CBSE Sample Question Paper Term 1

Class – VIII (Session : 2021 - 22)

SUBJECT - SCIENCE - 086 - TEST - 02

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. Some crystals of copper sulphate were dissolved in water. The colour of the solution obtained would be: **[0.8]**

   a) Green
   b) Red
   c) Brown
   d) Blue

2. The correct sequence of anaerobic reactions in yeast is **[0.8]**

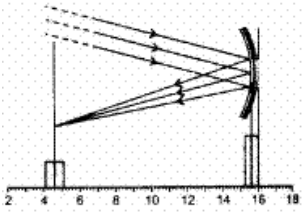
   a) $\text{Glucose} \xrightarrow{cytoplasm} \text{Pyruvate} \xrightarrow{mitochondria} \text{Lactic acid}$
   b) $\text{Glucose} \xrightarrow{cytoplasm} \text{Pyruvate} \xrightarrow{mitochondria} \text{Ethanol + Carbondioxide}$
   c) $\text{Glucose} \xrightarrow{cytoplasm} \text{Pyruvate} \xrightarrow{cytoplasm} \text{Lactic acid}$
   d) $\text{Glucose} \xrightarrow{cytoplasm} \text{Pyruvate} \xrightarrow{cytoplasm} \text{Ethanol + Carbondioxide}$

3. A student added zinc granules to copper sulphate solution taken in a test tube. Out of the following, the correct observations made by the student will be **[0.8]**

   A. Zinc granules have no regular shape.
   B. Zinc granules have silvery grey colour.
   C. The colour of zinc granules changed to brownish-black.

   a) C only
   b) B only
   c) A only
   d) All of these

4. The focal length of the concave mirror in the experimental set up, shown below, equals **[0.8]**

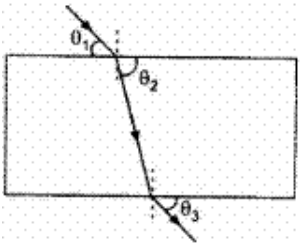


a) 10.3 cm
b) 11.0 cm
c) 12.2 cm
d) 1.7 cm

5. Name the blood vessel which carries deoxygenated blood from the heart to the lungs. **[0.8]**

a) Capillaries
b) Pulmonary vein
c) Pulmonary artery
d) Aorta

6. A student, while doing the experiment, on tracing the path of a ray of light passing through a rectangular glass slab, measured the three angles marked as θ_1, θ_2 and θ_3 in the figure. His measurements could be correct if he were to find: **[0.8]**

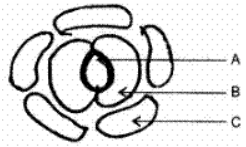


a) $\theta_1 > \theta_2$ but $\theta_2 = \theta_3$
b) $\theta_1 > \theta_2 > \theta_3$
c) $\theta_1 < \theta_2$ but $\theta_1 = \theta_3$
d) $\theta_1 < \theta_2 < \theta_3$

7. Which of the following statements is correct regarding the propagation of light of different colours of white light in air? **[0.8]**

a) All the colours of the white light move with the same speed
b) Red light moves fastest
c) Blue light moves faster than green light
d) Yellow light moves with the mean speed as that of the red and the violet light

8. In order to complete the diagram of stomatal apparatus given below, nuclei should be drawn in the parts marked. **[0.8]**



a) A, B and C
b) A and B
c) A and C
d) B and C

9. At noon the sun appears white as **[0.8]**

a) light is least scattered
b) all the colours of the white light are scattered away
c) red colour is scattered the most
d) blue colour is scattered the most

10. The chemical formula of baking soda is: **[0.8]**

a) $MgCO_3$ b) Na_2CO_3

c) $MgSO_4$ d) $NaHCO_3$

11. Which liquid did a student use for putting a drop on the slide before placing the coverslip while preparing a temporary mount of leaf epidermal peel? **[0.8]**

a) Water b) Iodine

c) Glycerine d) Safranin

12. Which of the following can undergo a chemical reaction? **[0.8]**

a) $CuSO_4$ + Fe b) $ZnSO_4$ + Fe

c) $MgSO_4$ + Fe d) $MgSO_4$ + Pb

13. 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.

