

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. Zinc and silver nitrate reacts to form:

- (a) $\text{Ag} + \text{Zn}(\text{NO}_3)_3$
 (b) $\text{ZnNO}_3 + \text{Ag}$
 (c) $\text{AgNO}_3 + \text{Zn}(\text{NO}_3)_2$
 (d) $\text{Zn}(\text{NO}_3)_2 + \text{Ag}$

- (a) $\text{Na} > \text{K} > \text{Cu} > \text{Ag}$
 (b) $\text{K} > \text{Cu} > \text{Na} > \text{Ag}$
 (c) $\text{Ag} > \text{Cu} > \text{Na} > \text{K}$
 (d) $\text{K} > \text{Na} > \text{Cu} > \text{Ag}$

2. The table below gives the pH values of some substances in two columns.

Substance	pH value
(I) Brine	(a) 10
(II) Gastric Juices	(b) 7
(III) Milk of Magnesia	(c) 13
(IV) Aqueous sodium Hydroxide	(d) 1

The correct matching of substances and their pH value is:

- (a) I – (c); II – (b); III – (a); IV – (d)
 (b) I – (b); II – (a); III – (c); IV – (d)
 (c) I – (d); II – (b); III – (a); IV – (c)
 (d) I – (b); II – (d); III – (a); IV – (c)
3. Arrange the following metals in the decreasing order to reactivity Na, K, Cu and Ag.

4. Which of the following is decomposed by sunlight?

- (a) CuCl_2 (b) AgBr
 (c) ZnSO_4 (d) AlCl_3

5. The strength of a basic solution can be increased by:

- (a) by adding H^+ ions
 (b) by decreasing OH^- ions
 (c) by adding OH^- ions
 (d) by reducing H^+ ions

6. A small amount of sodium hydroxide solution is added to a small piece of granulated zinc metal in a test tube. Which of the following represent correct equation?

- (a) $\text{Zn}_{(s)} + \text{NaOH} \longrightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$
 (b) $\text{Zn}_{(s)} + \text{NaOH} \longrightarrow \text{Zn}(\text{OH})_2 + \text{NaOH}$
 (c) $\text{ZnO} + \text{NaOH} \longrightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$
 (d) $\text{Zn} + \text{NaOH} \longrightarrow \text{No reaction}$

7. Which of the following is represent in a chemical change?
- Remain constant in temperature
 - Change in colour
 - Evolution of a gas
 - Both (b) and (c)

8. What is aqua-regia?
- It is mixture of conc. HNO_3 and H_2SO_4 (1 : 3)
 - It is a mixture of HCl and HNO_3 (3 : 1)
 - It is a mixture of HCl and H_2SO_4 (3 : 1)
 - It is a mixture of HNO_3 and H_2SO_4 (1 : 3)

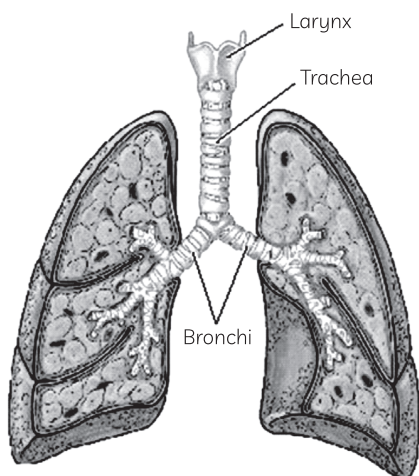
9. Acid rain water flowing into a river affects aquatic life by:
- contaminating the water
 - lowering the pH of water
 - increase the pH of water
 - deposit harmful metals into water bodies

10. What type of a chemical reaction is represented by the following equation:
- $$3\text{BaCl}_2 + \text{Al}_2(\text{SO}_4)_3 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$$
- Displacement Reaction
 - Decomposition Reaction
 - Precipitation Reaction
 - Combustion Reaction

11. Select the correct match below:

	Internal energy reserves	Internal energy reserves
(a)	Glycogen	Starch
(b)	Starch	Maltose
(c)	Glycogen	Maltose
(d)	Starch	Glycogen

12. Tracheal rings present in throat ensure that:

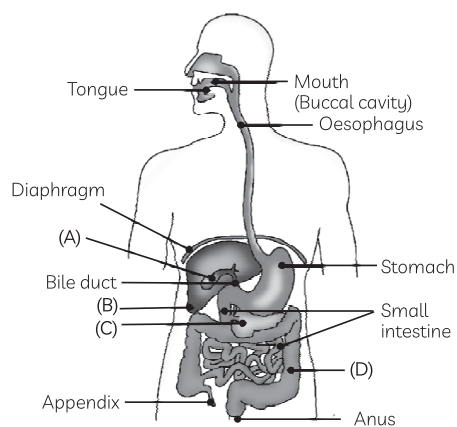


- the air-passage must collapse
- the air-passage does not collapse
- the air-passage does not expand
- the food-passage does not collapse

13. Roots of the plants absorb water from the soil through the process of:

- Diffusion
- Transpiration
- Osmosis
- Both (a) and (b)

14. Study the diagram of the human alimentary canal given below in which four parts have been labelled as A, B, C and D.



Select the options that correctly identify the parts and their functions or structure.

