CBSE Sample Question Paper Term 1

Class – X (Session : 2021 - 22)

SUBJECT - SCIENCE - 086 - TEST - 01

Class 10 - Science

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 40**

General Instructions:

1. The Question Paper contains three sections.
2. Section A has 24 questions. Attempt any 20 questions.
3. Section B has 24 questions. Attempt any 20 questions.
4. Section C has 12 questions. Attempt any 10 questions.
5. All questions carry equal marks.
6. There is no negative marking.

Section A

Attempt any 20 questions

1. The pale green colour of the solution after half an hour when iron nails are dipped in copper sulphate solution is due to the formation of **[0.8]**

   a) FeS
   b) FeS_2
   c) $FeSO_3$
   d) $FeSO_4$

2. The steps involved in making a slide of the epidermal peel of leaf are given as follows: **[0.8]**

   A. Pull out a thin peel from the lower surface of the leaf.
   B. Place a drop of glycerine on the slide.
   C. Stain the peel in safranin.
   D. Place the stained peel of the glycerine.
   E. Remove the extra stain by washing with water.
   F. Place the coverslip over the peel.

   Which one is the correct sequence of steps to be followed?

   a) A, B, C, D, E, F
   b) A, B, D, C, E, F
   c) A, C, E, B, D, F
   d) A, C, D, B, E, F

3. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple color of the solution fades and finally disappears. Which of the following is the correct explanation for the observation? **[0.8]**

   a) $FeSO_4$ acts as an oxidising agent and oxidises $KMnO_4$
   b) $KMnO_4$ is an oxidising agent, it oxidises $FeSO_4$
   c) $KMnO_4$ is an unstable compound and
   d) The colour disappears due to dilution; no reaction is involved

decomposes in presence of $FeSO_4$ to

a colourless compound.

4. A student obtained a sharp image of the grill of a window in the laboratory on a screen, using a convex lens. For getting better results, her teacher suggested focusing on a distant tree instead of the grill. In which direction should the lens be moved for this purpose to get a sharp image on the screen? **[0.8]**

a) behind the screen

b) very far away from the screen

c) towards the screen

d) away from the screen

5. While performing an experiment to determine the percentage of water absorbed by raisins, the following data was obtained: Mass of water taken in the beaker = 50 g Mass of raisins before soaking them in water = 5 g Mass of raisins after soaking in water for 2 hours = 8 g. The percentage of water absorbed by raisins would be : **[0.8]**

a) $\frac{(8-5)g}{8g} \times 100$

b) $\frac{(8-5)g}{5g} \times 100$

c) $\frac{(8-3)g}{8g} \times 100$

d) $\frac{(8-5)g}{3g} \times 100$

6. Under which of the following conditions a concave mirror can form an image larger than the actual object? **[0.8]**

a) When object is kept at a distance greater than its radius of curvature

b) When object is placed between the focus and centre of curvature

c) When the object is kept at a distance equal to its radius of curvature

d) When object is kept at a distance less than its focal length

7. Phenomenon responsible for the twinkling of stars **[0.8]**

a) Atmospheric refraction

b) Internal refraction

c) None of these

d) Regular refraction

8. Name a body part where anaerobic respiration takes place. **[0.8]**

a) Mitochondria

b) Chloroplast

c) Protoplasm

d) Cytoplasm

9. The critical angle for diamond is **[0.8]**

a) 93^o

b) 180^o

c) 50^o

d) 24^o

10. Which colour of light has the longest wavelength? **[0.8]**

a) Violet

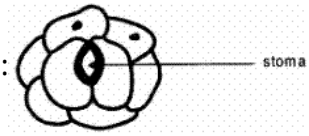
b) Green

c) Yellow

d) Red

11. A student had drawn the diagram of stomata as shown below in a hurry. He could not be given full marks as he **[0.8]**

:



a) did not label the stoma in its correct position

b) forgot to draw nuclei in guard cells and also to label the diagram

c) did not draw nuclei, in guard cells and other cells

d) should have drawn nuclei and chloroplasts in guard cells and nuclei in all epidermal cells

12. Aluminum is used for making cooking utensils. Which of the following properties of aluminum are responsible for the same? **[0.8]**

i. Good thermal conductivity
ii. Good electrical conductivity
iii. Ductility
iv. High melting point

a) (i) and (ii)

b) (i) and (iii)

c) (ii) and (iii)

d) (i) and (iv)