14. In which of the following group/ groups of animals, the heart does not pump oxygenated blood to different parts of the body? **[0.8]**

a) Amphibians only b) Amphibians and reptiles only

c) Pisces only d) Pisces and amphibians

15. The speed of light, in a given medium, is $\frac{2}{3}$rd of its speed in a vacuum. The absolute refractive index of the medium is equal to: **[0.8]**

a) $\frac{3}{2}$ b) $\frac{4}{9}$

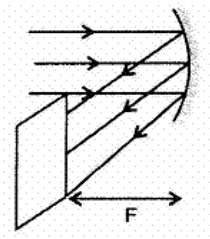
c) $\frac{2}{3}$ d) $\frac{9}{4}$

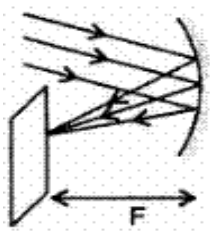
16. Decomposition of vegetable matter into compost is an example of: **[0.8]**

a) Endothermic reaction b) Combination reaction

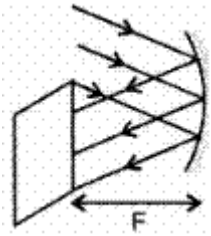
c) Redox reaction d) Exothermic reaction

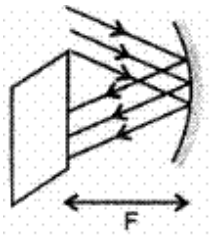
17. Which of the following pictures depict the correct image formation **[0.8]**

a) 

b) 

c) d)





18. When a light passes through a prism, it splits into its component colours. This phenomenon is called. **[0.8]**

a) Reflection
b) Spectrum
c) Dispersion
d) Refraction

19. The deviation in the path of ray of light can be produced **[0.8]**

a) By a glass prism but not by rectangular glass slab.
b) By a glass prism as well as a rectangular glass slab.
c) By a rectangular glass slab but not by a glass prism.
d) Neither by a glass prism nor by rectangular glass slab.

20. To show experimentally that CO_2 is given out during respiration, student must use **[0.8]**

a) KOH solution
b) C_2H_5OH
c) $Ca(OH)_2$ solution
d) $Al(OH)_3$ solution

21. KOH is a strong base since in solution it forms **[0.8]**

a) more number of K^+ ions
b) more number of OH^- ions
c) less number of OH^- ions
d) less number of K^+ ions

22. Choose the forms in which most plants absorb nitrogen **[0.8]**

i. Proteins
ii. Nitrates and Nitrites
iii. Urea
iv. Atmospheric nitrogen

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

23. An object is kept at a distance more than twice the focal length (F) from a concave mirror. The image will be formed at a distance: **[0.8]**

a) Between F and 2F
b) Equal to F
c) More than 2F
d) Less then F

24. Twinkling of stars is due to atmospheric **[0.8]**

a) dispersion of light by water droplets
b) internal reflection of light by clouds
c) refraction of light by different layers of varying refractive indexes
d) scattering of light by dust particles

Section B

Attempt any 20 questions

25. Given below are certain chemical properties of substances. **[0.8]**

A. It turns blue litmus red.

B. It turns red litmus blue.

C. It reacts with zinc and a gas evolves.

D. It reacts with solid sodium carbonate to give brisk effervescence.

Which out of these properties are shown by dilute hydrochloric acid?

a) A, C and D only

b) A and C only

c) B, C and D only

d) A and B only

26. Which of the following salts contains water of crystallization? **[0.8]**

A. Gypsum

B. Washing Soda

C. Blue vitriol

D. Plaster of Paris

a) C and D

b) B and D

c) A and B

d) A, B, C and D

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 elements symbolized as A and B is a metal: ${}^{23}_{11}A, {}^{40}_{20}B$? **[0.8]**

