Class X Session 2025-26
Subject - Science
Sample Question Paper - 05

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

Section A

1. Anaerobic process **[1]**

   a) takes place in yeast during fermentation
   b) produces only energy in the muscles of human beings
   c) takes place in the presence of oxygen
   d) produces ethanol, oxygen, and energy

2. A cross between two tall pea plants resulted in offsprings having a few dwarf plants. The gene-combination of the parental plants must be **[1]**

   a) Tt and Tt
   b) Tt and tt
   c) TT and tt
   d) TT and Tt

3. Match the following with correct response. **[1]**

Column A	Column B
(i) The largest part of the brain	(a) Cranial meninges
(ii) The protective covering of the brain	(b) Spinal cord
(iii) Forebrain	(c) Olfactory lobe
(iv) Cerebellum	(d) Cerebrum

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

4. In a nerve cell, the site where the electrical impulse is converted into a chemical signal is known as: **[1]**

   a) Neuromuscular junction
   b) Dendrites
   c) Axon
   d) Cell body

5. How much of the net primary productivity of a terrestrial ecosystem is eaten and digested by herbivores? **[1]**

   a) 0.1%
   b) 100%

c) 10%

d) 1%

6. In the excretory system of human beings, some substances in the initial filtrate such as glucose, amino acids, salts and water are selectively reabsorbed in **[1]**

a) Nephron

b) Ureter

c) Urethra

d) Urinary bladder

7. In an ecosystem, the 10% of energy available for transfer from one trophic level to the next trophic level is in the form of**:** **[1]**

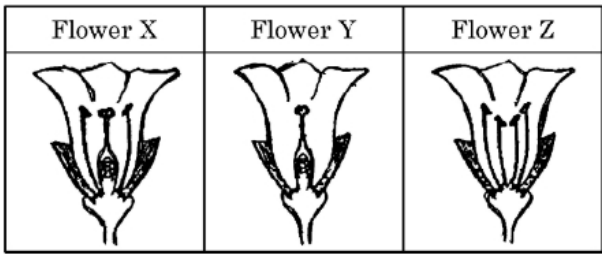
a) Chemical energy

b) Heat energy

c) Mechanical energy.

d) Light energy

8. Consider the following three flowers namely X, Y and Z. Which flower(s) would develop into a fruit? **[1]**



a) X and Y only

b) X only

c) Y and Z

d) Z only

9. **Assertion (A):** Genes inherited from the parents decide the sex of a child. **[1]**
Reason (R): X chromosome in a male child is inherited from his father.

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.

10. a. What happens when in a human female the egg released by the ovary is not fertilized? **[2]**
b. Name one bacterial and one viral infection caused due to unsafe sex.

11. a. What is meant by garbage? List two classes into which garbage is classified. **[2]**
b. What do we actually mean when we say that the **enzymes are specific in their action**?

OR

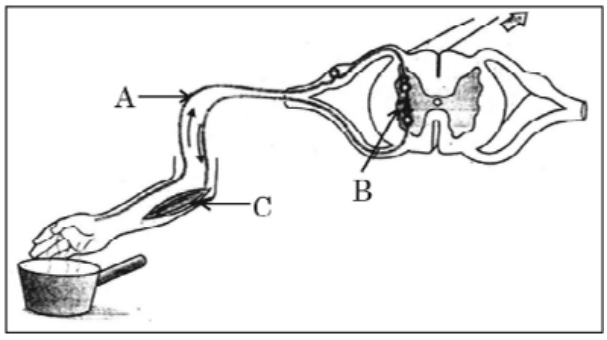
Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why?

12. In the given diagram **[2]**

i. Name the parts labelled A, B, and C.

ii. Write the functions of A and C.

iii. Reflex arcs have evolved in animals? Why?



13. Mendel, in one of his experiments with pea plants, crossed a variety of pea plant having round seeds with one having wrinkled seeds. State Mendel's observations giving reasons of F_1 and F_2 progeny of this cross. Also, list any two contrasting characters, other than round seeds of pea plants that Mendel used in his experiments. **[3]**

14. The process of spore formation takes place in many simple multicellular organisms. Name the **[3]**

i. organism using this process to reproduce, and

ii. reproductive and non-reproductive parts of such organisms. List two benefits to an organism that reproduces through spores.