13. Which of the following phenomena of light are involved in the formation of a rainbow? **[0.8]**

a) Refraction, dispersion and total internal reflection

b) Refraction, dispersion and internal reflection

c) Dispersion, scattering and total internal reflection

d) Reflection, refraction and dispersion

14. The chemical used to test the starch: **[0.8]**

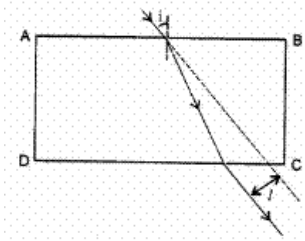
a) Methyl alcohol

b) Safranin

c) Glycerine

d) Iodine

15. A student traces the path of a ray of light passing through a rectangular glass slab for three different values of angle of incidence (i) namely 30^o, 45^o, 60^o. He produces the incident ray and measures the perpendicular distance, l, between the produced incident ray and the emergent ray. **[0.8]**



He will observe that

a) '*l*' keeps on increasing with increase in angle of incidence.

b) 'l' keeps on decreasing with increase in angle of incidence.

c) 'l' remains the same for all three angles of incidence.

d) 'l' is maximum for $\angle i = 45^o$ and is less than this value both for $\angle i = 30^o$and for $\angle i = 60^o$.

16. When you place an iron nail in copper sulphate solution, the reddish-brown coating formed on the nail is **[0.8]**

a) Smooth and shiny
b) Rough and granule
c) Soft and dull
d) Hard and flaky

17. If a pencil beam is allowed to fall along the principal axis of a concave mirror, the ray will **[0.8]**

a) emerge out along the principal axis
b) deviate by 60^o
c) retrace its path along the principal axis
d) deviate by 30^o

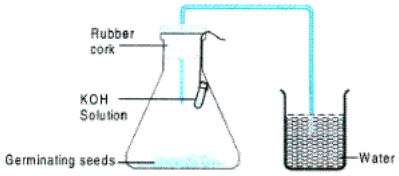
18. If the angle of incidence is increased for a pair of air – glass interface, then the angle of refraction will **[0.8]**

a) increase
b) remains the same
c) decrease
d) first increases and then decreases

19. What is the spectrum of white light? **[0.8]**

a) The band of 7 colours.
b) None of these
c) The band of 6 colours.
d) The band of 5 colours.

20. **[0.8]**



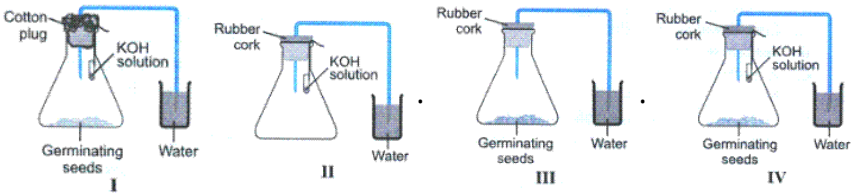
In the experimental set-up shown above, KOH solution has been kept in the flask to

a) absorb carbon dioxide so as to create a particle vacuum
b) react with water to generate oxygen.
c) remove impurities present in the air in the flask
d) create a dry atmosphere for wet germinating seeds

21. Which acid is present in fatigued muscles? **[0.8]**

a) Citric acid
b) All of these
c) Acetic acid
d) Lactic acid

22. Out of the four experimental set-up shown below, which one will demonstrate the evolution of carbon dioxide during respiration of germinating seeds ? **[0.8]**



a) III
b) II
c) IV
d) I

23. If parallel beams, non-parallel to principal axis fall on the convex lens, they converge at a point: **[0.8]**

a) away from principal axis
b) called focus on the axis
c) on principal axis
d) centre of curvature

24. Which is the correct condition for the total internal reflection to occur? **[0.8]**

a) All of these
b) light should pass from rarer to denser medium
c) light should pass from denser to rarer medium
d) Critical angle should be greater than angle of incidence

Section B

Attempt any 20 questions

25. Solid sodium bicarbonate was placed on a strip of pH paper. The colour of the strip **[0.8]**

a) turned blue
b) turned light pink
c) did not change
d) turned green and suddenly yellow

26. Dry HCl gas does not show acidic nature because **[0.8]**

a) it is dry
b) it does not ionize to form H^+ and Cl^- ions
c) it is a polar covalent compound
d) it is a gas

27. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset? **[0.8]**

a) Scattering of light
b) Total internal reflection of light
c) Dispersion of light
d) Reflection of light from the earth

28. Which one of the following properties is not generally exhibited by ionic compounds? **[0.8]**

a) Electrical conductivity in solid state
b) Electrical conductivity in molten state
c) Solubility in water
d) High melting and boiling points

29. Which of the following statements is not correct? **[0.8]**

a) Some metals react with acids to give salt and hydrogen.
b) Some non metal oxides react with water to form an acid.
c) All metal carbonates react with acid to give a salt, water and carbon dioxide.
d) All metal oxides react with water to give salt and acid.