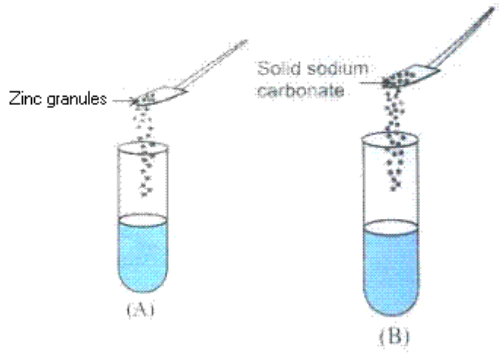
a) Neither A nor B is a metal

b) Both A and B are metals

c) A is metal

d) B is metal

29. A student took two test tubes containing 2 ml of dilute hydrochloric acid and added zinc granules to test tube (A) and solid sodium carbonate to test tube (B) as shown below: **[0.8]**



The correct observation would be

a) Rapid reaction in both the test tubes

b) No reaction in any of the test tubes.

c) Slow reaction in (A) and rapid reaction in (B)

d) Rapid reaction in (A) but a slow reaction in (B)

30. Silver articles on exposure become black. It is an example of **[0.8]**

a) Oxidation reaction

b) Corrosion

c) Reduction reaction
d) Redox reaction

31. **Assertion (A):** Plaster of Paris is used by doctors by setting fractured bones. **[0.8]**
Reason (R): When Plaster of Paris is mixed with water and applied around the fractured limbs, it sets into a hard mass.

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):** Magnesium chloride is an ionic compound. **[0.8]**
Reason (R): Metals and nonmetals are formed by mutual transfer of electrons.

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):** Blood of insects is colourless. **[0.8]**
Reason (R): The blood of insect does not play any role in transport of oxygen.

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):** Refractive index of glass with respect to air is different for red light and violet light. **[0.8]**
Reason (R): Refractive index of a pair of media depends on the wavelength of light used.

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 twinkling of stars is due to the fact that the refractive index of the earth's atmosphere fluctuates. **[0.8]**
Reason (R): When light propagates from one medium to another its direction of propagation changes.

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. Which of the following gives the correct increasing order of acidic strength? **[0.8]**

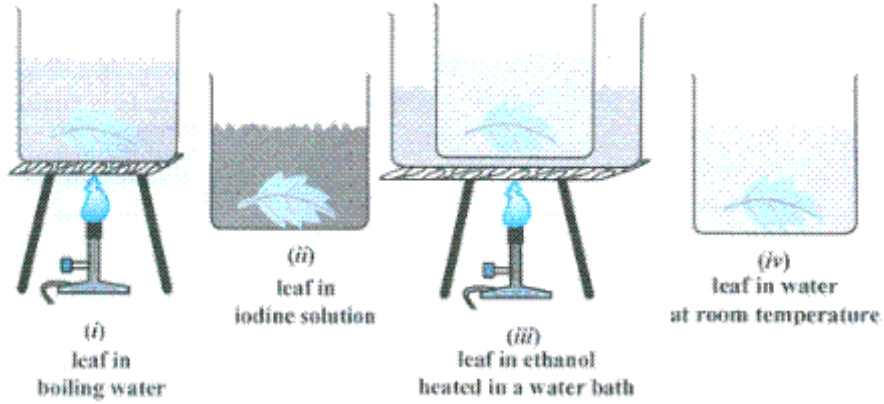
a) Hydrochloric acid < Water < Acetic acid
b) Water < Acetic acid < Hydrochloric acid
c) Water < Hydrochloric acid < Acetic acid
d) Acetic acid < Water < Hydrochloric acid

37. Which of the following can be best used to find the focal length of a lens? **[0.8]**

a) light from window of our lab
b) light from a distant tree
c) object at a distance of 10 cm for a
d) light from sun

focal length of 30 cm

38. A student performed the starch test on a leaf. Some steps involved are shown below. **[0.8]**



The correct sequence of steps should be

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

39. Refraction cannot cause bending as light moves from one surface to another if the incident and refraction angles i and r are related as: **[0.8]**

a) $i = r = 90^o$
b) $i = 0^o = r = 90^o$
c) $i \neq r = 0^o$
d) $i = r = 0^o$

40. Which of the following is(are) true when HCl (g) is passed through water? **[0.8]**

i. It does not ionise in the solution as it is a covalent compound.
ii. It ionises in the solution
iii. It gives both hydrogen and hydroxyl ion in the solution
iv. It forms hydronium ion in the solution due to the combination of hydrogen ion with water molecule

