinary bladders and a urethra.**

**(d) a pair of kidney, a pair of ureters, a urinary bladder and a urethra.**

**54.** **The given figure represent the structure of a nephron.**




**Which of the following is responsible for concentrating the solute in the filtrate?**

**(a) Q** **(b) S**

**(c) R** **(d) P**

**55.** **Which of the following statement(s) is (are) true about excretion in human beings?**

**(I) Urine is stored in the urethra until the urge of passing it out.**

**(II) Kidneys are the primary excretory organs.**

**(III) The bladder is muscular, so it is under nervous control.**

**(IV) Each kidney has large numbers of filtration units called nephrons.**

**(a) (I) and (II) only** **(b) (I) and (III) only**

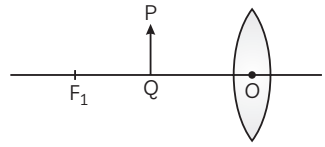
**(c) (II), (III) and (IV)** **(d) (II) and (IV) only**

**56.** **Study the table below and select the incorrect match.**

| Exchange Organs | Substances Excreted |
|---|---|
| (a) Kidneys | Nitrogenous wastes |
| (b) Lungs | Urea |
| (c) Skin | Sweat |
| (d) Oil glands | Sebum |

***Q. 57 to 60 are based on Case Study–3***

***Case 3:*** *Study the given experiment. The formation of an image for an object PQ placed in front of a convex lens is shown in figure.*




**57.** **The image is formed:**

**(a) at force $F_1$**

**(b) at infinity**

**(c) beyond $2F_1$**

**(d) at centre of curvature $C_1$**

**58.** **What will be the nature of the image formed by convex lens:**

**(a) real and inverted, diminished**

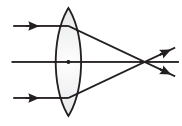
**(b) virtual and erect of same size as that of object**

**(c) real and inverted, magnified**

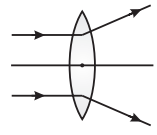
**(d) virtual and erect magnified**

**59.** **Which diagram represent the correct ray diagram:**

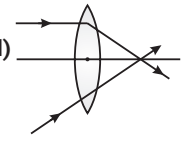
**(I)**



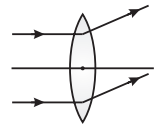
**(II)**



**(III)**



**(IV)**



**(a) (I)** **(b) (II)**

**(c) (III)** **(d) (IV)**

**60.** **If the focal length of the lens is 4 cm and object is placed at 6 cm from optical centre the image will be formed at:**

**(a) 2.4 cm from O** **(b) 4.8 cm from O**

**(c) 24 cm from O** **(d) 48 cm from O**

# SOLUTION
## SAMPLE PAPER - 2

## SECTION - A

**1.** *(c) Both (I) and (III)*

**Explanation:** The reaction between calcium oxide and water is a combination reaction as the two compounds combine to form a single product slaked lime, $Ca(OH)_2$ and the equation of the reaction taking place is:

$CaO_{(s)} + H_2O_{(l)} \rightarrow Ca(OH)_{2(aq)}$ + Heat

It is also an exothermic reaction as a large amount of heat is released during this reaction.

**2.** *(d) Nature of solution A Basic; Nature of Solution B: Acidic*

**Explanation:** The solution A is basic as it acquired a pink colour when a few drops of phenolphthalein indicator were added to it. Since the solution became colourless on adding few drops of B to this solution, the solution B is acidic in nature as a neutralization reaction takes place between acid and base.