30. Which among the following statement(s) is(are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to **[0.8]**

i. the formation of silver by decomposition of silver chloride
ii. sublimation of silver chloride
iii. decomposition of chlorine gas from silver chloride
iv. oxidation of silver chloride

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

31. **Assertion (A):** Phenolphthalein gives pink colour in basic solution. **[0.8]**

Reason (R): Phenolphthalein is a natural indicator.

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.

32. **Assertion (A):** When a piece of copper metal is added to dilute sulphuric acid, the solution turns blue. **[0.8]**

Reason (R): Copper reacts with dilute sulphuric acid to form copper (II) sulphate solution.

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.

33. **Assertion (A):** In human heart, there is no mixing of oxygenated and deoxygenated blood. **[0.8]**

Reason (R): Valves are present in the heart which allows the movement of blood in one direction only.

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.

34. **Assertion (A):** Higher is the refractive index of a medium or denser the medium, lesser if the velocity of light in that medium. **[0.8]**

Reason (R): Refractive index is inversely proportional to velocity.

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.

35. **Assertion (A):** The blue colour of the sky appears due to the scattering of blue colour. **[0.8]**

Reason (R): Blue light has a longer wavelength.

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.

36. Name the substance which on treatment with chlorine (Cl) yields bleaching powder. **[0.8]**

a) CaO

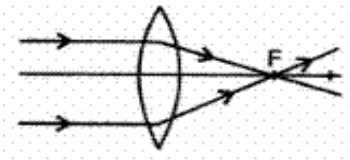
b) $\mathrm{Ca(OH)_2}$

c) CuO

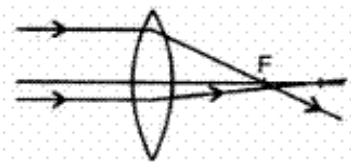
d) $\mathrm{CaCO_3}$

37. Which of the following diagrams give a correct picture? **[0.8]**

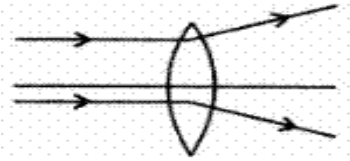
a)



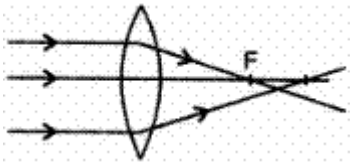
b)



c)



d)



38. In the sketch of the stomatal apparatus given below **[0.8]**

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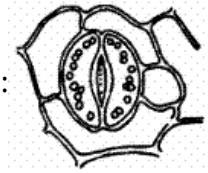


Which one of the following is missing?

a) Chloroplasts in the guard cells
b) Cell walls of the cells
c) Cell membranes of the cells
d) Nuclei in the guard cells

39. On covering a portion of a lens with a black sheet: **[0.8]**

a) size depending on the coverage area
b) a full image is formed
c) full image of reduced brightness is formed
d) full image of increased brightness is formed

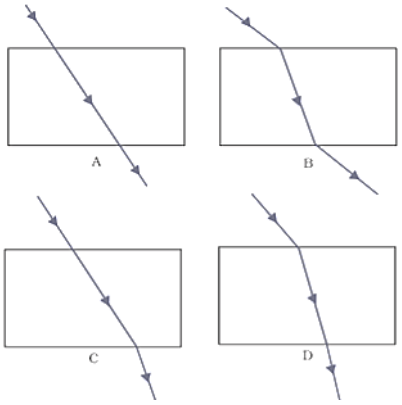
40. When carbon dioxide gas is passed through a calcium hydroxide solution it forms **[0.8]**

a) calcium carbonate
b) calcium
c) calcium bicarbonate
d) calcium chloride

41. A student obtains a blurred image of an object on a screen by using a concave mirror. In order to obtain a sharp image on the screen, he will have to shift the mirror. **[0.8]**

a) towards the screen
b) to a position very far away from the screen
c) depending upon the position of the object
d) away from the screen

42. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C, and D in Figure. Which one of them is correct? **[0.8]**



a) B
b) C
c) D
d) A

43. Which component of blood transports, carbon dioxide, and nitrogenous wastes in dissolved form? **[0.8]**

a) RBC
b) Plasma
c) Platelets
d) WBC

44. Given below are few steps (not in proper sequence) followed in the determination of the **[0.8]**

focal length of a given convex lens by obtaining a sharp image of a distant object:

A. Measure the distance between the lens and screen

B. Adjust the position of the lens to form a sharp image

C. Select a suitable distant object

D. Hold the lens between the object and the screen with its faces parallel to the screen

The correct sequences of steps for determination of focal length are:

a) C, D, B, A

b) C, A, B, D

c) A, B, C, D

d) C, A, D, B

45. Raisins are soaked in water for determining the percentage of water absorbed by raisins. The formula, used by a student, for calculating the percentage of water absorbed is: **[0.8]**

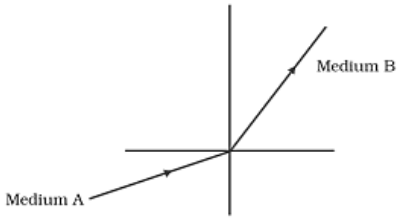
a) $\frac{Initial\ weight\ -\ final\ weight}{Initial\ weight} \times 100$

b) $\frac{Initial\ weight\ -Final\ weight}{Final\ weight} \times 100$

c) $\frac{Final\ weight\ -\ Initial\ weight}{Final\ weight} \times 100$

d) $\frac{Final\ weight\ -\ Initial\ weight}{Initial\ weight} \times 100$

46. A light ray enters from medium A to medium B as shown in Figure. The refractive index of medium B relative to A will be **[0.8]**



a) equal to unity

b) less than unity

c) greater than unity

d) zero

47. The clear sky appears blue because **[0.8]**

a) Violet and blue lights get scattered more than lights of all other colours by the atmosphere.

b) Blue light gets absorbed in the atmosphere.

c) Light of all other colours is scattered more than the violet and blue colour lights by the atmosphere.

d) Ultraviolet radiations are absorbed in the atmosphere.

48. Alloys are homogeneous mixtures of a metal with a metal or nonmetal. Which among the following alloys contain non-metal as one of its constituents? **[0.8]**

a) Amalgam

b) Steel

c) Bronze

d) Brass

Section C

Attempt any 10 questions

Question No. 49 to 52 are based on the given text. Read the text carefully and answer the questions:

In a redox reaction, both oxidation, as well as reduction, takes place together, oxidation involves loss of electrons while reduction involves the gain of electrons. The redox- reaction may involve a combination

of atoms and molecules, displacement of metals, or non-metals.
Example: $CuSO_4 + Zn \longrightarrow ZnSO_4 + Cu$
displacement of Cu metal from its compound.

49. In the above equation, which of the following gets reduced? **[0.8]**

a) Zn
b) $ZnSO_4$
c) $CuSO_4$
d) Cu

50. The oxidising agent generally: **[0.8]**

a) both gains the electron and is in a gaseous state
b) is in a gaseous state
c) gains the electron
d) loses the electrons

51. Identify the oxidising agent and reducing agent in the above reaction **[0.8]**

a) Zinc, Copper
b) Zinc, Zinc
c) Copper, Zinc
d) Copper, Copper

52. Identify the type of reaction. **[0.8]**

a) Displacement reaction
b) Addition reaction
c) Double displacement reaction
d) Substitution reaction

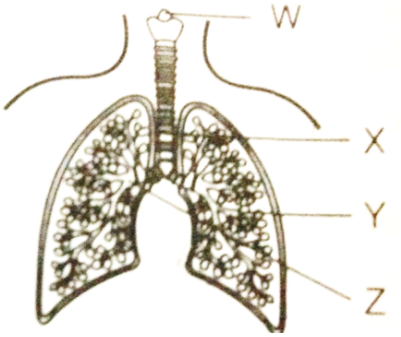
Question No. 53 to 56 are based on the given text. Read the text carefully and answer the questions:

Breathing in humans involves three steps- Inspiration, gaseous exchange, and expiration. When we breathe in, ribs move up and flatten the diaphragm due to which the chest cavity increases. As a result, air moves into the lungs. During gaseous exchange haemoglobin binds with the oxygen and carries it along with the blood in the body. Oxygen diffuses into the cell and carbon dioxide diffuses into the blood. It is then carried to the lungs for expiration. During expiration, ribs move down and the diaphragm becomes dome-shaped decreasing the chest cavity thus pushing the air out of the lungs.