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

41. Four students reported the following observation tables for the experiment, to trace the path of a ray of light passing through a glass slag for different angles of incidence. The observations, likely to be correct are those of student. **[0.8]**

∠i	∠r	∠e
30°	40°	30°
40°	50°	40°
50°	60°	50°

(I)

∠i	∠r	∠e
30°	20°	30°
40°	30°	40°
50°	40°	50°

(II)

∠i	∠r	∠e
30°	20°	40°
40°	30°	50°
50°	40°	60°

(III)

∠i	∠r	∠e
30°	20°	20°
40°	30°	30°
50°	40°	40°

(IV)

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

42. If two lenses of power P_1 and P_2 are put in contact, what will be the net power? **[0.8]**

a) $P_1 \times P_2$ b) P_1 - P_2

c) $\frac{P_1}{P_2}$ d) P_1 + P_2

43. Match the following with correct response **[0.8]**

Column A	Column B
(i) Insects	(a) Gills
(ii) Earthworm	(b) Trachea
(iii) Fishes	(c) Lungs
(iv) Mammals	(d) Skin

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

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

44. A sharp image of a distant object is obtained on a screen by using a convex lens. In order to determine the focal length of the lens, you need to measure the distance between the **[0.8]**

a) lens and the object b) object and the screen

c) lens and the screen d) None of these

45. Choose the correct path of urine in our body **[0.8]**

a) Kidney $\rightarrow$ Ureter $\rightarrow$ Urethra $\rightarrow$ Urinary bladder b) Urinary bladder $\rightarrow$ Kidney $\rightarrow$ Ureter $\rightarrow$ Urethra

c) kidney $\rightarrow$ Urinary bladder $\rightarrow$ Urethra $\rightarrow$ Ureter d) Kidney $\rightarrow$ Ureters $\rightarrow$ Urinary bladder $\rightarrow$ Urethra

46. With an increase in the thickness glass slab the lateral displacement: **[0.8]**

a) remains same b) increases

c) decreases d) zero

47. Match the following with correct response. **[0.8]**

(a) Atmospheric refraction	(i) Twinkling of star
(b) Scattering of light	(ii) Rainbow
(c) Dispersion	(iii) Red colour of rising sun
(d) Tyndall effect	(iv) White colour of clouds

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

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

48. Which of the following metal reacts neither with cold water nor with hot water but reacts with hot steam to produce hydrogen gas? **[0.8]**

a) Mg b) Fe

c) Ca d) Na

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 electrolysis, the electric current is used to carry out decomposition. Hence it is an electrolytic decomposition. During the electrolysis of water, the reaction involved is:

$2H_2O(l) \longrightarrow 2H_2(g) + O_2(g)$

49. During electrolysis, the charges carried by anode and cathode are respectively: **[0.8]**

a) +ve, -ve

b) -ve, +ve

c) each -ve

d) each +ve

50. The gases released respectively at anode and cathode during electrolysis of water is: **[0.8]**

a) H_2, O_2

b) O_2, no gas at the cathode

c) H_2, no gas at the cathode

d) O_2, H_2

51. The volume of gas collected at the cathode during the electrolysis of water is: **[0.8]**

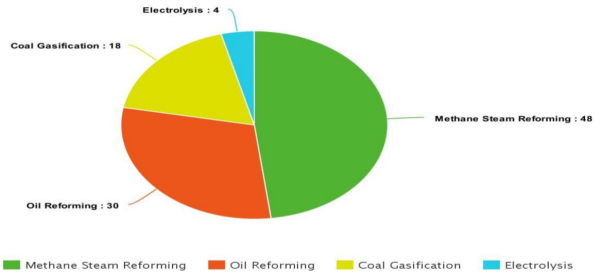
a) same as the volume of gas collected at the anode

b) half of the volume of gas collected at the anode

c) double of the volume of gas collected at the anode

d) one-fourth of volume of gas collected at the anode

52. Which is the most popular method of hydrogen production according to the pie chart given below? **[0.8]**



a) Oil reforming

b) Electrolysis

c) Methane steam reforming

d) Coal gasification

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

Sanjay studied about blood circulation in humans. He wanted to observe the flow of blood and was about to cut his finger a bit. He suddenly realized that this could be fatal.