- A: Gall Bladder: stores pancreatic juice
 - B: Liver: Secretes bile juice
 - C: Pancreas: Secretes pancreatic juice
 - D: Large intestines: Site for complete digestion of carbohydrates, proteins and fats
- Both (I) and (II)
 - Both (II) and (III)
 - Both (I) and (IV)
 - Both (II) and (IV)

15. Different organisms use different pathways for breakdown of glucose to obtain energy

Select the incorrect statements:

	Process	Site or part where it takes place
(I)	Breakdown of glucose into pyruvate	Mitochondria
(II)	Breakdown of pyruvate using oxygen	Mitochondria

	Process	Site or part where it takes place
(III)	Conversion of pyruvate into lactic acid and carbon dioxide	Yeast
(IV)	Conversion of pyruvate into lactic acid	Muscle cells

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

16. Which blood vessels have thick and elastic walls?

- (a) Arteries (b) Veins
 (c) Capillaries (d) Lymph

17. When the magnification of converging lens is +1, then the image formed is:

- (a) real inverted and of the same size as that of the object
 (b) virtual, erect and of the same size as that of the object
 (c) real inverted and bigger than the size of the object
 (d) virtual erect and bigger than the size of the object

18. A person standing in front of mirror found that his image is of same height. this implies that the mirror is:

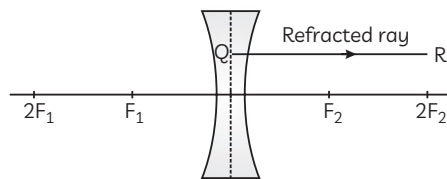
- (a) concave (b) plane
 (c) convex (d) either (a) or (b)

19. According to the new cartesian sign convention:

- (a) focal length of concave mirror is negative that of convex mirror is positive
 (b) focal length of concave mirror is positive and that of convex mirror is negative
 (c) focal length of both concave and convex mirrors is negative
 (d) focal length of both concave and convex mirrors is positive

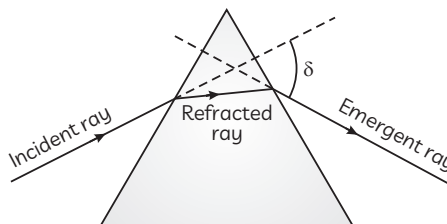
20. The diagram below shows the refracted ray QR through a concave lens.

What will be the predicted direction for incident ray for such case?



- (a) parallel to axis line
 (b) towards F_1
 (c) towards F_2
 (d) between F_2 and $2F_2$

21. A ray of light passes through a prism as shown in figure:



The angle δ is known as:

- (a) angle of emergence
 (b) angle of dispersion
 (c) angle of prism
 (d) angle of deviation

22. An object is placed 20 cm from the convex lens, with focal length 40 cm. The image formed is virtual and erect.

What will be power of the lens?

- (a) - 2.5 D
 (b) + 0.025 D
 (c) + 2.5 D
 (d) - 0.025 D

23. Name the phenomena due to which we see a delayed sunset.

- (a) Atmospheric reflection
 (b) Internal reflection
 (c) Atmospheric refraction
 (d) Internal refraction

24. The colour of sky as seen by an astronaut in space would be black due to:

- (a) No scattering of light taking place in space
 (b) No atmospheric refraction taking place in space
 (c) No dispersion of light taking place in space
 (d) Both (b) and (c)

SECTION - B

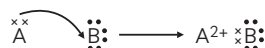
(Section B consists of 24 questions (Q. No. 25 to 48). Attempt any 20 questions from this section.
The first attempted 20 questions would be evaluated.)

- 25.** Name the oxidising and reducing agent in the following reaction:
- (a) H_2S : Oxidising agent, SO_2 : reducing agent
 (b) H_2S : Oxidising agent, SO_2 : neither reduced nor oxidised
 (c) H_2S : Oxidising agent, SO_2 : oxidising agent
 (d) It is a non-redox reaction
- 26.** Equal volumes of hydrochloric acid and potassium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is analysed with a pH strip.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Red							Green						Blue

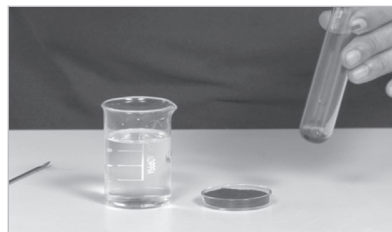
What is the colour obtained in the reaction mentioned in above passage?