15. In each of the following situations what happens to the rate of photosynthesis? **[4]**

i. Cloudy days

ii. No rainfall in the area

iii. Good manuring in the area

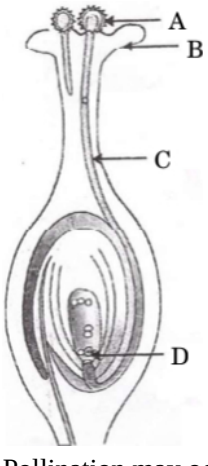
iv. Stomata get blocked due to dust

16. i. Explain by giving one example each: **[5]**

a. Unisexual flowers

b. Bisexual flowers

ii. Name the labelled parts A, B, C and D in the diagram given below.



iii. Pollination may occur without fertilisation but fertilisation will not take place without pollination. Give reason to justify this statement.

OR

i. Distinguish between hormonal co-ordination in plants and animals.

ii. Which part of the brain is responsible for -

1. intelligence
2. riding a bicycle
3. vomiting

4. controlling hunger

iii. How is brain and spinal-cord protected against mechanical injuries?

Section B

17. Which of the following statements are correct abount an aqueous solution of an acid and of a base? **[1]**

A. higher the pH, stronger the acid

B. higher the pH, weaker the acid

C. Lower the pH, Stronger the base

D. Lower the pH, weaker the base

a) All of these

b) A and D

c) B and C

d) A and C

18. Which of the given statement is correct or wrong: **[1]**

Statement A: Ethane decolorizes bromine water whereas ethyne does not.

Statement B: Mixture of water and alcohol is used in radiators of vehicles in cold countries.

a) Both - Statement A and Statement B - are false.

b) Statement A is true; Statement B is false.

c) Statement B is true; Statement A is false.

d) Both - Statement A and Statement B - are true.

19. The metal which melts when kept on the palm is: **[1]**

a) Sodium

b) Potassium

c) Lithium

d) Gallium

20. Match the following with the correct response: **[1]**

(i) The bond which holds cations and anions	(a) Ionic
(ii) Self linking property of carbon	(b) Pyridine
(iii) Denatured alcohol	(c) Catenation
(iv) Synthetic detergents	(d) Non-biodegradable

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

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

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

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

21. Aluminum is used for making cooking utensils. Which of the following properties of aluminum are responsible for the same? **[1]**

i. Good thermal conductivity

ii. Good electrical conductivity

iii. Ductility

iv. High melting point

a) (i) and (ii)

b) (ii) and (iii)

c) (i) and (iii)

d) (i) and (iv)

22. Carbon compounds: **[1]**

i. are good conductors of electricity.

ii. are bad conductors of electricity.

iii. have strong forces of attraction between their molecules.

iv. have weak forces of attraction between their molecules.

The correct statements are:

a) (i) and (ii)

b) (ii) and (iii)

c) (ii) and (iv)

d) (i) and (iii)

23. Juice of tamarind turns blue litmus to red. It is because of the presence of an acid called: **[1]**

a) methanoic acid

b) oxalic acid

c) tartaric acid

d) acetic acid

24. Which one of the following elements symbolized as A and B is a metal: ${}^{23}_{11}A, {}^{40}_{20}B$? **[1]**

a) B is metal

b) Neither A nor B is a metal

c) A is metal

d) Both A and B are metals

25. When a piece of limestone reacts with dilute HCl, a gas X is produced. When gas X is passed through lime water then a white precipitate Y is formed. On passing excess of gas X, the white precipitate dissolves forming a soluble compound Z. **[2]**

a. What are X, Y and Z?

b. Write equations for the reactions which take place :

i. When limestone reacts with dilute HCl.

ii. When gas X reacts with lime water to form white precipitate Y.