53. What is the correct route for blood flow in a human? **[0.8]**

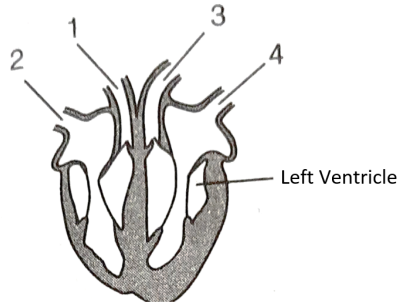
a) left auricle → left ventricle → right ventricle → right auricle → lungs

b) left auricle → left ventricle → lungs → right ventricle → right auricle

c) right auricle → right ventricle → lungs → left auricle → left ventricle

d) right auricle → right ventricle → left ventricle → left auricle → lungs

54. The diagram shows the vertical section through the heart: **[0.8]**



What are the functions of the numbered blood vessels?

a) carries blood to body-1, carries blood to lungs-2, carries blood from lungs-3, carries blood from body-4

b) carries blood to body-2, carries blood to lungs-4, carries blood from lungs-3, carries blood from body-1

c) carries blood to body-3, carries blood to lungs-1, carries blood from lungs-4, carries blood from body-2

d) carries blood to body-1, carries blood to lungs-3, carries blood from lungs-4, carries blood from body-2

55. The table shows the characteristics of blood in one blood vessel of the body. **[0.8]**

oxygen concentration	carbon dioxide concentration	pressure
high	low	high

Which blood vessel contains blood with these characteristics?

a) Pulmonary vein

b) Vena cava

c) Aorta

d) Pulmonary artery

56. The colour of blood is red due to the presence of **[0.8]**

a) Haemoglobin

b) Xanthophyll

c) Hemocyanin

d) Chlorophyll

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

Metal has various physical properties which include metallic lustre that they have shining surfaces in their pure state. Metal can be easily beaten into thin sheets. They are ductile can drown into wire due to which metal can be given different shapes according to their needs. Metal is a good conductor of heats and has high melting and boiling point.

57. Which of the following is the least reactive metal? **[0.8]**

a) Lead

b) Sodium

c) Copper

d) Silver

58. The metal which is most ductile _____. **[0.8]**

a) aluminium

b) magnesium

c) gold

d) copper

59. Which of the following metal exist in a liquid state? **[0.8]**

a) Calcium
b) Mercury
c) Sodium
d) Potassium

60. Which of the following metal is a poor conductor of heat? **[0.8]**

a) All of these
b) Copper
c) Lead
d) Silver

Solution

SUBJECT - SCIENCE - 086 - TEST - 02

Class 10 - Science

Section A

1. **(d)** Blue
   Explanation: When water is added to white coloured anhydrous copper sulphate, its colour changes to blue, indicating that the blue coloured copper sulphate pentahydrate is regenerated.
   $CuSO_4(s) \xrightarrow{Heat} CuO(s) + SO_3(g)$

2. **(d)** Glucose $\xrightarrow{cytoplasm}$ Pyruvate $\xrightarrow{cytoplasm}$ Ethanol + Carbondioxide
   Explanation: In yeast cytoplasm, Glucose is breakdown in anaerobic conditions to produce Pyruvate which is a further breakdown to Ethanol and carbon-dioxide.