- (a) Yellow (b) Red (c) Yellowish green (d) Blue
- 27.** During the formation of a compound between two atoms A and B. Atom A loses two electrons while atom B gains one electron.



Choose the option with correct formula of the compound formed

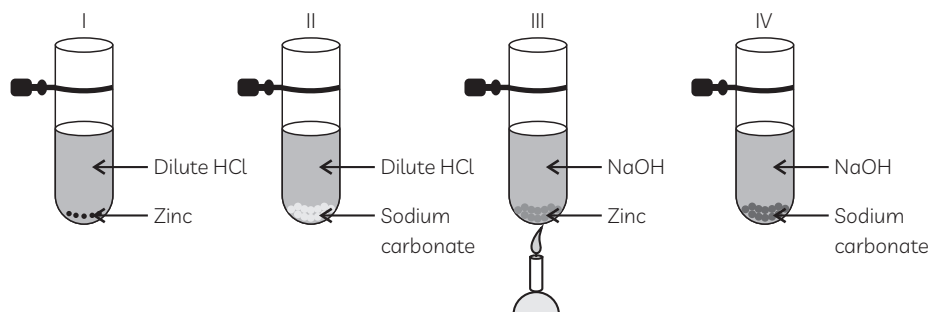
- (a) AB (b) A_2B
 (c) AB_2 (d) A_2B_2
- 28.** Which of the metals react with dilute Nitric acid and evolve hydrogen gas?
- (I) P (II) Mg
 (III) Mn (IV) Zn
- (a) Both (I) and (II)
 (b) Both (II) and (III)
 (c) Both (I) and (IV)
 (d) Both (II) and (IV)
- 29.** A small amount of a substance X is taken in a beaker and dilute hydrochloric acid is added to it slowly while stirring. The colour of the solution turns blue green.



Select the correct statements:

- (I) The substance X is copper oxide
 (II) The substance X is iron oxide
 (III) The blue green colour of the solution is due to the formation of copper chloride.
 (IV) The blue green colour of the solution is due to the formation of copper sulphate.
- (a) Both (I) and (III)
 (b) Both (II) and (III)
 (c) Both (I) and (IV)
 (d) Both (II) and (IV)

- 30.** Deeksha performed an experiment using zinc granules and sodium carbonate with sodium hydroxide and hydrochloric acid under different conditions as shown here.



What will be the observation recorded by Deeksha?

- (a) H₂ gas is evolved in (R)
- (b) All the setup becomes heated, as it is exothermic reaction
- (c) Basic salt is formed in condition (Q)
- (d) No gas is evolved in condition

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): The acids must always be added slowly to water with constant stirring.

Reason (R): Dissolving an acid or a base in water is highly exothermic reaction.

32. Assertion (A): When hydrogen and nitrogen combines, ammonia is formed.

Reason (R): It is an exothermic reaction.

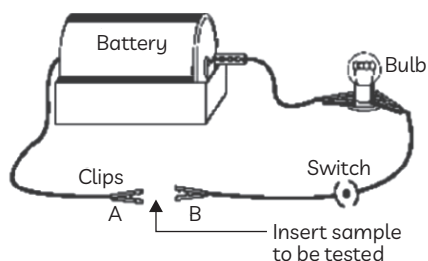
33. Assertion (A): Mucosal walls of the intestine has numerous villi.

Reason (R): Villi increases the surface area of digestion.

34. Assertion (A): At noon, the Sun appears white as only a little of the blue and violet colours are scattered.

Reason (R): Near the horizon, most of the blue light and shorter wavelengths are scattered away by the particles.

35. Samples of silver, copper, PVC and graphite were taken and placed one by one between the terminals A and B as shown:



The bulb does not glow after inserting which of the substances?

- (I) PVC
- (II) Graphite
- (III) Silver
- (IV) Copper
- (a) Only (I)
- (b) Only (II)
- (c) Both (I) and (III)
- (d) Both (II) and (IV)

36. The changes that do not happen to the food in the small intestine before its absorption are:

- (a) proteins are converted to amino acids
- (b) Carbohydrates are converted to glucose
- (c) Fats are emulsified
- (d) Fats are converted to fatty acids and glycerol.