53. What is the correct sequence of air passage during inhalation? **[0.8]**

a) Nostrils $\longrightarrow$ Pharynx $\longrightarrow$ Larynx $\longrightarrow$ Trachea $\longrightarrow$ Alveoli
b) Nostrils $\longrightarrow$ Larynx $\longrightarrow$ Pharynx $\longrightarrow$ Trachea $\longrightarrow$ Lungs
c) Nasal passage $\longrightarrow$ Trachea $\longrightarrow$ Pharynx $\longrightarrow$ Larynx $\longrightarrow$ Alveoli
d) Larynx $\longrightarrow$ Nostrils $\longrightarrow$ Pharynx $\longrightarrow$ Lungs

54. The diagram shows part of the human gas exchange system. **[0.8]**



What are W, X, Y, and Z?

a) Bronchus-X, Bronchiole-Z, Larynx-Y, trachea-W

b) Bronchus-W, Bronchiole-X, Larynx-Z, trachea-Y

c) Bronchus-Y, Bronchiole-W, Larynx-X, trachea-Z

d) Bronchus-Z, Bronchiole-Y, Larynx-W, trachea-X

55. In which organism the cell membrane acts as the respiratory surface? **[0.8]**

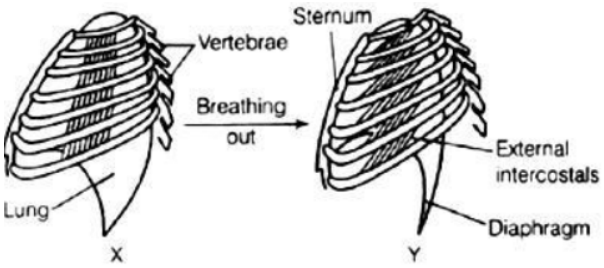
a) Lizards

b) Amoeba

c) Earthworms

d) Fish

56. The diagram shows the ribs and some of the muscles used in breathing: **[0.8]**



Which muscle relaxes in moving from position X to position Y?

a) Diaphragm-No, Intercostal muscle-No

b) Diaphragm-No, Intercostal muscle-Yes

c) Diaphragm-Yes, Intercostal muscle-Yes

d) Diaphragm-Yes, Intercostal muscle-No

Question No. 57 to 60 are based on the given text. Read the text carefully and answer the questions:

Non-metals are either solids or gases. Non-metal can exist in different forms such as carbon. Each form is called allotrope. Alkali metal is so soft that it can be cut with a knife. They have low density and low melting point. Some metal can melt if they are kept in the palm.

57. Which of the following non-metal is liquid? **[0.8]**

a) Oxygen

b) Iodine

c) Hydrogen

d) Bromine

58. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be: **[0.8]**

a) calcium

b) silicon

c) carbon

d) iron

59. Which of the following pair of reactants can undergo a displacement reaction under appropriate condition? **[0.8]**

a) $ZnSO_4$ + Fe

b) $MgSO_4$ + Pb

c) $MgSO_4$ + Fe

d) $CuSO_4$ + Fe

60. Which of the following is the allotrope of carbon? **[0.8]**

a) Diamond

b) Graphite

c) None of these

d) Both Diamond and Graphite

Solution

SUBJECT - SCIENCE - 086 - TEST - 01

Class 10 - Science

Section A

1. **(d)** $FeSO_4$

   Explanation: Copper Sulphate Solution ($CuSO_4$) is blue in colour. When an iron nail is placed in it, we can observe the following:

   i. reddish-brown deposits on iron (these are of Copper)
   ii. colour of the solution turns from blue to light green.

   The formula for this reaction is: Fe + $CuSO_4 \rightarrow FeSO_4$ + Cu

   Here, Fe is more reactive than Cu. So Fe displaces Cu to form Iron Sulfate and Copper.

