

Class X Session 2025-26

Subject - Science

Sample Question Paper - 06

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. The process in which loss of water in the form of vapours from the aerial parts of plants takes place is X, which helps in Y. Here X and Y respectively are: [1]

- a) transpiration and photosynthesis. b) translocation and absorption of water and minerals from soil by roots.
- c) translocation and movement of soluble products of photosynthesis in phloem. d) transpiration and temperature regulation.

2. A zygote is formed by the fusion of a male gamete and a female gamete. The number of chromosomes in the zygote of a human is [1]

- a) 23 b) 92
- c) 46 d) 44

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

Column A	Column B
(i) The master gland	(a) Control cell division and cell growth
(ii) Cytokinin	(b) Regulates metabolism
(iii) Insulin	(c) Reduces blood sugar
(iv) Thyroxine	(d) Pituitary gland

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

4. In plants the role of cytokinin is: [1]

- a) Promote the opening of stomatal pore. b) Help in the growth of stem.
- c) Wilting of leaves. d) Promote cell division.

5. A food chain will be more advantageous in terms of energy if it has [1]



- a) 3 trophic levels
- b) 2 trophic levels
- c) 5 trophic levels
- d) 4 trophic levels

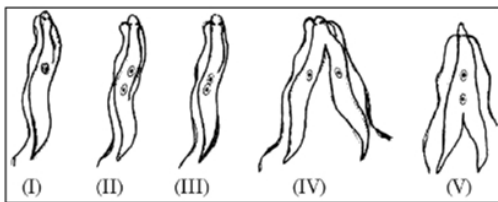
6. One of the events that does not occur during photosynthesis is: [1]

- a) Chlorophyll absorbs solar energy.
- b) Carbon dioxide is released during the process.
- c) Carbon dioxide is absorbed during the process.
- d) Oxygen is released during the process.

7. Identify the food chain in which the organisms of the second trophic level are missing: [1]

- a) Tiger, grass, snake, frog
- b) Grasshopper, grass, snake, frog, eagle
- c) Grass, goat, lion
- d) Zooplankton, Phytoplankton, small fish, large fish

8. Choose the correct order of the stages of binary fission in Leishmania. [1]



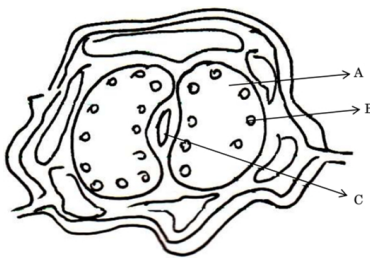
- a) I, III, V, II, IV
- b) I, III, II, V, IV
- c) I, II, III, V, IV
- d) I, II, III, IV, V

9. **Assertion (A):** Sex of the children will be determined by what they inherit from their mother. [1]

Reason (R): Women have XX sex chromosomes.

- 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. Identify the following diagram and name the parts marked as A, B and C [2]



- 11. a. Write the percentage of (i) solar energy captured by the autotrophs and (ii) energy transferred from autotrophs to the next level in a food chain. [2]
- b. What are trophic levels? Why do different food chains in an ecosystem not have more than four to five trophic levels? Give reason.

OR

How do harmful chemicals get accumulated progressively at each trophic level in a food chain?

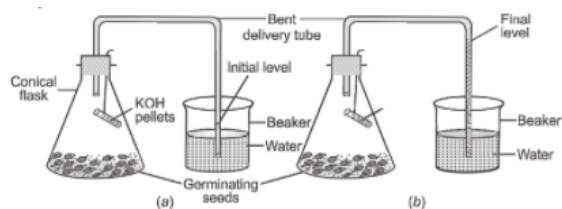
12. Why is the use of iodised salt advisable? [2]

13. a. Name the two types of gametes produced by men. [3]

b. Does a male child inherit X chromosome from his father? Justify.

c. How many types of gametes are produced by a human female?

14. What is placenta? Describe its role during pregnancy. [3]
15. Study the fig (a) and (b). What difference you observe in the figure (b)? Give a justified reason for your answer. [4]



16. i. Use of a condom is beneficial for both the sexes involved in a sexual act. Justify this statement giving two reasons. [5]
- ii. How do oral contraceptive help in avoiding pregnancies?
- iii. What is sex selective abortion? How does it affect a healthy society? (State any one consequence)

OR

- i. What are tropic movements? Give an example of a plant hormone which (1) inhibits growth and (2) promotes cell division.
- ii. Explain directional movement of a tendril in pea plant in response to touch. Name the hormone responsible for this movement.