26. What is a displacement reaction? Write balanced chemical equation for a displacement reaction in which iron is a reactant. Name one more element whose behaviour is similar to that of iron in such reactions. Why will this kind of behaviour not be shown by gold? **[3]**

OR

Identify the type of reaction in the following

a. $ZnCO_3 + 2HCl(aq) \longrightarrow ZnCl_2(aq) + H_2CO_3(aq)$

b. $2NaBr(aq) + Cl_2(g) \longrightarrow 2NaCl(aq) + Br_2(aq)$

c. $2CuO(s) \xrightarrow{heat} 2Cu(s) + O_2(g)$

27. i. Which types of metals can be obtained in their pure form by just heating their oxides in air? Give one example. **[3]**

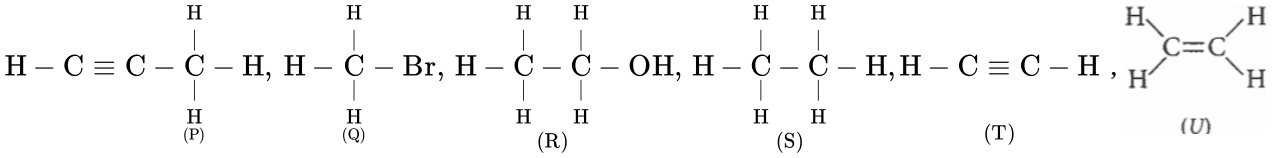
ii. Consider the reaction given below used to obtain Manganese metal in pure form:

$3MnO_2(s) + 4Al(s) \longrightarrow 3Mn(l) + 2Al_2O_3(s) + Heat$

a. What type of reaction is it?

b. What is the role of aluminium in this reaction?

28. Read the following: **[4]**



i. Which of the compounds P, Q, R, S, T, U belong to same homologous series? (1)

ii. Write the name of compound R. Also write the functional group present in it. (1)

iii. What is the IUPAC name of compound T and U (2)

OR

What are unsaturated hydrocarbons? Which of the compounds P, Q, R, S, T , U are example of unsaturated hydrocarbons? (2)

OR

Read the following text carefully and answer the questions that follow:

A series of organic compounds having the same functional group, with similar or almost identical chemical characteristics in which all the members can be represented by the same general formula and the two consecutive members of the series differ by —CH_2, group or 14 mass unit in their molecular formulae is called a homologous series. For example, all the members of the alcohol family can be represented by the general formula, $C_nH_{2n+1}OH$ where, n may have the values 1, 2, 3, ... etc. The various members of a particular homologous series are called homologues. The physical properties such as density, melting point, boiling point, solubility, etc. of the members of a homologous series show almost regular variation in ascending or descending the series.

i. Write two characteristics of homologous series. (1)

ii. What are the fourth and fifth members of the alcohol homologous series? Write their name with the formula. (1)

iii. Draw structure of Butanol. (2)

OR

What is heteroatom? (2)

29. i. Five solutions A, B, C, D and E when tested with pH paper showed pH as 4, 1, 13, 7 and 10 respectively. Which solution is: **[5]**

(1) Strongly acidic (2) Strongly alkaline (3) Weakly acidic (4) Neutral and (5) Weakly alkaline? Arrange the solutions in increasing order of H^+ion concentration.

ii. Write the name and formula of (1) an acidic salt and (2) a basic salt giving the name of the parent acid and parent base used to form the salt in each case.

OR

Write the main difference between an acid and a base. With the help of suitable examples explain the term neutralization and the formation of -

i. acidic,

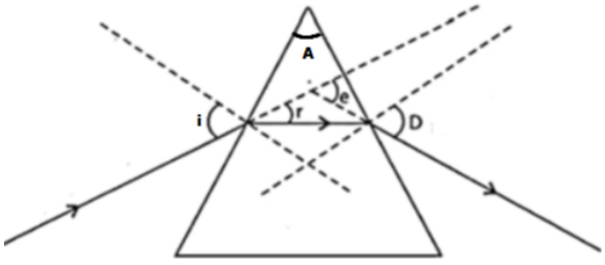
ii. basic and

iii. neutral salts.