37. The part of nephron that filters the blood passing through it is:

- (a) Bowman's capsule
- (b) Glomerulus
- (c) Renal artery
- (d) Collecting duct

38. Select the correct combinations:

	Xylem	Phloem
(I)	Transports water, minerals and amino acids	Transports soluble products of photosynthesis only.
(II)	Transports in one direction only	Transports in one direction only
(III)	Vessels and tracheids form a continuous channel	Takes place in sieve tubes and companion cells
(IV)	Does not require ATP	Requires ATP

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

39. The refractive indices of four media are given in the table below:

Medium	Refractive index
Dense flint glass	1.65
Diamond	2.42
Water	1.33
Turpentine oil	1.47

The correct order of speed of light through these media will be:

- (a) water < Turpentine oil < Dense flint glass < Diamond
- (a) water > Turpentine oil > Dense flint glass > Diamond

- (a) water < Turpentine oil and Dense flint glass > Diamond
 (a) water > Turpentine oil and Dense flint glass < Diamond

40. The absolute refractive index of a medium is always:

- (a) Less than 1
 (b) Equal to 1
 (c) Greater than 1
 (d) No fixed value

41. Select the correct statements :

- (I) Effect of root pressure in transport of water is more important during day.
 (II) Effect of root pressure in transport of water is more important at night.
 (III) Transpiration pull is the major driving force in the movement of water in xylem during the day.
 (IV) Transpiration pull is the major driving force in the movement of water in xylem during the night.
 (a) Both I and III
 (b) Both II and III
 (c) Both I and IV
 (d) Both II and IV

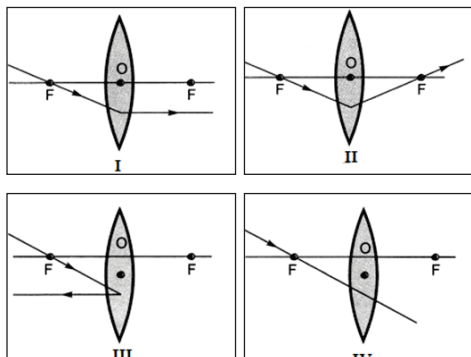
42. In the human heart, the oxygen rich blood from the lungs first comes to:

- (a) Left atrium
 (b) Left ventricle
 (c) Right atrium
 (d) Right ventricle

43. Which of the following are not uses of concave mirror:

- (a) In search lights
 (b) In vehicle head lights
 (c) As rear view mirror
 (d) As shaving mirror

44. Four students completed the ray diagram of a ray passing through the focus of a convex lens.



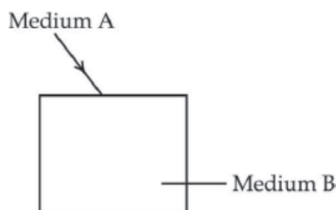
Select the correct ray diagram.

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

45. When light is incident from air on a rectangular glass slab and , then the angle of incidence will be:

- (a) 0°
 (b) 45°
 (c) 90°
 (d) depends on the refractive index of glass

46. If a ray of light enters from a medium A (refractive index 2.25) into a slab made up of a transparent substance B (refractive index 1.5), then the emergent ray:



- (a) Will bend towards the normal
 (b) Will bend away from the normal
 (c) Will be parallel to the incident ray
 (d) Will move straight without any deviation

47. If an object is kept 40 cm in front of a concave mirror of focal length 20 cm, then the position and nature of the image will be:

	Position of image	Nature of image
(a)	40 cm in front of mirror	Real, inverted, same size as object
(b)	40 cm in front of mirror	Real, inverted, magnified
(c)	40 cm behind mirror	Virtual erect, same size as object
(d)	40 cm in front of mirror	Virtual, erect, magnified

48. Select the incorrect statements:

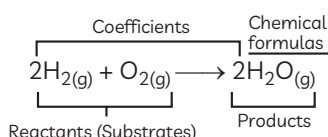
- (I) Almost all metals combine with oxygen to form metal oxides.
 (II) All metal oxides are soluble in water.
 (III) All metal oxides are basic in nature.
 (IV) Some metal oxides dissolve in water to form alkalis.
 (a) Only I (b) Only II
 (c) Both II and III (d) Both III and IV

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: A chemical equation is the representation of chemical change in terms of symbols and formulae of reactants and products. The substances which react are written on the left hand side of the arrow and are termed as reactants while the substances produced as result of reaction are called products and are written on the right hand side of the arrow. The arrowhead shows the direction of the reaction. A chemical equation in which the number of atoms of each element on reactant side is equal to that on the product side is said to be balanced.



49. Which of the following statement is incorrect regarding the significance of the chemical equations?

- A chemical equation provides both qualitative and quantitative details of a chemical change.
- A chemical equation tells about the names of various reactants and products.
- A chemical equation provides information regarding the relative number of molecules (or atoms) of reactants and products, involved in the reaction.
- A chemical equation provides the information about the density of product formed.