Section B

17. Which one of the following statements is **not** correct? [1]

- a) Some of the metals react with acids to give salt and hydrogen gas.
- b) Generally, all metal carbonates react with acids to give salt, water and carbon dioxide.
- c) All metal oxides react with water to give salt and hydrogen gas.
- d) Some non-metal oxides react with water to form acids.

18. Which of the given statement is true or false: [1]

Statement A: Valeric acid is the common name of hexane.

Statement B: Glycerol is added in the manufacturing of soap.

- a) Statement B is true and statement A is false
- b) Neither statement A nor statement B is false
- c) Both the statements A and B are false
- d) Statement A is true and statement B is false

19. The metals which are found in both free state as well as combined state are: [1]

- a) Gold and silver
- b) Gold and platinum
- c) Platinum and silver
- d) Copper and silver

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

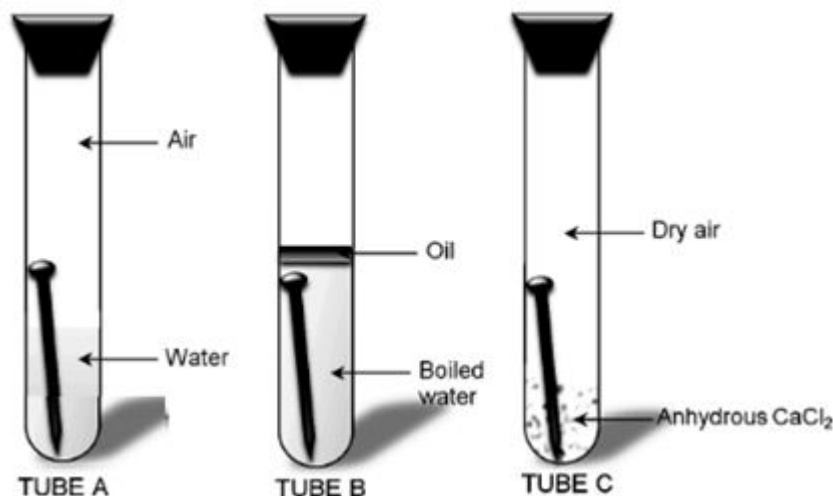
Column A	Column B
(i) Welding	(a) Ethyl alcohol
(ii) Fuel in a spirit lamp	(b) Ester
(iii) Lime water turns milky	(c) Carbon dioxide
(iv) Fruity smell	(d) Ethyne and oxygen

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



21. Take three boiling tubes A, B and C. Pour some water in test tube A Put iron nails in it and cork it. Pour boiled distilled water in another test tube B and put iron nails in it. Add 1 ml of oil over it such that oil floats over it and prevents the air from entering. Take some iron nails in test tube C and put some anhydrous calcium chloride in it and cork it. [1]

Leave all the three test tubes for one day and then observe.



In which test tube nail is rusted?

- a) Tube A
b) Tube B and C
c) Tube A and C
d) Tube B
22. You want to test for hardness of water but hard water is not available in the laboratory. Which of the following compounds may be dissolved in pure water to make it hard? [1]
- i. Hydrogen Carbonate of Sodium
ii. Sulphate of Magnesium
iii. Chloride of Calcium
iv. Carbonate of Sodium
- a) (i) and (ii)
b) (ii) and (iii)
c) (i) and (iv)
d) (iii) and (iv)
23. An aqueous solution **A** turns phenolphthalein solution pink. On addition of an aqueous solution **B** to **A**, the pink colour disappears. The following statement is true for solution **A** and **B**. [1]
- a) A has pH greater than 7 and B has pH less than 7.
b) A is strongly basic and B is a weak base.
c) A is strongly acidic and B is a weak acid.
d) A has pH less than 7 and B has pH greater than 7.
24. Dried fruit plastic bags sold in the market are filled with: [1]
- a) All of these
b) Hydrogen gas
c) Nitrogen gas
d) Helium gas
25. Kedar heated a few crystals of copper sulphate in a dry boiling tube. [2]
- a. What will be the color of the copper sulphate after heating?
b. Will you notice water droplets in the boiling tube?

c. Where have these come from?