Section C

30. Study the following figure in which a student has marked the angle of incidence (∠i), angle of refraction (∠r), angle of emergence (∠e), angle of prism (∠A) and the angle of deviation (∠D). The correctly marked angles **[1]**

are:



a) ∠A, ∠i and ∠D

b) ∠A, ∠i and ∠r

c) ∠A, ∠i, ∠r and ∠D

d) ∠A and ∠i

31. Which of the following statement is incorrect? **[1]**

A. A ray of light passing from an optically rarer medium to an optically denser medium bends away from the normal.

B. A ray of light passing from an optically denser medium to an optically rarer medium bends away from the normal.

C. A ray of light passing from an optically rarer medium to an optically denser medium bends toward the normal.

D. A ray light passing from an optically denser medium to an optically rarer medium bends towards the normal.

a) A, B and D

b) B and C

c) A and C

d) A and D

32. **Assertion (A):** Force experienced by moving charge will be maximum if direction of velocity of charge is perpendicular to applied magnetic field. **[1]**

Reason (R): Force on moving charge is independent of direction of the applied magnetic field.

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

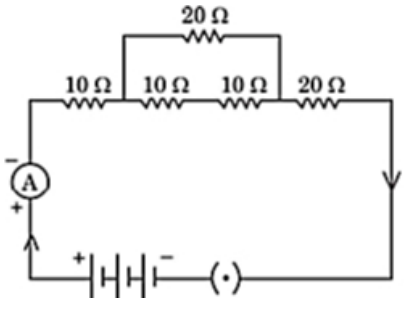
b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

33. State Snell's law of refraction of light. Write an expression for the absolute refractive index of a medium in terms of speed of light. **[2]**

34. Calculate the equivalent resistance of the following electric circuit: **[2]**



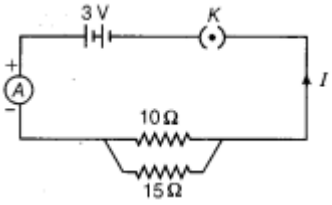
OR

a. Write the mathematical expression for Joule's law of heating.

b. Compute the heat generated while transferring 96000 coulomb of charge in two hours through a potential difference of 40 V.

35. What are the common defects of vision that can be corrected by the use of suitable eyeglasses or spectacles? **[3]**

36. Study the following circuit and answer the questions that follows: **[3]**



i. How much current is flowing through

a. 10Ω and

b. 15Ω resistor?

ii. What is the ammeter reading?

37. a. Draw the pattern of magnetic field lines produced by a current carrying circular loop showing the direction of current in the loop and the direction of the magnetic field lines. **[3]**

b. State the rule which can be applied to know the direction of magnetic field lines in the above case.

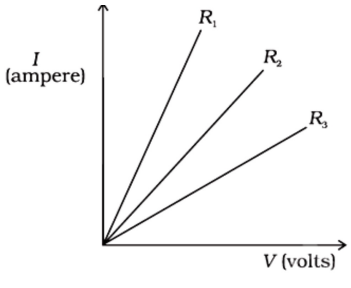
38. **Read the following text carefully and answer the questions that follow:** **[4]**

In 1827, a German physicist Georg Simon Ohm (1787-1854) found out the relationship between the current I, flowing in metallic wire and the potential difference across its terminals. He stated that the electric current flowing through a metallic wire is directly proportional to the potential difference V, across its ends provided its temperature remains the same.

The resistance of a circuit is defined as the ratio between the voltage applied to the current flowing through it. Rearranging the above relation,

$R = \frac{V}{I}$

Electric charge flows easily through some materials than others. The electrical resistance measures how much the flow of this electric charge is restricted within the circuit.



i. What is the unit of electrical resistance? (1)

ii. Define Ohm's law. (1)

iii. From graph which resistance have high resistance? (2)

OR

What does the slope of V-I graph at any point represent? (2)

39. An object 6 cm in size is placed at 50 cm in front of a convex lens of focal length 30 cm. At what distance from the lens should a screen be placed in order to obtain a sharp image of the object? Find the nature and size of the image. Also draw labelled ray diagram to show the image formation in this case. **[5]**

OR

i. A person suffering from myopia (near-sightedness) was advised to wear the corrective lens of power -2.5 D. A spherical lens of the same focal length was taken in the laboratory. At what distance should a student place an object from this lens so that it forms an image at a distance of 10 cm from the lens?

ii. Draw a ray diagram to show the position and nature of the image formed in the above case.