2. **(c)** A, C, E, B, D, F

   Explanation: Real Lab Procedure

   A. Pluck a fresh leaf from a balsam plant.
   B. Fold the leaf and carefully tear along the bruised area of the lower side of the leaf.
   C. We can see a colourless narrow border along the torn edge.
   D. Carefully pull out the thin membranous transparent layer from the lower epidermis using a forceps.
   E. Put the epidermis into a watch glass containing distilled water.
   F. Take few drops of Safranin solution using a dropper and transfer this into another watch glass.
   G. Using a brush transfer the epidermis into the watch glass containing the Safranin solution.
   H. Keep the epidermis for 30 sec in the Safranin solution to stain the peel.
   I. To remove excess stain sticking to the peel, place it again in the watch glass containing water.
   J. Place the peel onto a clean glass slide using the brush.
   K. Take a few drops of glycerine using a dropper and pour this on the peel.
   L. Using a needle, place a coverslip over the epidermis gently.
   M. Drain out the excess glycerine using a blotting paper.
   N. Take the glass slide and place it on the stage of the compound microscope.
   O. Examine the slide through the lens of the compound microscope.

   So, A, C, E, B, D, F is the correct sequence for a temporary mount of a leaf peel.

3. **(b)** $KMnO_4$ is an oxidising agent, it oxidises $FeSO_4$

   Explanation: In this reaction potassium permanganate is an oxidizing agent. The purple color appeared due to potassium permanganate when all the permanganate solution is utilized.

4. **(c)** towards the screen

   Explanation: When the image distance increases, object distance decreases. Thus, the distance between the mirror and screen will decrease. So, the mirror should be moved towards the screen.

5. **(b)** $\frac{(8-5)g}{5g} \times 100$

   Explanation: $\frac{w_2-w_1}{w_1} \times 100$

   = $\frac{8-5}{5} \times 100$

   = $\frac{3}{5} \times 100$

   = 60%

6. **(b)** When object is placed between the focus and centre of curvature

   Explanation: When an object is placed between F and C an enlarged image is formed beyond C.

7. **(a)** Atmospheric refraction

   Explanation: Twinkling of stars is due to atmospheric refraction. Distant star acts like a point source of light. When the starlight enters the earth's atmosphere it undergoes refraction continuously, due to changing refractive index i.e. from Rarer to denser medium. It bends towards the normal successively, hence the amount of light enters our eyes fluctuates sometimes bright and sometimes faint.

8. **(d)** Cytoplasm
Explanation: Cellular Respiration is divided into two series of biochemical reactions: anaerobic and aerobic reactions. Anaerobic reactions occur in the cytoplasm of the cell and aerobic reactions occur in the mitochondria of the cells.

9. **(d)** 24^o
Explanation: The critical angle for diamond is equal to 24.4^o (approx. 24^o), so that once the light gets into diamond, it is very likely to be totally reflected internally. By cutting the diamond suitably, multiple internal reflections can be made to occur.
As the sine of the critical angle is equal to the reciprocal of the refractive index of that material i.e.
$\sin c = \frac{1}{\mu}$ or $c = \sin^{-1}\left(\frac{1}{\mu}\right)$
$c = \sin^{-1}\left(\frac{1}{2.42}\right)$ [refractive index of diamond = 2.42]
$c = \sin^{-1}(0.413)$
$c = 24.4^o$

10. **(d)** Red
Explanation: Violet has the shortest wavelength and red has the longest wavelength.

11. **(d)** should have drawn nuclei and chloroplasts in guard cells and nuclei in all epidermal cells
Explanation: Guard cells contains nuclei and chloroplast.

12. **(d)** (i) and (iv)
Explanation: Aluminium has good thermal conductivity and high melting point. These properties are useful in the making of utensils. The commonly used metals in making utensils are copper, steel (an alloy of iron) and aluminium.
Copper and aluminium are the most preferred due to their conduction of heat.

13. **(b)** Refraction, dispersion and internal reflection
Explanation: Rainbow is formed due to the phenomena: Refraction, dispersion, and total internal reflection due to falling of sunlight on rain droplets.

14. **(d)** Iodine
Explanation: Iodine makes starch blue-black.

15. **(a)** '*l*' keeps on increasing with increase in angle of incidence.
Explanation: $l \propto \sin(i - r)$ where r is the angle of refraction.

16. **(c)** Soft and dull
Explanation: When you dip an iron nail in $CuSO_4$, iron replaces copper from $CuSO_4$, since it is more reactive than copper. The displaced copper gets deposited on the nail, which is soft and dull in nature.
$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

17. **(c)** retrace its path along the principal axis
Explanation: The angle of incidence for a ray along the principal axis is zero and so will be the reflection angle. So the ray will retrace its path.