26. 2g of silver chloride is taken in a china dish and the china dish is placed in sunlight for some time. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. [3]

OR

State one characteristic each of the chemical reaction which takes place when:

- Dilute hydrochloric acid is added to sodium carbonate.
 - Lemon juice is added gradually to potassium permanganate solution.
 - Dilute sulphuric acid is added to the barium chloride solution.
 - Quick lime is treated with water.
 - Wax is burned in the form of a candle.
27. Nikita took Zn, Al, Cu, Fe, Mg and Na metal and put each metal in cold water and then hot water. She reacted the metal with steam [3]
- Name the metal which reacts with cold water.
 - Which of the above metals react with steam?
 - Name the metal which reacts with hot water.
 - Arrange these metals in order of increasing reactivity.

28. **Read the following text carefully and answer the question that follow:** [4]

As neutral atom carbon has electronic configuration $\overset{K}{2}, \overset{L}{4}$. To gain inert gas configuration carbon can either donate 4 valence electrons (helium gas configuration) or gain 4 electrons (neon gas configuration), but it cannot do so. To acquire inert gas configuration carbon can only share its 4 valence electrons with other atoms forming covalent bonds. A covalent bond can be defined as a chemical bond formed between two atoms by mutual sharing of valence electrons so that each atom acquires the stable electronic configuration of the nearest noble gas. The concept of covalent bonds was given by Langmuir and Lewis to explain bonding in non-ionic compounds. The covalent bonds are of three types. If each atom contributes one electron, the covalent bond formed is called a single covalent bond and is represented by a single line (-) and if each atom contributes two electrons, the covalent bond formed is called a double bond and is represented by a double line (=) and if each atom contributes three electrons, the covalent bond formed is called a triple bond and is represented by a triple line (\equiv).

- Define Catenation. (1)
- What are names given for carbon atoms linked with single, double, triple bond? (1)
- Define Valency and write two examples of molecules containing double bond. (2)

OR

Draw the electron dot structure for Cl_2 molecule. (2)

OR

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

Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Answer the following questions:

- What are hydrocarbons? (1)



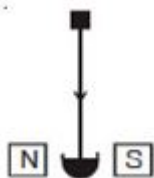
- OR**

29. i. Define water of crystallisation. [5]

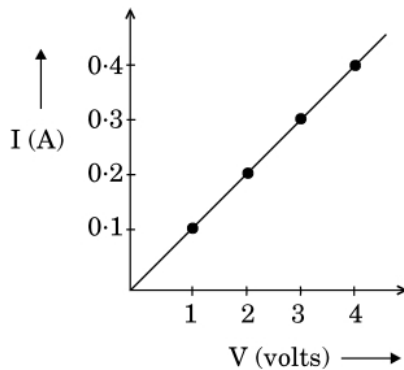
ii. Write the chemical name and formula of a compound having water of crystallisation in its molecule and appears blue.

iii. Write the chemical formula of bleaching powder. Write a balanced chemical equation of the reaction involved in its preparation. List its three uses.

- i. Write the common names of **X**, **Y** and **Z**, and the chemical formula of **Y**.
- ii. How is **Y** prepared and how does it help in making cakes soft and spongy? Illustrate the reaction with suitable chemical equation.
- iii. Write the name and chemical formula of a mild base other than **Y** used as an antacid.

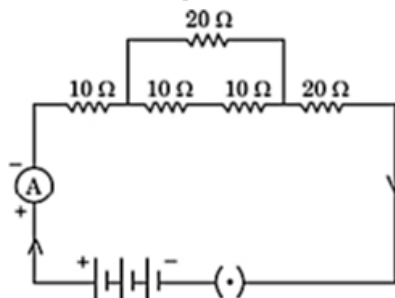


- What does the graph depict about the dependence of current on the potential difference?
- Find the current that flows through the resistor when the potential difference across it is 2.5 V.