Solution

Section A

1. **(a)** takes place in yeast during fermentation
   Explanation:
   takes place in yeast during fermentation
2. **(a)** Tt and Tt
   Explanation:
   Tt and Tt
3. **(d)** (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
   Explanation:
   - The cerebrum is the largest part of the brain, located superiorly and anteriorly in relation to the brainstem.
   - The primary function of Cranial meninges is to protect the nervous system. It is a three-layer protective tissue that surrounds the neuraxis.
   - Olfactory lobe Either member of a pair of lobes in the forebrain.
   - At the anterior end of the cerebrum; the part of the brain at the back of the skull in vertebrates, which coordinates and regulates muscular activity.
4. **(a)** Neuromuscular junction
   Explanation:
   In a nerve cell, the site where the electrical impulse is converted into a chemical signal is known as Neuromuscular junction.
5. **(c)** 10%
   Explanation:
   10%
6. **(a)** Nephron
   Explanation:
   Nephron
7. **(a)** Chemical energy
   Explanation:
   The autotrophs capture the energy present in sunlight and convert it into chemical energy. Therefore, the energy available for transfer from one trophic level to the next trophic level in an ecosystem is in the form of chemical energy. When one form of energy is changed to another, some energy is lost.
8. **(a)** X and Y only
   Explanation:
   A flower's ovary develops into the flower's fruit. Because Flowers X and Y both contain ovaries, they can both develop into fruit.
9. **(c)** A is true but R is false.
   Explanation:
   X chromosomes in the child is inherited from mother and may be inherited by father also.
10. a. If the egg is not fertilized it leads to menstruation.
    b. Bacterial infection - Syphilis and Chlamydia
    Viral infection - AIDS and Hepatitis.

11. a. The household waste or rubbish produced in our day-to-day life is called garbage. For example, spoilt food, vegetable peels, leaves, wood, grass, paper, plastic, etc.

Garbage is classified into the following two types:

i. Biodegradable garbage - Garbage that can be decomposed naturally. Examples - vegetable peels, leaves, paper, etc.

ii. Non-Biodegradable garbage - Garbage that cannot be decomposed naturally. Examples - metal, plastics, etc.

b. Catalyst , Enzymes are biological molecules, usually proteins, that catalyze chemical reactions by lowering the activation energy required for the reaction to occur. Each enzyme is designed to catalyze a specific chemical reaction, and it does so by recognizing and binding to a specific substrate or group of substrates.

OR

Use of Plastic cups raised the concern towards hygiene thus they were replaced by disposable plastic cups.

Plastic cups are non-biodegradable and harm the environment friendly. They were thus replaced by Kulhads.

Making Kulhad made of clay on a large scale resulted in the loss of top fertile soil.

Now, disposable paper cups are used because - the paper can be recycled, it is biodegradable and is eco-friendly material which does not cause environmental pollution.

12. i. A - Sensory neuron or Nerve, B - Relay neuron or Interneuron, C - Effector

ii. The functions of A and C are:

A: The sensory neuron conducts the nerve impulses towards the Central Nervous System (CNS). The CNS is comprised of the brain and the spinal cord.

C: The effector organ shows response by contracting or secreting a product.

iii. Animals have evolved reflex arcs because the brain's reasoning process is too slow for them. Reflex arcs have probably developed as an efficient means of surviving in the absence of actual cognitive processes. However, reflex arcs continue to be more effective for fast responses even after the development of complex neuron networks.

13. i. In first generation progeny (F_1 progeny) all plants with round seeds.

ii. In second generation progeny (F_2 progeny) all plants with round and wrinkled seeds.

iii. (i) Tall and drawrf plants.

(ii) Yellow and green seeds.

(iii) White and purple flowers.