**3.** *(b) (II) and (III)*

**Explanation:** $AlCl_3$ and NaCl are ionic compounds while $CCl_4$ and HCl are covalent compounds.

**Caution**

*Al and Na are metals, and Cl, C, H are non-metals. Ionic compounds are formed between metals and non-metals while covalent compounds are formed between non-metals.*

**4.** *(d) 3, 1, 3, 2*

**Explanation:** $3BaCl_2 + Al_2(SO_4)_3 \rightarrow 3BaSO_4 + 2AlCl_3$

**Caution**

*We can use fractional coefficients to balance chemical equation. However, any fractional coefficient of an atom cannot be used directly, as atoms cannot exist in fractional state.*

**5.** *(a) Milk*

**Explanation:** Milk is an acid-forming food as it contains lactic acid. It has a pH of 6 (approx).

**Related Theory**

*An antacid is a substance which neutralise stomach acidity. It is used to relieve heartburn, indigestion and upset stomach.*

**6.** *(a) (II), (III), (IV)*

**Explanation:** Nitrogen gas is an antioxidant, which prevents food from being oxidised. When fats and oils are oxidised, they become rancid and their smell and taste changes.

**Related Theory**

*The rancidity is retarded when food is kept inside the refrigerator since the low temperature does not promote the oxidation reaction.*

**7.** *(c) CuO*

**Explanation:** CuO is getting reduced to metallic Cu by loosing its oxygen.

**8.** *(a) $NaHCO_3$*

**Explanation:** Sodium hydrogen carbonate ($NaHCO_3$) is used as soda-acid fire extinguisher.

**9.** *(c) Statement A and B are correct*

**Explanation:** Bases are bitter in taste and have a soapy touch. Carbon dioxide is acidic in nature. So, it produces acidic salt and water with the bases. Hydrogen gas is evolved by the reaction of zinc with bases. This gas does not extinguish a lightning splinter.

**10.** *(b) Both (I) and (IV)*

**Explanation :** When electric current is passed through acidified water, it undergoes decomposition reaction.

Hydrogen gas is collected over cathode and oxygen gas is collected over anode. The volume of hydrogen gas is double the volume of oxygen gas collected.

The equation for the chemical reaction taking place is:

$$2H_2O_{(l)} \longrightarrow 2H_{2(g)} + O_{2(g)}$$

**11.** *(c) During night*

**Explanation:** Desert plants open up their stomata during night and take in $CO_2$. Stomata remains close during the day time to prevent the loss of water by transpiration. They store the $CO_2$ until the sun comes out and they can carry on with photosynthesis during the day time.

**Related Theory**

*CAM plants (e.g., cacti, pineapple) open their stomata at night time to fix the $CO_2$ in form of organic acids. However, during the light reactions in daytime $O_2$ is evolved while the stomata are closed and there is no way out.*

**12.** *(a) X : Guard Cells; Function of X : Opening and closing of stomatal pore; Y : chloroplast; Function Responsible for photosynthesis.*

**Explanation:** X is guard cells which are responsible for opening and closing of the stomatal pore. Y is chloroplast which contain

the green pigment chlorophyll due to which plants are able to perform photosynthesis.

**13.** *(a) collapsing of air passage*

**Explanation:** Rings of cartilage are present in the throat as it helps the throat from collapsing when there is a low amount of air present.

**Related Theory**

*The cartilaginous rings are C-shaped to allow the trachea to collapse slightly at the opening so that food can pass down the oesophagus.*

**14.** *(d) (I), (IV)*

**Explanation:** Various factors responsible of ascent of sap are capillarity, Root pressure and Transpiration pull.

**Caution**

*The effect of root pressure in transport of water is more important at night. During the day when the stomata are open, the transpiration pull becomes the major driving force in the movement of water in the xylem.*

**15.** *(b) (II) Pulmonary veins: Carry oxygenated blood from lungs to the heart.*

**Explanation:** Pulmonary artery carries deoxygenated blood from the heart to the lungs; Aorta carries oxygenated blood from the heart to the body parts and vena cava carries deoxygenated blood from various body parts to the heart from where it is carried to the lungs for purification.