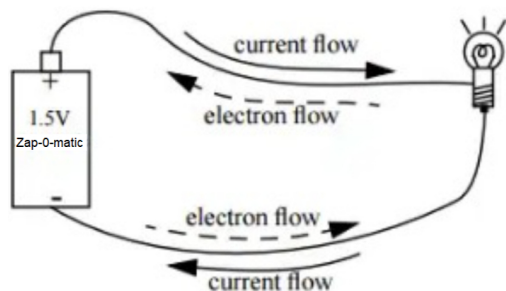
OR

Calculate the equivalent resistance of the following electric circuit:



- What are the common defects of vision that can be corrected by the use of suitable eyeglasses or spectacles? [3]
- Should the resistance of an ammeter be low or high? Give reason. [3]
- Draw the pattern of magnetic field lines around a bar magnet. Mark the position of North Pole, South Pole and the places where the magnetic field is strongest. [3]
 - Why do the magnetic field lines not intersect each other?
- Read the following text carefully and answer the questions that follow:** [4]

The rate of flow of charge is called electric current. The SI unit of electric current is Ampere (A). The direction of flow of current is always opposite to the direction of flow of electrons in the current.



The electric potential is defined as the amount of work done in bringing a unit-positive test charge from infinity to a point in the electric field. The amount of work done in bringing a unit positive test charge from one point to another point in an electric field is defined as potential difference.

$$V_{AB} = V_B - V_A = \frac{W_{BA}}{q}$$

The SI unit of potential and potential difference is volt.

- Write the formula of voltage in terms of work done, current, time and charge.
- What is the number of electrons flowing per second in a conductor if 1 A current is passing through it?
- What would be the potential difference between the two terminals of a battery, if 100 joules of work is required to transfer 20 coulombs of charge from one terminal of the battery to other?

OR

The 2 C of charge is flowing through a conductor in 100 ms, then what would be the current in the circuit?

39. a. List four characteristics of the image formed by a convex lens when an object is placed between its optical centre and principal focus. [5]
- b. Size of the image of an object by a concave lens of focal length 20 cm is observed to be reduced to $\frac{1}{3}$ rd of its size. Find the distance of the object from the lens.

OR

- i. Define principal axis of a lens. Draw a ray diagram to show what happens when a ray of light parallel to the principal axis of a concave lens passes through it.
- ii. The focal length of a concave lens is 20 cm. At what distance from the lens should a 5 cm tall object be placed so that its image is formed at a distance of 15 cm from the lens? Also calculate the size of the image formed.



Solution

Section A

1.
(d) transpiration and temperature regulation.
Explanation:
transpiration and temperature regulation.
2.
(c) 46
Explanation:
46
3. (a) (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
Explanation:
 - The pituitary gland is a master gland that produces growth hormones.
 - Cytokinins are a group of hormones that promote cell division in plant roots and shoots and the growth of buds.
 - The insulin hormone is secreted by the pancreas which maintains blood sugar level in the body.
 - Thyroxine a hormone that is made by the thyroid gland and is one of the most important thyroid hormones and it also maintains metabolism in the body.
4.
(d) Promote cell division.
Explanation:
In plant cells, cytokinins encourage cell division, Plant roots and shoots contain it.
5.
(b) 2 trophic levels
Explanation:
2 trophic levels
6.
(b) Carbon dioxide is released during the process.
Explanation:
During this process, the following things take place:
 - i. Chlorophyll's absorption of light energy.
 - ii. Splitting of water molecules into hydrogen and oxygen and the conversion of light energy into chemical energy.
 - iii. Carbon dioxide is converted to carbohydrates.
$$\begin{array}{ccccccc} 6\text{CO}_2 & + & 6\text{H}_2\text{O} & \xrightarrow{\text{photosynthesis}} & \text{C}_6\text{H}_{12}\text{O}_6 & + & 6\text{O}_2 \\ \text{carbon dioxide} & & \text{water} & & \text{glucose} & & \text{oxygen} \end{array}$$
7. (a) Tiger, grass, snake, frog
Explanation:
Tiger, grass, snake, frog
8.
(b) I, III, II, V, IV
Explanation:
In Leishmania binary fission occurs in a definite orientation:
 - i. A constriction in the cell membrane first appears after nuclear division.



- ii. Inwardly transversely from the centre of the dividing cell, the membrane expands.
- iii. The cytoplasm divides into two equal pieces, each with a single nucleus
- iv. The daughter cells can split off and create two new creatures.

9.

(d) A is false but R is true.

Explanation:

A is false but R is true.