50. Among the following, the correct balanced equation is

- $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_4 + 4\text{H}_2$
- $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- $\text{N}_2 + \text{H}_2 \rightarrow \text{NH}_3$
- $\text{C} + \text{O}_2 \rightarrow \text{CO}$

51. In which of the following equation, the mass is not same on both the sides?

- Word equation
- Skeletal equation
- Balanced equation
- Both (a) and (b)

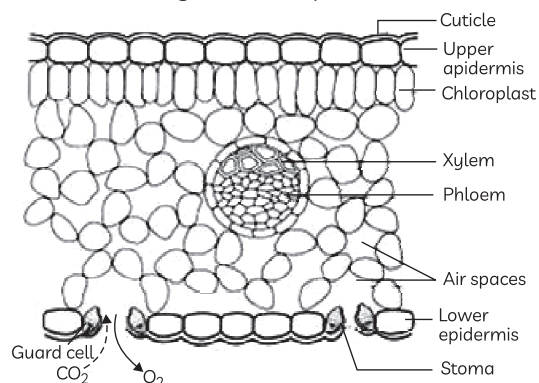
52. How is input of energy represented in chemical equation?

- delta (Δ)
- nu (μ)
- $h\nu$
- Both (a) and (c)

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

Case 2: Green plants absorb light in their leaves and convert it to energy by photosynthesis. Photosynthesis is a process by which green plants, having chlorophyll, synthesize the simple sugar (glucose) from the simple raw materials water and carbon dioxide using the energy of sunlight. Oxygen is released in this process.

Though all green parts of a plant are capable of performing photosynthesis, the leaves are the most suitable organs for this process.



Anatomy of a leaf. Note how plants obtain CO₂ through stomata

53. Photosynthesis occurs in

- Endoplasmic reticulum
- Golgi body
- Stomata
- Chloroplast

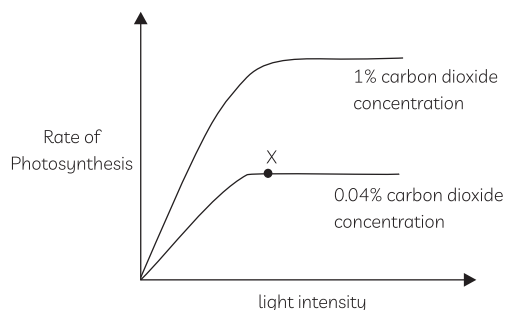
54. The carbohydrates which are not used immediately by plants is stored in the form of:

- Glycogen
- Starch
- ATP
- ADP

55. Which of the following are functions of stomata:

- Exchange of gases
 - Transpiration
 - Prevents loss of water at night
 - Translocation
- Both I and II
 - Both I and III
 - I, II and III
 - I, III and IV

- 56.** The graph below shows the variation of rate of photosynthesis with light intensity for different levels of carbon dioxide.



After analyzing the graph a student writes the following statements.

- (I) The rate of photosynthesis increases linearly with light intensity.
 (II) The rate of photosynthesis first increases linearly with increase in light intensity and then becomes a constant.
 (III) For a given light intensity, the rate of photosynthesis will be more if carbon dioxide concentration is less.
 (IV) For a given light intensity, the rate of photosynthesis does not depend upon the carbon dioxide concentration.

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

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

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

Case 3: Mirror formula is a relation between object distance (u) image distance (v) and focal length (f) if a special mirror, it can be written as:

$$\frac{1}{u} + \frac{1}{v} - \frac{1}{f} = \frac{2}{R}$$

Where R is the radius of curvature of the mirror. The formula is valid in all situations for spherical mirrors for all position of the object.

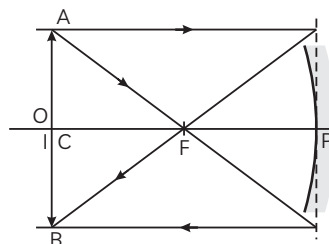
Consider the case, in which a mirror forms a real image of height 1 cm of an object of height 1 cm placed 20 cm away from the mirror.

Mirror formula is a relation between object distance (u), image distance (v) and focal length (f) in a spherical mirror.

It is represented as $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$.

This formula is valid in all situations for a spherical mirrors for all positions of the object.

Consider the case in which mirror forms a real image of height 1 cm of an object of height 1 cm, placed at 30 cm away from the mirror.



- 57.** Distance of an object from the mirror is:

- (a) 20 cm (b) 30 cm
 (c) 50 cm (d) 60 cm

- 58.** Focal length of mirror is:

- (a) - 16 cm (b) - 12 cm
 (c) - 15 cm (d) - 10 cm

- 59.** Radius of curvature of the mirror is:

- (a) - 32 cm (b) - 24 cm
 (c) - 20 cm (d) - 30 cm

- 60.** Magnification of image, if the height of an object is thrice that of image:

- (a) 4 (b) 3
 (c) $\frac{1}{3}$ (d) $\frac{1}{6}$



SOLUTION

SAMPLE PAPER - 5

SECTION - A

- 1.** (d) $Zn(NO_3)_2 + Ag$

Explanation: Zn is more reactive than Ag.