14. i. Rhizopus

ii. a. Reproductive part - sporangia

b. Non reproductive part - Hyphae

- Large number of spores are formed
- survive in unfavourable conditions

15. i. **Cloudy days:** The rate of photosynthesis during cloudy days decreases due to less light intensity of light which is one of the essential element for it.

ii. **No rainfall in the area:** The rate of photosynthesis decreases in no rainfall area as water is one of the main raw material needed by plants for photosynthesis. Water also brings other nutrients along with it. If there is no rainfall in an area, there will be less water available to plants resulting in the decrease of photosynthesis process

iii. **Good manuring in the area:** The rate of photosynthesis will increase because plants need raw minerals such as N, P, Fe, Mg etc., for performing the various functions as well as for their growth. They take these minerals from the soil along with the water in dissolved form so Good manuring in the area increase the amount of these minerals in the soil and also help them to provide micro as well as macro nutrients thus, increasing the rate of photosynthesis.

iv. **Stomata get blocked due to dust:** Blockage of stomata will reduce the rate of photosynthesis because blockage will affect availability pf Carbon-di-oxide.

16. i. Unisexual flowers have either stamens or carpels but not both.

Eg - Papaya and watermelon

Bisexual flowers have both stamens and carpels. Here are some examples of each: eg - Hibiscus and mustard

ii. A - Pollen grain

B - Stigma

C - Pollen tube

D - Female germ cell

iii. Pollination may occur without fertilization but fertilization will not take place without pollination because pollination does not depend on fertilization but fertilization cannot take place without pollination because for fertilization to occur, it requires both

male and female gametes.

OR

i.

Hormonal coordination in Plants	Hormonal coordination in Animals
1) By simple diffusion	Transported through blood to the target organ.
2) No specialised glands involved.	Hormone released by Endocrine glands.

ii. 1. Cerebrum/forebrain
2. Cerebellum/hindbrain
3. Medulla/hindbrain
4. Hypothalamus/forebrain.

iii. Brain is protected I - Bony box/skull/cranium/fluid filled balloon in skull,
Spinal cord is protected in - Backbone/Vertebral column.

Section B

17.

(b) A and D

Explanation:

Both (A) and (D) are correct. Higher the pH, stronger is the base. Basicity of a solution increases from pH value 8 to14. Lower the pH, higher is the acidity. Acidity of a solution increases from 6 to 0.

18.

(c) Statement B is true; Statement A is false.

Explanation:

- The bromine water test is a test for unsaturated hydrocarbons. Ethane undergoes addition reaction and decolorizes bromine water. Similarly, ethyne also decolorizes bromine water.
- The mixture of water and alcohol is used in radiators of vehicles in cold countries. Alcohol is used for antifreeze mixture. Antifreeze is an additive that lowers the freezing point of a water-based liquid.

19.

(d) Gallium

Explanation:

Gallium

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

Explanation:

- Ionic bonds are formed between cations and anions.
- Catenation is the linkage of atoms of the same element into longer chains. Catenation occurs most readily in carbon.
- Pyridine is added to alcohol to make it unsuitable for drinking.
- Most of the synthetic detergents are non-biodegradable. They cannot be decomposed by micro-organisms like bacteria.

21.

(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.

22.

(c) (ii) and (iv)

Explanation:

(ii) and (iv)

Carbon compounds is that they are poor conductors of electricity and do not have strong forces of attraction between their molecules.

23.

(c) tartaric acid

Explanation:

Juice of tamarind turns blue litmus to red. It is because of the presence of an acid called tartaric acid.

24.

(d) Both A and B are metals

Explanation:

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

25. a. Compound **X** is Carbon Dioxide (CO_2); Compound **Y** is Calcium Carbonate ($CaCO_3$); Compound **Z** is Calcium Hydrogen Carbonate [$Ca(HCO_3)_2$].

b. i. $CaCO_3(s) + 2\ HCl\ (l) \rightarrow CaCl_2\ (aq) + H_2O\ (l) + CO_2(g)$

ii. $Ca(OH)_2\ (aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O(l)$

26. Displacement reaction is a type of reaction in which a more reactive element displaces another less reactive element. The reactivity series of metals can be used to find out the displacement reaction.

Chemical equation for a displacement reaction in which Iron is a reactant:

$Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

One more element whose behaviour is similar to that of iron in such reaction is Zn.

$Zn + 2HCl \rightarrow ZnCl_2 + H_2\uparrow$

This is not shown by Gold as it is the least reactive element.