10. Stomata

- A. Guard Cell
- B. Chloroplast
- C. Stoma

11. a. In a food chain, autotrophs use around 1% of sunlight to prepare their own food. After that, all the next levels gain 10% of the energy that the previous level acquired. For example: Let you have a food chain with 4 levels.
- b. Trophic level is defined as the position of an organism in the food chain and ranges from a value of 1 for primary producers to 5 for marine mammals and humans. There is only 10% flow of energy from one trophic level to the next higher level. The loss of energy at each step is so great that very little usable remains after four or five trophic levels. Hence only 4 to 5 trophic levels are present in each food chain.

OR

Biomagnification is the process by which a harmful chemical enters the food chain and gets accumulated progressively at each trophic level in a food chain.

12. Iodine is required by the thyroid gland to make thyroxine hormone. Iodised salt provides iodine needed by thyroid gland to make sufficient thyroxine for our body. The use of iodised salt prevents risk of goitre.
13. a. Sperm having X chromosome and sperm having Y chromosome
- b. No, As male child gets only Y chromosome from his father and X chromosome from mother to have XY chromosome.
- c. One type/only ovum/egg
14. Placenta is a special tissue which provides nutrition to the embryo from the mother's blood.

Role:

- i. Provides a large surface area to transport glucose and O_2 from mother's blood to embryo.

15. In the fig (b) the water level in the bent delivery tube has risen up. It is because of absorption of carbon dioxide by KOH pellets in the tube, the air from bent tube moves into the conical flask, resulting in rising of the water level.
16. i. Use of condoms are beneficial for both the sexes as it prevents the spread of sexual transmitted diseases (STDs).
- condoms which are put on penis(in males) and on vagina (in females) before starting coital activity .
 - These are popularly called Nirodh.
 - These are very widely used contraceptives in India because they are easily available, low cost, reliable, effective, and with no side effects .these also prevent the spread of sexually transmitted diseases like AIDs, syphilis,etc.
- ii. • Physiological devices such as oral contraceptives are taken through mouth .
- These contain a combination of synthetic progestins (acting like progesterone) and estrogens, so-called combined pills.
 - These combination inhibit the secretion of FSH and LH from anterior lobe of pituitary gland. These also retarded the entry of sperms in the uterus.
- iii. Sex selective abortion is aborting a child on the basis of sex .it effects a healthy society in most negative way as it disturbs the sex ratio in the population and now a sex selective abortion is a crime.

OR

- i. Plant growth movements in response to stimuli in a particular direction/directional movements due to light, gravity etc. Is known as tropic movement.
 - Plant growth inhibitor: Absciscic Acid
 - Promotes cell division - Cytokinins
- ii. When the tendrils come in contact with any support, auxins move away from the point of contact of the support. More growth occurs on the side away from the support. As a result, unequal growth occurs on its two sides and thus tendrils coil/ circle



around the support.

Hormone - Auxins

Section B

17.

(c) All metal oxides react with water to give salt and hydrogen gas.

Explanation:

All metal oxides react with water to give salt and hydrogen gas.

18.

(c) Both the statements A and B are false

Explanation:

Valeric acid is another name for pentanoic acid. **Soaps** are sodium or potassium salts of long-chain fatty acids. When triglycerides in fat/oil react with aqueous NaOH or KOH, they are converted into **soap** and glycerol.

19.

(d) Copper and silver

Explanation:

Copper and silver

20.

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

Explanation:

- The oxyacetylene welding process uses a combination of ethyne (C_2H_2) and oxygen gas to provide a high-temperature flame. It is commonly used to permanently join mild steel.
- Alcohol meant for industrial purposes (fuel for spirit lamps) is made unfit for human consumption by adding small amounts (about 5%) of methanol to alcohol. The mixture is known as denatured spirit or denatured alcohol.
- Carbon dioxide turns lime water turns milky due to the formation of insoluble calcium carbonate.
- Esters have a fruity smell and are used in perfumes and cosmetics due to their characteristic odour.

21. **(a)** Tube A

Explanation:

Iron nails get rusted in test tube A because both air and water are present in it. Iron nails do not get rusted in B because there is water but no air. In C, rusting will not take place because there is neither air nor water.

22.

(c) (i) and (iv)

Explanation:

(i) and (iv)

23. **(a)** A has pH greater than 7 and B has pH less than 7.

Explanation:

A has pH greater than 7 and B has pH less than 7.

24.

(c) Nitrogen gas

Explanation:

Nitrogen prevents the oxidation of dried fruits. It is used to prevent rancidity.

