CLASS - X (CBSE SAMPLE PAPER) | SCIENCE

SAMPLE PAPER – 05

TIME : 3 HRS. **MAX. MARKS : 80**

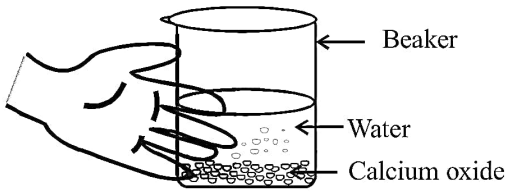
GENERAL INSTRUCTIONS :

1. **This question paper consists of 39 questions in 5 sections.**
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.**
3. **Section A consists of 20 objective type questions carrying 1 mark each.**
4. **Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.**
5. **Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words.**
6. **Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.**
7. **Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.**

SECTION-A

Select and write one most appropriate option out of the four options given for each of the questions from 1 to 20.

1. Calcium oxide reacts vigorously with water.



Identify the incorrect statements.

(i) It is an endothermic reaction.

(ii) Slaked lime is produced.

(iii) Quick lime is produced.

(iv) It is an exothermic reaction.

(v) It is a combination reaction.

(1) (i) and (ii) (2) (iii) and (iv) (3) (i) and (iii) (4) (ii), (iv) and (v)

2. Identify the reducing agent in the reaction (i) and (ii) respectively.

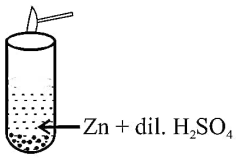
$MnO_{2(s)} + 4HCl_{(aq)} \longrightarrow MnCl_{2(s)} + 2H_2O_{(\ell)} + Cl_{2(g)}$ .....(i)

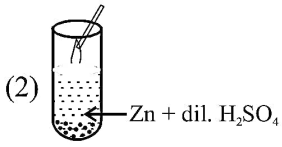
$CuO_{(s)} + H_{2(g)} \longrightarrow Cu_{(s)} + H_2O_{(\ell)}$ .....(ii)

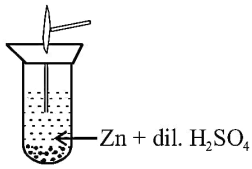
(1) $MnO_{2(s)}$, $H_{2(g)}$ (2) $HCl_{(aq)}$, $H_{2(g)}$

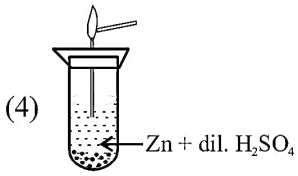
(3) $Cl_{2(g)}$, $Cu_{(s)}$ (4) $MnCl_{2(s)}$, $H_2O_{(\ell)}$

3. The safest method to detect hydrogen gas produced in a reaction would be the method shown in

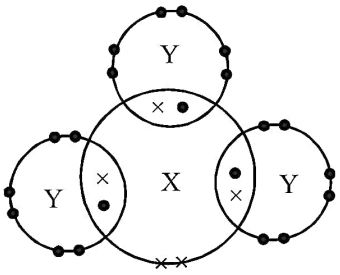
(1) 

(2) 

(3) 

(4) 

4. The diagram given below shows the electronic arrangement of the valence electrons in a molecule of compound XY_3. Which of the following pairs of elements could be X and Y?



	X	Y
(1)	Argon	Neon
(2)	Nitrogen	Hydrogen
(3)	Phosphorus	Fluorine
(4)	Sulphur	Oxygen

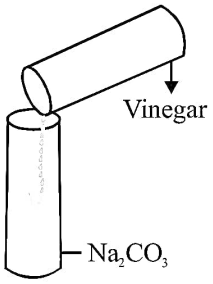
5. Which of the following metals will melt if you keep them on your palm?

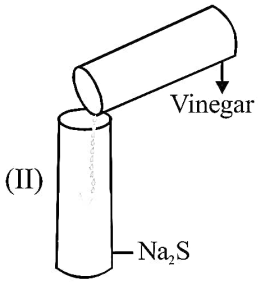
(i) Magnesium (ii) Mercury

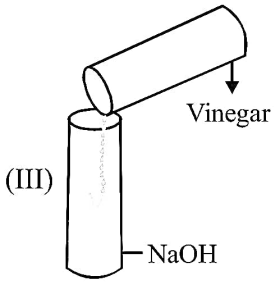
(iii) Caesium (iv) Gallium

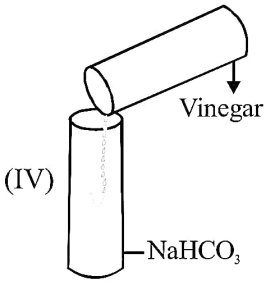
(1) (i) and (iii) (2) (ii) and (iv) (3) (iii) and (iv) (4) (ii) and (iii)

6. A student added vinegar to test tubes I, II, III, IV and then introduced a burning matchstick, near the mouth of the test tubes.