OR

a. Double decomposition reaction [An exchange of ions took place]

b. Displacement reaction [A more reactive non-metal displaces a less reactive non-metal from its salt solution.]

c. Decomposition reaction/Reduction reaction [A compound decomposes to form two or more products./CuO is reduced to Cu.]

27. i. Metals low in activity series can be reduced to pure metals just by heating their oxides in presence of air, example mercury (Hg):

$$\underset{\text{Mercurous oxide}}{2HgO(s)} \xrightarrow{\text{Heat}} \underset{\text{Mercury}}{2Hg(l)} + O_2(g)$$

ii. a. The given reaction is a displacement reaction.

b. Aluminium is more reactive than manganese used as a reducing agent, as Al is capable of replacing Mn from MnO_2.

28. i. P and T belongs to same homologous series i.e. alkynes

ii. The name of Compound R is Ethanol. The functional group present in it is Alcohol (-OH).

iii. The IUPAC name of compound T is Ethyne whereas of U is Ethane

OR

A hydrocarbon in which two carbons are connected by double or triple bond is called unsaturated hydrocarbon.

P, T, U are examples of unsaturated hydrocarbons.

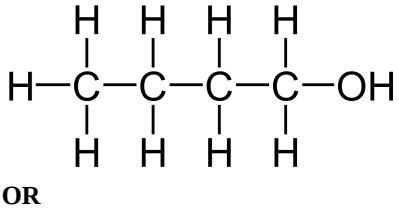
OR

i. 1. All the members of a homologous series can be represented by same general formula.

2. All the members of homologous series show similar chemical properties.

ii. Fourth member is butanol C_4H_9OH.

Fifth member is pentanol $C_5H_{11}OH$

iii. 

OR

An organic compound having atom other than carbon and hydrogen is called hetroatom.

29. i. 1. Strongly acidic -Solution B
2. Strongly alkaline - Solution C
3. Weakly acidic- Solution A
4. Neutral - Solution D
5. Weakly alkaline- Solution E

Increasing Order of H^+ ion concentration :– C < E < D < A < B

ii. 1. Acidic salt: Ammonium chloride; NH4Cl
Parent Acid- Hydrochloric acid /HCl
Parent Base- Ammonium hydroxide/(NH_4OH)

2. Basic salt: Sodium Carbonate; Na_2CO_3

Parent Acid- Carbonic acid/H_2CO_3

Parent Base- Sodium hydroxide/NaOH

OR

Acid	Base
An acid produces H^+ ions in aqueous solution	A base produces OH^- ions in aqueous solution.
Acids are sour in taste.	Bases are bitter in taste
Acids change the colour of blue litmus to red.	Bases change the colour of red litmus to blue.

Neutralization - A reaction of an acid with a base to produce salt and water.

i. Acidic - When strong acid reacts with a weak base, acidic salt is formed.
$NaOH + HCl \rightarrow NaCl + H_2O$

ii. Basic - When a weak acid reacts with a strong base, basic salt is formed.
$NaOH + H_2CO_3 \rightarrow Na_2CO_3 + H_2O$

iii. Neutral - When strong acid reacts with a strong base or weak acid react with a weak base, the neutral salt is formed.
$KOH + HNO_3 \rightarrow KNO_3 + H_2O$

Section C

30.

(d) ∠A and ∠i
Explanation:
∠A and ∠i

31.

(b) B and C
Explanation:
A ray of light passing from an optically denser medium to an optically rarer medium bends away from the normal, and a ray of light passing from an optically rarer medium to an optically denser medium bends toward the normal.

32.

(c) A is true but R is false.
Explanation:
From equation F = qvB sinθ
Force on moving charge will be maximum if the direction of the velocity of charge is perpendicular to direction of magnetic field (when $\theta = 90^o$)

33.