25. a. The blue colour of the copper sulphate crystals turns to white.

b. Yes, we will notice water droplets in the boiling tube.

c. Copper sulphate crystals ($CuSO_4 \cdot 5H_2O$) have water of crystallization as the part of crystals which gets removed on heating.



26. • In this reaction, we will observe that the white colour of Silver chloride changes to Greyish white due to the formation of Silver metal. The decomposition of silver chloride is caused by light. This reaction is used in black and white photography.
- $2\text{AgCl(s)} \xrightarrow{\text{Sunlight}} 2\text{Ag(s)} + \text{Cl}_2\text{(g)}$
- Decomposition reaction / Photolytic decomposition.

OR

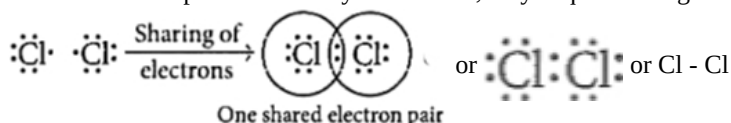
- i. When dilute hydrochloric acid is added to sodium carbonate - Evolution of carbon dioxide gas takes place.
- ii. Lemon juice is added gradually to potassium permanganate solution - Change its colour from purple to colourless.
- iii. When dilute sulphuric acid is added to the barium chloride solution - Formation of white precipitate of barium sulphate.
- iv. Quick lime is treated with water - change in temperature.
- v. Wax is burned in the form of a candle - Change in state from solid to liquid and gas.
27. (i) Na
- (ii) Al, Zn, Fe
- (iii) Mg
- (iv) $\text{Na} > \text{Mg} > \text{Al} > \text{Zn} > \text{Fe} > \text{Cu}$

28. i. Catenation can be defined as the self-linking property of atoms of an element through a covalent bond so as to form large chain, rings, branched chain of varying length.
- ii. Alkanes- carbon atoms connected by single bond.
Alkenes- carbon atoms connected by double bond.
Alkyne- Carbon atoms connected by triple bond.
- iii. The combining power of an element with other atom to form chemical bond is called valency.
Examples of molecules having double bond are
Carbon dioxide(CO_2), Sulphur dioxide(SO_2)
- $\text{O} = \text{C} = \text{O}$, $\text{O} = \text{S} = \text{O}$



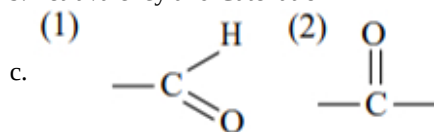
OR

In chlorine molecule, both chlorine atoms contribute one electron and thus share single electron pair to form single covalent bond. As shared pair is shared by both atoms, they acquire inert gas configuration of argon atom in valence shell.

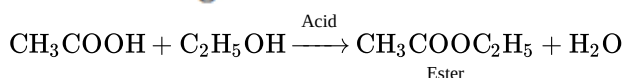


OR

- a. Compounds formed by carbon and hydrogen only.
- b. Tetravalency and Catenation



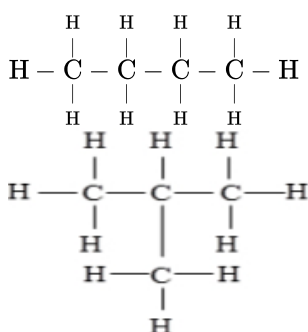
c.



OR

Compounds with identical molecular formula but different structures

Two isomers of butane C_4H_{10}



29. i. Water of crystallization is the water molecules that are chemically bonded into a crystal structure.
 ii. Copper Sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)
 iii. Bleaching powder, $\text{CaO}(\text{Cl})_2$ The chemical equation is as follows: $2\text{Ca}(\text{OH})_2 + 2\text{Cl}_2 \rightarrow \text{Ca}(\text{OCl})_2 + \text{CaCl}_2 + 2\text{H}_2\text{O}$
 it is used as an oxidizing agent. It is used as a germicide and disinfectant, especially in the sterilization of drinking water, to free water from harmful microorganisms. It is used for the production of chloroform.

OR

- i. X-Tartaric acid Y-Baking soda Z- Baking powder Y- NaHCO_3
 ii. $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$
 $\text{NaHCO}_3 + \text{H}^+ \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Sodium salt of acid}$
 CO_2 released during heating makes the cake soft and spongy
 iii. Magnesium hydroxide; $\text{Mg}(\text{OH})_2$

Section C

30. (b) Black
Explanation:
 The sky appears blue due to the scattering of the blue colour by the earth's atmosphere. In moon there is no atmosphere hence nothing to scatter light. Thus, the sky appears dark or black as seen from the moon surface.