3. **(d)** All of these
   Explanation:
   - Zinc granules are grey in colour and do not have any regular shape.
   - Zn is more reactive than copper. So, it will displace copper from copper sulphate solution. A reddish-brown layer of copper will be deposited on zinc granules and the solution will become colourless due to formation of zinc sulphate.
   - The reaction is as follows:
     $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

   So, all the observations are correct.

4. **(b)** 11.0 cm
   Explanation: Distance of pole to focus is called focal length :
   $\therefore f = 15.6 - 4.6 = 11.0$ cm

5. **(c)** Pulmonary artery
   Explanation: The pulmonary arteries carry deoxygenated blood from the right ventricle to the lungs. The pulmonary veins carry oxygenated blood from the lungs to the left atrium.

6. **(c)** $\theta_1 < \theta_2$ but $\theta_1 = \theta_3$
   Explanation: For $i = (90 - \theta_1)$, the value of $r = (90 - \theta_2)$ will be less. So $\theta_2 > \theta_1$.
   As long as the surfaces of the slab are parallel the $\angle e = \angle i$
   i.e. $(90 - \theta_3) = (90 - \theta_1)$ or $\theta_3 = \theta_1$

7. **(a)** All the colours of the white light move with the same speed
   Explanation: All the colors of white light move with the same speed because speed of light doesn't depend on color and has a constant value.

8. **(d)** B and C
   Explanation: Stomatal pore does not have nucleus.

9. **(a)** light is least scattered
   Explanation: light is least scattered

10. **(d)** $NaHCO_3$
    Explanation: Baking soda is called sodium hydrogen carbonate/sodium bicarbonate.

11. **(c)** Glycerine
    Explanation: Glycerine is used to temporarily mount the specimen as it prevents the specimen from drying.

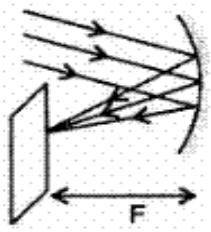
12. **(a)** $CuSO_4$ + Fe
    Explanation: $CuSO_4$ + Fe can undergo a chemical reaction. As the iron metal is more reactive than copper metal, iron displaces copper from copper sulphate solution and forms aqueous iron sulphate ($FeSO_4$) and solid copper (Cu). This a single displacement reaction is also known as a Substitution reaction.

13. **(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.

14. **(c)** Pisces only
Explanation: In Pisces, the heart is two-chambered with one auricle and one ventricle. Therefore, the oxygenated blood is directly sent to all parts of the body. Then the deoxygenated blood is sent to the heart and the heart pumps the blood to the gills for oxygenation.

15. **(a)** $\frac{3}{2}$
Explanation: If c is the speed of light in vacuum, and v is the speed of light in the medium, then refractive index of the medium n_m is given by:
$n_m = \frac{speed\ of\ light\ in\ vacuum}{speed\ of\ light\ in\ the\ medium} = \frac{c}{v}$
$\therefore n_m = \frac{c}{v} = \frac{3}{2}$

16. **(d)** Exothermic reaction
Explanation: The decomposition of plant and animal organic waste by the action of microbes into useful compost is an exothermic reaction because a large amount of energy is released in this process. It is different from other chemical reactions, as they need the energy to break the bond. But in these reactions, the breakdown is carried out by microbes.

17. **(b)** 

Explanation: Parallel beams getting reflected from the concave mirror will converge at focus to produce a sharp image.

18. **(c)** Dispersion
Explanation: Dispersion is the phenomena of splitting of white light into its constituent seven colours (VIBGYOR) on passing through a glass prism.

19. **(a)** By a glass prism but not by rectangular glass slab.
Explanation: The angle of deviation through a triangular prism is the angle between the incident ray and the emerging ray (angle δ). However, in glass slab, the incident ray and the emergent ray are parallel to each other thus angle of incidence is equal to the angle of emergence.

20. **(a)** KOH solution
Explanation: KOH is used to absorb the carbon dioxide released during respiration of germinating seeds which creates a vacuum in the flask.

21. **(b)** more number of OH^- ions
Explanation: A strong base that is completely ionized in aqueous solution. This means when the strong base is placed in a solution such as water, all of the strong bases will dissociate into its ions. The general equation of the dissociation of a strong base is:
$XOH(aq) \rightarrow X + (aq) + OH^-(aq)$
In aqueous medium, KOH dissociates completely to form a large number of OH^- ions.