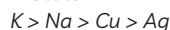
- 2.** (d) I - (b); II - (d); III - (a); IV - (c)

Explanation: Brine or solution of sodium chloride in water is a neutral solution having pH 7. Gastric juices contain the acid HCl and have pH 1. Milk of Magnesia is a mild base

used as an antacid and has pH 10. Aqueous sodium hydroxide is a strong base having pH 13.

3. (d) $K > Na > Cu > Ag$

Explanation: The decreasing order of reactivity of the given metals in



4. (b) $AgBr$

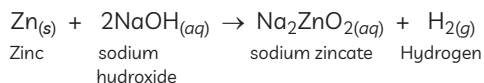
Explanation: $2AgBr \xrightarrow{\text{sunlight}} 2Ag + Br_2$

5. (c) by adding OH^- ions

Explanation: The strength of base depends on number of OH^- ion produced on adding water. So by adding OH^- ions, the strength of basic solution can be increased.

6. (a) $Zn_{(s)} + NaOH \longrightarrow Na_2ZnO_2 + H_2$

Explanation: Sodium hydroxide solution is added to a few pieces of granulated zinc metal taken in a test tube.



7. (d) both (b) and (c)

Explanation: Change in temperature, change in colour and evolution of gas are the examples of chemical changes as they cause the change the chemical structure of the reactants.

8. (b) It is a mixture of HCl and HNO_3 (3 : 1)

Explanation: It is mixture of conc. HCl and conc. HNO_3 in the ratio of 3 : 1.

Caution

→ *Aqua regia is a mixture of three parts of concentrated hydrochloric acid and one part concentrated nitric acid.*

9. (b) lowers the pH of water

Explanation: Acid rain water, if mixed with river water, will lowers its pH below 5.6, i.e., makes river water acidic. While the living body works normally within a pH range of 7-7.8. That's why, flow of acid rain water into a river makes the survival of aquatic life in the river difficult.

10. (c) Precipitation

Explanation: The given reaction represent both Precipitation reaction or double displacement reaction.

11. (d) Internal energy reserve in plants : Starch;
Internal energy reserve in human :
Glycogen

Explanation: Internal energy reserve in plants is starch and its glycogen in case of human beings.

12. (b) the air-passage does not collapse

Explanation: The given structure are rings of cartilage, which are present in the throat. These ensure that the air-passage does not collapse.

13. (c) osmosis

Explanation: Plants absorb water from the soil by osmosis. They absorb mineral ions by active transport, against the concentration gradient. Root hair cells are adapted for taking up water and mineral ions by having a large surface area to increase the rate of absorption.

14. (b) Both (II) and (III)

Explanation: Part labelled A is gall bladder and it stores bile. Part D is large intestine and it absorbs water from the digested food. Small intestine is the site of complete digestion of carbohydrates, proteins and fats.

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

Explanation: The first step is the break-down of glucose, a six-carbon molecule, into a three-carbon molecule called pyruvate and this process takes place in the cytoplasm. The pyruvate may be converted into ethanol and carbon dioxide. This process takes place in yeast during fermentation.

Breakdown of pyruvate using oxygen takes place in the mitochondria. Sometimes, when there is a lack of oxygen in our muscle cells, the pyruvate is converted into lactic acid which is also a three-carbon molecule.

16. (a) Arteries

Explanation: Arteries have thick elastic walls as they carry blood away from the heart to various parts of the body and blood comes out of the heart with very high pressure.

17. (b) virtual, erect and of the same size as that of the object

Explanation: As, the magnification is positive so the image formed will be virtual and erect.

$$\text{Magnification, } m = \frac{\text{height of image}}{\text{height of object}}$$

$$m = \frac{h_1}{h_0}$$

$$\Rightarrow m_0 = h_0$$

The image formed is of the same size as that of the object.

18. (d) either (a) or (b)

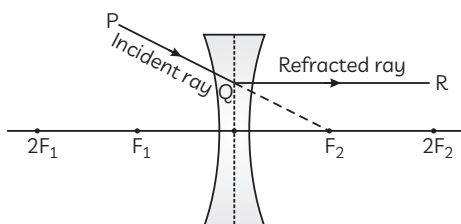
Explanation: Plane mirror always form image, of the same size as an object. In case of concave mirror, when an object is placed at radius of curvature the size of image equal that of an object.