**16.** *(c) Protein – Amino acid*

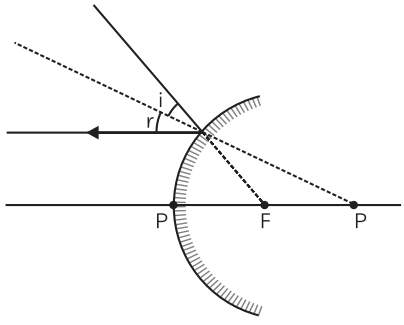
*Fats – Fatty Acid + Glycerol*

*Carbohydrates – Glucose*

**Explanation:** The final product of protein digestion is amino acids, carbohydrate digestion is glucose and fats digestion is fatty acids and glycerol.

**17.** *(c) Appear to diverge from F*

**Explanation:** A ray of light parallel to the principal axis appears to diverge from the principal focus F after reflection from a convex mirror.




**18.** *(b) Concave, plane and convex*

**Explanation:** In concave mirror, virtual image is enlarged and erect. In convex mirror, virtual image formed is diminished and in plane mirror, virtual image formed is of same size as the object.

**19.** *(b) less than one*

**Explanation:** In medium B, light ray bends away from normal. It indicates, medium B is optically rarer than medium A. Thus, speed of light in medium B is more than in medium A.

$$\text{Refractive index } ({}_An_B) = \frac{V_A}{V_B}$$

Since $V_A < V_B$

$\therefore$ ${}_An_B < 1$

**20.** *(d) diminished and virtual*

**Explanation:** Convex mirror always form virtual and diminished image irrespective of position of the object in front of mirror.

**21.** *(d) both (a) and (b)*

**Explanation:** Planets do not twinkle because:

(1) Planets are not a source of light. Instead, they reflect low intensity light reaching them.

(2) They are also closer to the Earth than the distant stars. Hence, the shift due to atmospheric refraction is smaller.

(3) As the planets are closer, planets appear larger in comparison to the stars. Hence, the shift is not enough for the planets to twinkle.

**22.** *(c) the light of different colours have different speed in a medium.*

**Explanation:** A prism works because the different colours of light travel at different speeds inside the glass. Because the colours of light travel at different speeds, they get bent by different amounts and come out all spread out instead of mixed up.

**23.** *(c) White*

**Explanation:** If the size of particles scattering the light is large enough, the scattered light may even appear white.

**Caution**

*Fine particles scatter light of shorter wavelength and larger particles scatter light of longer wavelength. However, if the size of the scattering particles is large enough, then, the scattered light may even appear white.*

**24.** *(a) Dispersion occurs at point A*

**Explanation:** At point A, dispersion occurs while at point B internal reflection occurs.

**Related Theory**

*Rainbows are formed when light from the sun is scattered by water droplets. Refraction occurs when the light from the sun changes direction when passing through a medium denser than air. Once the refracted light enters the raindrop, it is reflected off the back and then refracted again as it exits and travels to our eyes.*

## SECTION - B

**25.** *(a) Gold and Platinum*

**Explanation:** Gold and Platinum are the most stable metals which do not react easily.

**26.** *(b) CuSO4. 5H2O*

**Explanation:** The blue coloured salt is hydrated copper sulphate, CuSO4. 5H2O, which turns white on being heated as it loses its molecules of water of crystallization.

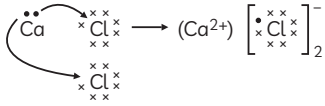
**27.** *(c) It reacts with oxygen present in air violently*

**Explanation:** Because sodium and potassium is very reactive metal and even combines explosively with air at room temperature and catches fire.

**Related Theory**

*Sodium and Potassium are kept immersed in kerosene oil to prevent accidental fires.*

**28.** *(a)*



**Explanation:** $CaCl_2$ is an ionic compound.

**29.** *(d) Bleaching powder*

**Explanation:**

$$Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O$$

Slaked Line — Chlorine — Bleaching powder — Water

**30.** *(d) Washing soda*

**Explanation:** Washing soda or $Na_2CO_3.10H_2O$ is obtained using common salt as a raw material. It is obtained by heating baking soda and recrystallisation of sodium carbonate gives washing soda. It is also a basic salt.

$$Na_2CO_3 + 10H_2O \longrightarrow Na_2CO_3.10H_2O$$

**31.** *(a) Both (A) and (R) true, and (R) is the correct explanation of (A).*

**Explanation:** Bee and ant sting contains formic acid. Baking soda helps to neutralise the acidity of the sting and mitigate inflammation.