22. **(d)** (ii) and (iii)
Explanation: Plants cannot absorb atmospheric Nitrogen. They can absorb the Nitrogen in the form of Nitrates, Nitrites, and Urea present in the soil.

23. **(a)** Between F and 2F
Explanation: When an object is placed at a distance more than twice the focal length (F) from a concave mirror, the image will be formed at a distance between F and 2F.

24. **(c)** refraction of light by different layers of varying refractive indexes
Explanation: Stars twinkle due to atmospheric refraction of light by different layers of atmosphere which

are having different refractive indexes.

Section B

25. **(a)** A, C and D only
Explanation:
- Dilute hydrochloric acid will turn blue litmus red.
- It evolves H_2 gas with Zn metal.
  $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
- Brisk effervescence will be due to CO_2 (g).
  $Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

26. **(d)** A, B, C and D
Explanation: All the above salts contain water of crystallization and their chemical formulae are given below:
Gypsum - $CaSO4.2H_2O$ - (2 molecules of water of crystallization)
Washing Soda - $Na2CO_3.10H_2O$ - (10 molecules of water of crystallization)
Blue vitriol - $CuSO_4.5H_2O$ - (5 molecules of water of crystallization)
Plaster of Paris - $2CaSO4.H_2O$ - (0.5 molecules of water of crystallization)

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. **(b)** Both A and B are metals
Explanation: A is Sodium (Atomic number 11) and B is Calcium (Atomic number 20). Both are metals.

29. **(a)** Rapid reaction in both the test tubes
Explanation: Reaction will be rapid in both test tubes
$Zn + 2HCl \rightarrow ZnCl_2 + H_2$
$Na_2CO_3 + 2HCl \rightarrow 2NaCl + H_2O + CO_2$

30. **(b)** Corrosion
Explanation: Silver is known to be resistant to corrosion, as it does not oxidize easily. When silver is exposed to air, a layer of silver sulfide is formed on the surface.
$2Ag(s) + H_2S(g) \rightarrow Ag_2S(s) + H_2(g)$

31. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Plaster of Paris when mixed with water and applied around the fractured limbs, sets into a hard mass and keeps the bone joints in a fixed position. So, it is commonly used for setting fractured bones.

32. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Ionic compounds are formed by mutual transfer of electrons from one atom to another i.e. from metal to nonmetals. Since Mg is metal and Cl is a nonmetal, so $MgCl_2$ is an ionic compound.

33. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true but R is not the correct explanation of A.

34. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: The Refractive index of any pair of media is inversely proportional to the wavelength of light.
Hence, $\gamma_v < \gamma_r$
$\mu_r < \mu_v$
where, γ_v and γ_r are the wavelengths of violet and red light. μ_v and μ_u are the refractive index of violet and red light.

35. **(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.

36. **(b)** Water < Acetic acid < Hydrochloric acid
Explanation: Water < Acetic acid < Hydrochloric acid
Distilled water is neutral. Acetic acid is an organic acid so it is less acidic than hydrochloric acid which is an inorganic acid.

37. **(d)** light from sun
Explanation: Larger the distance more sharper the image.

38. **(a)** (i), (iii), (iv), (ii)
Explanation: Boiling kills the cells, chlorophyll leaches out when boiled in ethanol, but the leaf becomes brittle, made normal by washing it in water. Starch, gets stained with iodine.

39. **(a)** $i = r = 90^o$
Explanation: It is because when i is 90 degrees, it means incident ray is perpendicular to the refracting surface, and light travels in the shortest path that's why it bends towards the normal when it enters a denser medium. But we know that the shortest distance is perpendicular to the medium. So refracted ray doesn't bend and continues to move straight.

40. **(d)** (ii) and (iv)
Explanation: Any acid produces hydrogen ion (H^+) which is present as hydronium ion (H_3O^-) because of combination with a water molecule.