19. (a) focal length of concave mirror is negative and that of convex mirror is positive

Explanation: : In case of concave mirror, the centre of curvature and focus lie in front of the surface of the mirror. Thus, the radius of curvature and focal length are taken as negative.

20. (c) towards F_2

Explanation: In figure the refracted ray is parallel to the principal axis, So, the incident ray must be appearing to meet at the principal focus of concave lens. To find the incident ray, F_2 joined to Q and produced as shown in the figure.



21. (d) angle of deviation

Explanation: The angle between incident ray

and emergent ray through prism called angle of deviation denoted by δ .

22. (c) + 2.5 D

Explanation: $P = \frac{1}{f}$, where f is expressed in metres.

Thus, $P = \frac{100}{f}$ (cm)

$$= \frac{100}{40} = 2.5 \text{ D}$$

The power of a convex lens is always taken as positive.

23. (b) Internal reflection

Explanation: The Advancement in sunrise and delayed sunset are the two phenomena that are caused due to the atmospheric refraction process. In this process the Sun appears to rise early by 2 minutes and set by 2 minutes late.



Related Theory

→ The sun appears flattened (or oval) at sunrise and sunset. The apparent flattening of the sun's disc at sunrise and sunset is also due to atmosphere refraction.

24. (a) No scattering of light taking place in space

Explanation: The sky would appear to be black to astronaut in space as there is no atmosphere to scatter the sun's light.

SECTION - B

25. (c) H_2S : Reducing agent, SO_2 : oxidising agent

Explanation: H_2S is a reducing agent while SO_2 is the Oxidising agent..

26. (c) yellowish green

Explanation: When Strong base (KOH) and strong acid (HCl) reacts, neutral salt is form. The Universal Indicator Colour Guide shows that Universal Indicator turns red when it is added to a strong acid, it turns purple when it is added to a strong base, and it turns a yellowish-green when it is added to a neutral solution.

27. (c) AB_2

Explanation: $(A^{2+}) (\ddot{B}:)_2 \rightarrow AB_2$

28. (b) Both (II) and (III)

Explanation: H_2 gas is not evolved when a

metal reacts with HNO_3 (nitric acid) as HNO_3 is a strong oxidizing agent and oxidizes the H_2 produced to water and is itself reduced to any of the oxides of nitrogen. However, Mg and Mn are exceptions as they react with very dilute Nitric acid to evolve H_2 gas.

29. (a) Both (I) and (III)

Explanation: When copper oxide reacts with dilute hydrochloric acid, the solution turns blue green due to the formation of copper chloride.



30. (d) No gas is evolved in condition

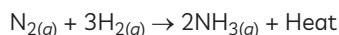
Explanation: (S) No gas will be evolved in condition (S) because NaOH does not react with sodium carbonate.

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

Explanation: A large amount of heat is produced when strong acid are mixed with water. When water is added to acid, an extremely concentrated solution is formed initially. Thus, large amount heat is released that the solution may boil very violently, splashing the acid out of the container.

32. (b) Both (A) and (R) are true, but (R) is not the correct explanation of the assertion.

Explanation: Ammonia is formed when hydrogen and nitrogen combines.



When the bond between two atoms of nitrogen and hydrogen molecules are broken and new bonds are formed, heat energy is liberated to the surroundings. Thus, the reaction is an exothermic.

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

Explanation: All the digested food is taken up by the walls of intestine, which has numerous villi. These increase the surface area of absorption.

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

Explanation: At noon the sun appears white because the light from the sun is directly overhead us. The light travels relatively shorter distance during the noon. Scattering of light is reduced as the distance is reduced. So, the sun appears white as only a little of the blue and violet colours are scattered.

35. (a) Only (I)

Explanation: Silver and copper are metals and good conductors of electricity due to which the bulb will glow when these samples are inserted between A and B.

Graphite, though a non-metal, is an allotropic form of carbon and a good conductor of electricity.

However, PVC is a poor conductor of electricity.

36. (c) Fats are emulsified

Explanation: The emulsification of fat takes place by the action of bile salts.

37. (b) Glomerulus

Explanation: Glomerulus are the bundle of blood capillaries present in the Bowman's capsule. One end of the glomerulus is attached to the renal artery (it brings dirty

blood containing wastes into the kidney) and the other end is attached to the renal vein (it carries away the cleansed blood from the kidney). The function of glomerulus is to filter the blood passing through it.

38. (d) Both (III) and (IV)

Explanation: Xylem transports water and mineral from the soil in upward direction. Phloem transports soluble products of photosynthesis, amino acids and some other substances from the leaf to different parts of the plant in upward and downward directions.

39. (a) water > Turpentine oil > Dense flint glass > Diamond

Explanation: The speed of light in a medium is inversely proportional to its refractive index. As refractive index of water is the least, speed of light will be greatest through it. Similarly, speed of light will be least through diamond.