**32.** *(a) Both (A) and (R) are true and (R) is the correct explanation of (A).*

**Explanation:** Silver bromide (AgBr), on exposure to light, undergoes photo chemical decomposition reaction. The silver ions produced reduce to silver atoms, which remains as an opaque image on the photographic film.

$$2AgBr \xrightarrow{\text{Sunlight}} 2Ag \downarrow + Br_2$$

**33.** *(c) (A) is true, but (R) is false.*

**Explanation:** When we blow air in lime water the $CO_2$ present in the exhaled air turns (it milky). The milky colour is due to the formation of calcium carbonate.

**34.** *(a) Both (A) and (R) are true and (R) is the correct explanation of (A)*

**Explanation:** The continuously changing atmosphere is able to cause variation in the light coming from a point sized star because of which the star appears to be twinkling.

**35.** *(c) Test Tube–1: Yes; Test Tube–2: Yes; Test Tube–3: No; Test Tube–4: Yes.*

**Explanation:** Displacement reaction will take place in the test tubes marked 1, 2 and 3 as magnesium is more reactive than zinc, iron is more reactive than copper and zinc is more reactive than copper. Whereas, no reaction will take place in the test tube marked 4 as copper being less reactive than zinc will not be able to displace zinc from zinc sulphate solution.

**36.** *(d) Both (I) and (III)*

**Explanation:** Anaerobic respiration takes place in yeast during fermentation and the products are ethanol, carbon dioxide and energy.

**37.** *(c) Nephrons*

**Explanation:** A nephron is the basic structural and functional unit of the kidneys that regulates water and soluble substances in the blood by filtering the blood, reabsorbing what is needed, and excreting the rest as urine.

**38.** *(c) Capillaries*

**Explanation:** Capillaries are the smallest blood vessels that have walls which are one-cell thick. Exchange of material between the blood and surrounding cells takes place across this thin wall. Arteries are the vessels which carry blood away from the heart to various organs of the body.

Veins collect the blood from different organs and bring it back to the heart.

**39.** *(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

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

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

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

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

$$v = -40$$

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

**40.** *(c) m = 1*

**Explanation:** The magnification of the images formed by plance mirrors is 1 as the size of the image is equal to the size of object.

**41.** *(b) Both (II) and (III)*

**Explanation:** Blood consists of a liquid medium called plasma in which the cells are suspended. Plasma transports food, carbon dioxide and nitrogenous wastes in dissolved form.

**42.** *(d) 12 Pm*

**Explanation:** The rate of photosynthesis is greatest at 12 noon as the amount of $CO_2$ taken in was greatest at that time.

**43.** *(b) Virtual, erect and enlarged*

**Explanation:** Here, the focal length = $\frac{R}{2}$ = 15 cm and the object is placed at 10 cm or between the pole and focus of the concave mirror. Therefore, image will be virtual, erect and enlarged or magnified.

**44.** *(a) 2.0 D and + 50 cm respectively*

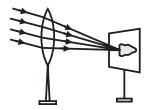
**Explanation:** The power of combination of lenses is given by: P = P1 + P2

Therefore, P = +2.5 – 0.5 = +2.0 D

Focal length is the reciprocal of power.

Therefore, f = ½ m = + 0.5 m = + 50 cm

**45.** *(c)*



**Explanation:** In case of concave ions, when the object is at placed at infinity, the image is formed at the locus of the lens. The nature of the image is real and invented.

**46.** *(d) 80 cm*

**Explanation:** The rays coming from an object placed at large distance can be considered as a parallel rays. After reflection from it, they appear to meet at its focus which is $\frac{40}{2}$ = 20 cm.