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

Explanation:

Refractive index of diamond w.r.t. liquid

$${}^l\mu_b = \frac{1}{\sin C} = \frac{\mu_d}{\mu_1}$$

$$\frac{\sqrt{6}}{\sqrt{3}} = \frac{1}{\sin C}$$

$$\sin C = \frac{1}{\sqrt{2}} = \sin 45^\circ$$

$$C = 45^\circ$$

32. (d) Towards the observer

Explanation:

As per Fleming's left hand rule, Direction of force is towards the observer.

33. Mirror formula is $\frac{1}{f} = \frac{2}{r} = \frac{1}{v} + \frac{1}{u}$

when f is the focal length, r , the radius of curvature; u , the distance of object and v , the distance of image from pole of the mirror.

Mirror formula holds good for all types of mirrors i.e. for plane, convex or concave.

34. i. $V \propto I$ i.e current is directly proportional to applied voltage.
 ii. at 2.5 V current will be 0.25 A

OR

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

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

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

$$R_P = 10 \Omega$$

$$\text{Total equivalent resistance} = R = R_1 + R_P + R_5$$

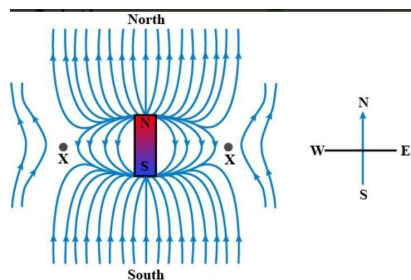
$$= R = 20 + 10 + 10 = 40 \Omega$$

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. The resistance of an ammeter should be low. An ammeter has to be connected in series with the circuit to measure current. In case, its resistance is not very low, its inclusion in the circuit will reduce the current to be measured. In fact, an ideal ammeter is one which has zero resistance.

37. a.



the poles are mentioned in the given figure and the magnetic field will be stronger at the end of the pole.

b. If magnetic field lines intersect each other, then at the intersection point there will be two directions of the same field which is not possible. Hence the field lines do not cross or intersect each other.

38. i. $V = \frac{W}{q} = \frac{W}{It}$

ii. $I = 1 \text{ A}, t = 1 \text{ s}$

$q = It = 1 \times 1 = 1 \text{ C}$

$n = \frac{q}{e} = \frac{1}{1.6 \times 10^{-19}} = 6.25 \times 10^{18}$

iii. The potential difference is the work done in moving a unit of positive electric charge from one point to another.

$W = 100 \text{ J}, q = 20 \text{ C}$

$V = \frac{W}{q} = \frac{100}{20} = 5 \text{ V}$

OR

$q = 2 \text{ C}, t = 100 \text{ ms} = 0.1 \text{ s}$

$I = \frac{q}{t} = \frac{2}{0.1} = 20 \text{ A}$

39. a. Four characteristics:

i. Image is formed on the same side of the lens as the object.

ii. The image is enlarged / magnified, virtual and erect.

b. $h' = \frac{h}{3}$

Focal length = -20cm

As per the lens formula

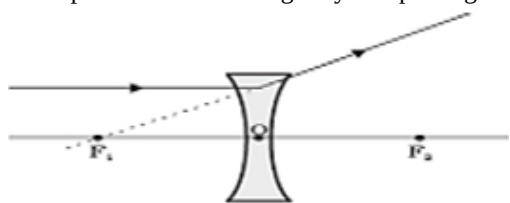
$\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$u = -40\text{cm}$

Hence, the distance of the object from the lens is 40cm.

OR

i. Principal axis: It is an imaginary line passing through the two centres of curvatures of a lens.



ii. $f = -20 \text{ cm}; h = 5 \text{ cm}; v = -15 \text{ cm}$

$\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = \frac{1}{(-15)} - \frac{1}{(-20)}$
 $= \frac{-1}{60 \text{ cm}}$

or $u = -60 \text{ cm}$ object is at a distance of 60 cm from the lens

Size of the image(magnification): $m = \frac{h'}{h} = \frac{v}{u}$

$h' = \frac{v}{u} \times h = \frac{(-15)}{(-60)} \times 5 = 1.25 \text{ cm}$