40. (c) Greater than 1

Explanation: The absolute refractive index of a medium is the ratio of speed of light in vacuum to the speed of light in that medium and since speed of light in vacuum = 3×10^8 m/s is the greatest, the value of absolute refractive index is always greater than 1.

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

Explanation : The effect of root pressure in transport of water is more important at night as during the day, transpiration pull is the major driving force in the movement of water in xylem

42. (a) Left atrium

Explanation: In the human heart, the oxygen rich blood from the lungs first comes to the left atrium which relaxes when it collects the blood from where it goes to the left ventricle and is then pumped out to the body.

43. (c) As rear view mirror

Explanation: Convex mirrors are used as rear view mirrors as they produce a virtual and erect image of objects and they have a wider field of view.

44. (a) I

Explanation: A ray passing through the focus of a convex lens after refraction becomes parallel to the principal axis.

45. (a) 0°

Explanation: When light is incident on a glass slab and , it means that light is incident normally on the glass interface. Therefore, angle of incidence = 0° .

46. (c) Will be parallel to the incident ray

Explanation: Here, medium A is denser than medium B. When a ray of light goes from a denser medium to a rarer medium, it bends away from the normal. However, the emergent ray will be parallel to the incident ray but will be laterally displaced.

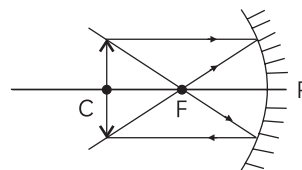
47. (a) position of image: 40 CM in front of mirror.
Nature of image: Real, inverted, same size as object.

Explanation: Here, Object distance, $u = -40$ cm; focal length of concave mirror, $f = -20$ cm.

Using the mirror formula $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$, we will find the image distance v.

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = -\frac{1}{20} - \left(\frac{1}{-40}\right) = -\frac{1}{20} + \frac{1}{40}$$

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



Position of image: 40 cm in front of the mirror.

Nature of image: Image is real, inverted and same size as object.

48. (C) (c) Both II and III

Explanation: Almost all metals combine with oxygen to form metal oxides.

Metal + Oxygen \longrightarrow Metal oxide

Some metal oxides, such as sodium oxide and potassium oxide, dissolve in water to form alkalis:

Moreover, some metal oxides, such as aluminium oxide and zinc oxide, show both acidic and basic nature and are known as amphoteric oxides.

SECTION - C

49. (d) A chemical equation provides the information about the density of product formed.

50. (a) $3\text{Fe} + 4\text{H}_2\text{O} \rightarrow \text{Fe}_3\text{O}_3 + 4\text{H}_2$

Explanation: A balanced chemical equation occurs when the number of atoms involved in the reactant side is equal to the number of atoms in products side.

Related Theory

\rightarrow The stoichiometric coefficients, assigned to each entity in the chemical equation are used to make the entire equation obey the law of conservation of mass and law of conservation of charge.

51. (d) Both (a) and (b)

Explanation: In both word and skeletal equation the mass is not same on both the sides.

52. (d) both (a) and (c)

Explanation: The greek letter delta (Δ) represent the input of heat energy while formula ' $h\nu$ ' describe the input of light as energy source.

53. (d) Chloroplast

Explanation: Photosynthesis takes place in the cell organelles found in green plants called chloroplast which contain chlorophyll.

54. (b) Starch

Explanation: Starch serves as the internal energy reserve to be used as and when required by the plant.

55. (c) I, II and III

Explanation: Stomata allow the exchange of gases (CO_2 and O_2) with the atmosphere.

Evaporation of water from the leaf surface occurs through the stomata. Thus, the stomata help in the process of transpiration. Based on the climatic conditions, it closes or opens its pores to maintain the moisture balance. Stomata remains open during the day and closed at night. This closure at night prevents water from Escaping through open pores.

56. (b) Only II

Explanation: The rate of photosynthesis first increases linearly with increase in light intensity and then becomes aconstant. Moreover, it also depends upon the carbon dioxide concentration in the atmosphere. More the concentration of carbon dioxide, faster will be the rate of photosynthesis for a given intensity of light.

57. (b) 30 cm

Explanation: $m = \frac{h_2}{h_1} = \frac{v}{u}$

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

$\Rightarrow v = 30$ cm

58. (c) -15 cm

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

$$\frac{1}{f} = \frac{1}{-30} + \frac{1}{-30}$$

$$= \frac{-1}{15}$$

or $f = -15$ cm

59. (c) -30 cm

Explanation: $R = 2f = 2 \times (-15) = -30$ cm

60. (c) 1/3

Explanation: $m = \frac{h'}{h}$

$\therefore h = 3 h'$

$\therefore m = \frac{1}{3}$