18. **(a)** increase
Explanation: According to Snell's law, ratio of the sine of the angle of incidence to the sine of the angle of refraction is always constant for a given pair of media. Therefore, if the angle of incidence increases, the angle of refraction also increases proportionally to the increase of incidence.

19. **(a)** The band of 7 colours.
Explanation: When a white light is passed through a prism it gets split into combination of seven colours which is known as the spectrum. The colors of the spectrum of white light are those seen in a rainbow. They are usually named in order as: red, orange, yellow, green, blue, indigo and violet.

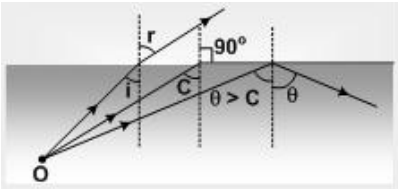
20. **(a)** absorb carbon dioxide so as to create a particle vacuum
Explanation: Carbon dioxide produced during respiration is absorbed by KOH. KOH is used to absorb the carbon dioxide released during respiration of germinating seeds which creates a vacuum in the flask.

21. **(d)** Lactic acid
Explanation: Lactic acid is a byproduct of anaerobic metabolism, in which the body produces energy without using oxygen. It is responsible for muscle fatigue and also tissue damage induced by the lactic acid following an intense workout.

22. **(c)** IV
Explanation: Presence of KOH solution, germinating seeds and rubber cork in conical flask and water in beaker.

23. **(a)** away from principal axis
Explanation: If these parallel beams non-parallel to the principal axis fall on the convex lens, one may pass through the optic centre and pass without any deviation. another may pass through focus and after refraction passes parallel to the principal axis. so they converge at a point away from the principal axis.

24. **(c)** light should pass from denser to rarer medium
Explanation: The two conditions for total internal reflection are:
i. The ray of light must travel from a denser medium into a rarer medium.
ii. The angle of incidence in the denser medium must be greater than the critical angle for that pair of media.



Section B

25. **(c)** did not change
Explanation: Solid $NaHCO_3$ does not change pH paper. It changes only in aqueous solution.

26. **(b)** it does not ionize to form H^+ and Cl^- ions
Explanation: When HCL is dissolved in water, ionization is facilitated which leads to the formation of H^+ and Cl^- ions. Further H^+ ions are hydrated in water to form hydronium ion. In dry HCl, no ionization can be seen. So no hydrogen ion is present in dry HCl. Due to which dry HCl has no action on litmus.
The acidic character of a compound depends upon whether H^+ ions are produced in solution. Dry HCl gas does not ionize hence does not show acidic nature.

27. **(a)** Scattering of light
Explanation: At Sunrise or Sunset, the reddish appearance of Sun is due to the scattering of light, and since Red color has the highest wavelength and is scattered least.

28. **(a)** Electrical conductivity in solid state
Explanation: Ionic compounds such as NaCl have a high melting point and high boiling point.
They are generally soluble in water than other organic solvents since water being polar covalent in nature breaks the ionic bonds.
Ionic compounds are good conductors of electricity in their molten state but not in their solid-state.

29. **(d)** All metal oxides react with water to give salt and acid.
Explanation: Metal oxides are basic in nature. They give alkaline solution when dissolved in water.

30. **(d)** (i) only
Explanation: When silver chloride is exposed to sunlight, it is decomposed to form silver. During this reaction, white silver chloride changes into greyish white silver metal. This is also known as photolytic decomposition reaction as it takes place in the presence of sunlight.

31. **(c)** A is true but R is false.
Explanation: Because H_2SO_4 is a strong acid, it readily forms hydronium ions when dissolved in water which are responsible for its corrosive action.

32. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: When a piece of copper metal is added to dilute sulphuric acid, the solution turns blue. It is

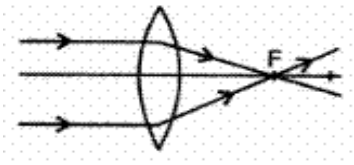
because copper reacts with dilute sulphuric acid to form blue copper (II) sulphate solution.

33. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: There is no mixing of oxygenated and deoxygenated blood due to the presence of inter-auricular and interventricular septum. On the other hand, valves are present in the heart which allows the movement of blood in one direction only.

34. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: According to Snell's law,
$\frac{\sin i}{\sin r} = \frac{n_2}{n_1} = \frac{c/v_2}{c/v_1} = \frac{v_1}{v_2}$
$n_1v_1 = n_2v_2$
This shows that the higher is the refractive index of a medium or denser the medium, lesser is the velocity of light in that medium.

35. **(c)** A is true but R is false.
Explanation: A is true but R is false.

36. **(b)** $\mathrm{Ca(OH)_2}$
Explanation: Bleaching powder is prepared by passing chlorine gas over dry slaked lime.
$\underset{\text{slaked lime}}{Ca(OH)_2} + Cl_2 \rightarrow \underset{\text{bleaching powder}}{CaOCl_2} + H_2O$

37. **(a)** 

Explanation: All rays passing parallel to the axis will pass through the focus after refraction in the lens.

38. **(d)** Nuclei in the guard cells
Explanation: Each guard cell has nucleus and chloroplast but in the figure nucleus is absent.

39. **(c)** full image of reduced brightness is formed
Explanation: There will be a drop in the intensity due to less light crossing the lens, but full image is formed as the light from every point of the object will reach the lens.

40. **(a)** calcium carbonate
Explanation: Calcium hydroxide is partially soluble in water and makes water alkaline or basic on the pH scale. If CO_2 is bubbled through lime water it reacts with the calcium hydroxide to produce calcium carbonate. The chemical reaction is shown below.
$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$

41. **(a)** towards the screen
Explanation: The blurred image is seen only when the separation between the screen and mirror is less than the focal length.

42. **(a)** B
Explanation: Snell's law gives the relationship between angles of incidence and refraction for a wave impinging on an interface between two media with different indexes of refraction.
Thus, light bends towards normal when it passes from air to glass. Light bends away from normal when it passes from glass to air.

43. **(b)** Plasma
Explanation: Carbon dioxide and nitrogen wastes transported through the blood by dissolving in plasma in water-soluble simpler molecular form, as CO_2 can dissolve with the nitrogen wastes or bind easily with the plasma proteins.

44. **(a)** C, D, B, A
Explanation: Unless an object is chosen and the setting of lens and screen is proper, image distance and thereby the focal length cannot be found.

45. **(d)** $\frac{Final\ weight\ -\ Initial\ weight}{Initial\ weight} \times 100$
Explanation: Let the weight of raisins before d experiment be w_1 let the weight of raisins after they have soaked water be w_2 percentage of water absorbed= $\frac{w_2\ -w_1}{w_1} \times 100$.

46. **(b)** less than unity
Explanation: Here the ray of light bends away from normal when it enters from medium A into medium B. This shows that medium B is optically rarer than medium A. Thorofore, spood of light in modium B is more than speod of light in medium A. So, ratio of speed of light in medium A to speed of light in medium B will be less than one.

47. **(a)** Violet and blue lights get scattered more than lights of all other colours by the atmosphere.
Explanation: The clear sky is blue in color because blue light is scattered more than other colour of light by molecules of air.

48. **(b)** Steel
Explanation: Steel is an alloy of metal iron and non metal carbon which makes it widely used in making utensils,pipes,conduits and various other purposes.

Section C

49. **(c)** $CuSO_4$
Explanation: $CuSO_4$

50. **(c)** gains the electron
Explanation: gains the electron

51. **(c)** Copper, Zinc
Explanation: Copper, Zinc

52. **(a)** Displacement reaction
Explanation: Displacement reaction

53. **(a)** Nostrils $\longrightarrow$ Pharynx $\longrightarrow$ Larynx $\longrightarrow$ Trachea $\longrightarrow$ Alveoli
Explanation: Nostrils $\longrightarrow$ Pharynx $\longrightarrow$ Larynx $\longrightarrow$ Trachea $\longrightarrow$ Alveoli

54. **(d)** Bronchus-Z, Bronchiole-Y, Larynx-W, trachea-X
Explanation: Bronchus-Z, Bronchiole-Y, Larynx-W, trachea-X

55. **(b)** Amoeba
Explanation: Amoeba

56. **(c)** Diaphragm-Yes, Intercostal muscle-Yes
Explanation: Diaphragm-Yes, Intercostal muscle-Yes

57. **(d)** Bromine
Explanation: Bromine

58. **(a)** calcium
Explanation: calcium

59. **(d)** $CuSO_4$ + Fe
Explanation: $CuSO_4$ + Fe

60. **(d)** Both Diamond and Graphite
Explanation: Both Diamond and Graphite