41. **(d)** II
Explanation: When light is entering from optically rarer to optically denser medium, the angle of incidence will be greater than the angle of refraction.
Since$\angle$ i = $\angle$e and $\angle$r < $\angle$i for dense glass slab.

42. **(d)** $P_1 + P_2$
Explanation: The net power of the lenses placed in contact is given by the algebraic powers of the individual powers.
Net power of the lens combination, $P = P_1 + P_2$

43. **(d)** (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)
Explanation:
    - Insects, and some other invertebrates, exchange oxygen and carbon dioxide between their tissues and the air by a system of air-filled tubes called tracheae. Tracheae open to the outside through small holes called spiracles.
    - Earthworms need oxygen just like humans, but they don't have lungs. They have a special skin that allows them to “breathe” oxygen right through it.
    - Most fish exchange gases using gills on either side of the pharynx (throat). Gills are tissues that consist of threadlike protein structures called filaments. These filaments have many functions including the transfer of ions and water, as well as the exchange of oxygen, carbon dioxide, acids, and ammonia.
    - The lungs are the primary organs of the respiratory system in mammals.

44. **(c)** lens and the screen
Explanation: The focal length of the lens, image distance should be known which is the distance between the lens and the screen.

45. **(d)** Kidney $\rightarrow$ Ureters $\rightarrow$ Urinary bladder $\rightarrow$ Urethra
Explanation: Urine from nephron is brought to the collecting duct of kidneys where the urine enters the ureters. There are 2 ureters, each opening from one kidney into the urinary bladder. The urinary bladder stores urine and its size increases as the amount of urine collected increases.
When the CNS gives a voluntary message the muscles of the bladder contract and the bladder sphincter relax thus excreting urine out through the urethra.

46. **(b)** increases
Explanation: The lateral displacement will increase if a glass block is made thicker as lateral displacement is directly proportional to the thickness of the glass slab.

47. **(a)** (a) - (i), (b) - (iii), (c) - (ii), (d) - (iv)
Explanation: Twinkling of stars is due to atmospheric refraction.
The rainbow is formed due to the dispersion and total internal reflection of sunlight by the tiny water droplet, present in the atmosphere.
The rising sun appears red because the sun is near horizon, and therefore the sunlight has to travel larger distance in the atmosphere which scatters away most of the blue light (shorter wavelength) by the atmospheric particles.
The phenomenon of scattering of light by the colloidal particles is known as the Tyndall Effect. Light of all wavelengths are scattered equally by the clouds and hence clouds appear white.

48. **(b)** Fe
Explanation: Sodium reacts vigorously with water. Such is the reaction that it has to be stored under kerosene. Calcium can react with cold water. Magnesium reacts with hot water. Heated iron reacts with water when hot steam is passed over it.
$3Fe\ (s) + 4H_2O\ (g) \rightarrow Fe_3O_4\ (s) + 4H_2\ (g)$

Section C

49. **(a)** +ve, -ve
Explanation: +ve, -ve

50. **(d)** O_2, H_2
Explanation: O_2, H_2

51. **(c)** double of the volume of gas collected at the anode
Explanation: double of the volume of gas collected at the anode

52. **(c)** Methane steam reforming
Explanation: Methane steam reforming

53. **(c)** right auricle $\rightarrow$ right ventricle $\rightarrow$ lungs $\rightarrow$ left auricle $\rightarrow$ left ventricle
Explanation: right auricle $\rightarrow$ right ventricle $\rightarrow$ lungs $\rightarrow$ left auricle $\rightarrow$ left ventricle

54. **(c)** carries blood to body-3, carries blood to lungs-1, carries blood from lungs-4, carries blood from body-2
Explanation: carries blood to body-3, carries blood to lungs-1, carries blood from lungs-4, carries blood from body-2

55. **(c)** Aorta
Explanation: Aorta

56. **(a)** Haemoglobin
Explanation: Haemoglobin

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

58. **(c)** gold
Explanation: gold

59. **(b)** Mercury
Explanation: Mercury

60. **(c)** Lead
Explanation: Lead