- Statement of Snell's Law: The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for the given pair of media.
If i is the angle of incidence and r is the angle of refraction, then.
$\frac{\sin i}{\sin r} = \text{constant}$
- Absolute Refractive Index of a medium $= \frac{\text{Speed of Light in vacuum}}{\text{Speed of Light in the medium}}$

34. $R_S = R_3 + R_4 = 10 + 10 = 20\ \Omega$

$\frac{1}{R_P} = \frac{1}{R_2} + \frac{1}{R_S}$

$= \frac{1}{20} + \frac{1}{20} = \frac{1}{10}\Omega$

$R_p = 10\ \Omega$

Total equivalent resistance = $R = R_1 + R_P + R_5$

$= R = 20 + 10 + 10 = 40\ \Omega$

OR

a. The mathematical expression of the Joules Law of heating is: $H = I^2 Rt$

Here, H is a heating effect, I is the current flowing through the device and t is the time taken.

b. Given:

Amount of charge transferred = 96000 C

Time taken = 2hrs = $2 \times 60 \times 60$ sec = 7200 sec

Potential difference = 40 V

Heat generated = $V \times I \times t$

and we know that; $I = \frac{Q}{t}$

So, H = VQ

$= 40 \times 96000$

$= 3.84 \times 10^6$ J

35. There are mainly four common defect of vision that can be corrected by the use of suitable eyeglasses or spectacles. There are

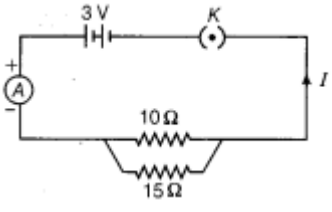
i. Myopia or near-sightedness,

ii. Hypermetropia or far-sightedness,

iii. Presbyopia, and

iv. Astigmatism

36. Given,



i. Current through

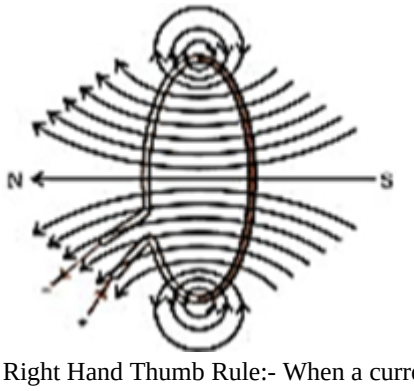
a. 10Ω resistor, $I_1 = \frac{V}{R} = \frac{3}{10} = 0.3A$

b. 15Ω resistor, $I_2 = \frac{V}{R} = \frac{3}{15} = 0.2A$

ii. Current flowing through the circuit $= 0.3 + 0.2 = 0.5A$

Thus, the ammeter reading is 0.5 A.

37. a.



b. Right Hand Thumb Rule:- When a current carrying straight conductor is held in the right hand in such a way that the thumb points towards the direction of the current, then the fingers will wrap around the conductor in the direction of the field lines of the magnetic field

38. i. Ohm is the unit of electrical resistance.

ii. According to Ohm's law, there is a relation between the current flowing through a conductor and the potential difference across it. It is given by,

$V \propto I$ $V = IR$

iii. R_3 resistance has high resistance.

OR

The slope of V-I graph at any point represents resistance.

39. Given,

f = 30cm

u = - 50 cm

h = 6cm

Lens formula

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

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

$$\frac{1}{v} = \frac{1}{30} - \frac{1}{50}$$

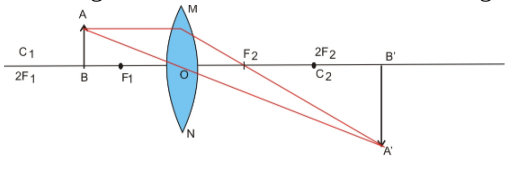
$$v = +75 \text{ cm}$$

$$m = \frac{v}{u} = \frac{h_i}{h}$$

$$\frac{75}{-50} = \frac{h_1}{6}$$

h_i = -9cm

The image formed is real, increased and enlarged.



OR

i. Given:

distance of image from the lens, i = 10 cm

power of the lens, P = -25 D

Now the focus of the lens:

$$P = \frac{1}{f}$$

where:

f = focal length

$$-25 = \frac{1}{f}$$

f = -0.04 m = -4 cm

From the equation of lens:

$$\frac{1}{f} = \frac{1}{i} + \frac{1}{o}$$

where:

o = distance of the object

$$-\frac{1}{4} = \frac{1}{10} + \frac{1}{o}$$

$\rho = -\frac{20}{7}$ cm i.e. negative sign means that the image formed is on the same side as that of the object.

ii.