**47.** *(d) the image becomes less brighter than before.*

**Explanation:** A complete image of an object will be formed but of less intensity because the light falling on the covered portion will not reach at the images position.

**48.** *(d) Both (a) and (c)*

**Explanation :** Metals such as lead (Pb), Copper (Cu), Silver (Ag) and Gold (Au) do not react with water at all as they lies below hydrogen in activity series.

**Related Theory**

*Metals like aluminium, iron and zinc do not react with water (hot or cold). But they react with steam to form metal oxide and hydrogen.*

## SECTION - C

**49.** *(c) $CO_2$*

**Explanation:** $CO_2$ turns lime water milky.

**50.** *(a) soluble in water*

**Explanation:** Calcium bicarbonate is soluble in water while calcium carbonate is insoluble in water.

**51.** *(b) $CaOCl_2$*

**Explanation:** Lime water reacts with chlorine to form $CaOCl_2$(bleaching powder).

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$

**52.** *(a) Formation of calcium carbonate*

**Explanation:** $\underset{\text{Calcium hydroxide (Lime water)}}{Ca(OH)_2} + \underset{\text{Carbon dioxide}}{CO_{2(g)}} \rightarrow \underset{\text{Calciumcarbonate (white ppt.) (Makes limewater milky)}}{CaCO_{3(s)}} + \underset{\text{Water}}{H_2O(l)}$

**53.** *(d) a pair of kidney, a pair of ureters, a urinary bladder and a urethra*

**Explanation:** The excretory system of human beings includes a pair of kidneys, a pair of ureters, a urinary bladder and a urethra.

**54.** *(c) R*

**Explanation:** In the given diagram, P is renal artery; Q is proximal convoluted tubule; R is loop of Henle and S is collecting tubule.

**Related Theory**

*The proximal convoluted tubule does not alter solute concentration and the distal vonvoluted tubule decreases solute concentration in the filtrate. It is the loop of Henle (descending and ascending limbs), which is responsible for concentrating or diluting the tubular fluid using a process called counter current mechanism.*

**55.** *(c) (II), (III) and (IV)*

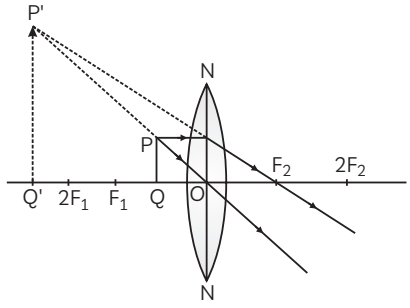
**Explanation:** Urine is stored in the urinary bladder until the pressure of the expanded bladder leads to the urge to pass it out through the urethra.

**56.** *(b) Lungs; Substances Excreted: Urea*

**Explanation:** Lungs excrete carbon dioxide from the blood.

**57.** *(c) beyond $2F_1$*

**Explanation:** The formation of image is as shown below




Hence, the position of the image is beyond $2F_1$ on the same side of the object.

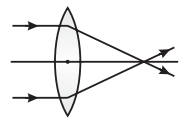
**58.** *(b) virtual and erect magnified*

**Explanation:** The nature of the image formed by convex lens, in the case is virtual and erect. The size of image is larger then that of the object *i.e.*, magnified image will be formed.

**Caution**

➥ *Convex lens always formed virtual and errect image.*

**59.** *(a) (l)*



**Explanation:** The convex lens has the property beam of light rays as a point *i.e.* focus the lens.

**60.** *(a) 2.4 cm from O*

**Explanation:**

$$f = 4 \text{ cm}$$
$$u = 6 \text{ cm}$$
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \text{ or } \frac{1}{v} = \frac{1}{f} + \frac{1}{u}$$
$$\frac{1}{v} = \frac{1}{4} + \frac{1}{6}$$
$$= \frac{4+6}{24} = \frac{10}{24}$$
$$\Rightarrow \quad v = 2.4 \text{ cm}$$