(I) 

(II) 

(III) 

(IV) 

The matchstick will be extinguished in test tubes -

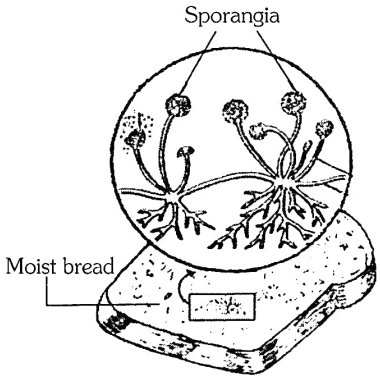
(1) I and IV (2) II and III

(3) III and IV (4) I and II

7. Which of the following compounds has a triple bond?

(1) C_2H_4 (2) C_3H_4 (3) C_3H_8 (4) C_4H_{10}

8. The image shows the bread mould on a bread. How these fungi obtain nutrition?



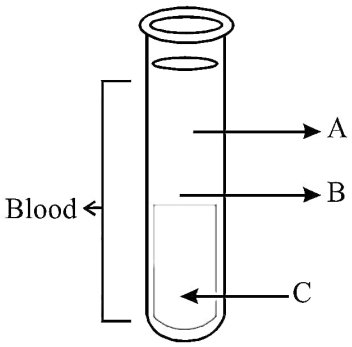
(1) By using nutrients from the bread to prepare their own food.

(2) By allowing other organisms to grow on the bread and then consuming them.

(3) By breaking down the nutrients of bread and then absorbing them.

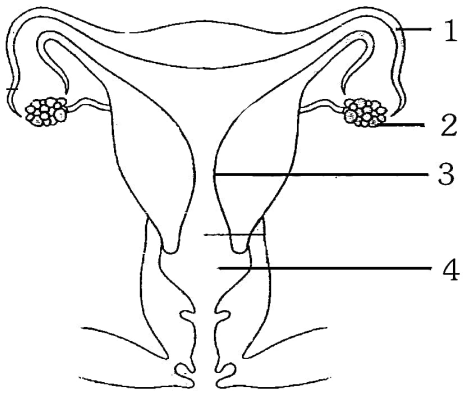
(4) By eating bread on which it is growing.

9. In the given diagram find out the 'C'



(1) WBC (2) RBC (3) Platelets and WBC (4) Plasma

10. Identify the part '3' in the given diagram.



(1) Fallopian tube (2) Vagina (3) Ovary (4) Endometrium

11. Which of the following trait choosen by mendel was a recessive trait in garden pea ?

(1) round seed (2) tall plant

(3) violet flower (4) green seed

12. In a food chain comprising of a snake, grass, frog and insect, the secondary consumer is _____.

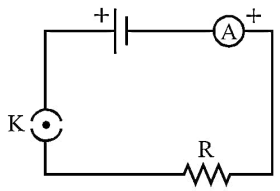
(1) Insect (2) Snake (3) Frog (4) Grass

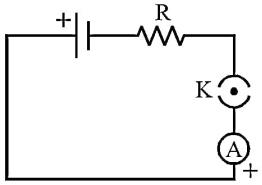
13. Which of the following represents voltage?

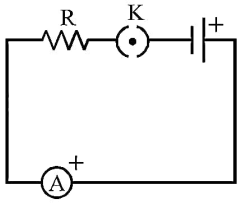
(1) $\frac{\text{Work done}}{\text{Current} \times \text{Time}}$ (2) Work done × Charge

(3) $\frac{\text{Work done} \times \text{Time}}{\text{Current}}$ (4) $\frac{\text{Work done} \times \text{Charge}}{\text{Time}}$

14. A cell, a resistor, a key, and an ammeter are arranged as shown in the circuit diagrams. The current recorded in the ammeter will be

(i) 

(ii) 

(iii) 

(1) maximum in (i)

(2) maximum in (ii)

(3) maximum in (iii)

(4) the same in all the cases.

15. Which of the following can make a parallel beam of light when light from a point source is incident on it?

(1) Concave mirror as well as convex lens.

(2) Convex mirror as well as concave lens.

(3) Two plane mirrors placed at 90° to each other.

(4) Concave mirror as well as concave lens.

16. An optical device has been given to a student and he determines its focal length by focusing the image of the sun on a screen placed at 24 cm from the device on the same side as the sun. Select the correct statement about the device.

(1) Convex mirror of focal length 12 cm

(2) Convex lens of focal length 24 cm

(3) Concave mirror of focal length 24 cm

(4) Convex lens of focal length 12 cm

Directions : Q.17 to 20 are Assertion - Reasoning based questions. These consist of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(1) Both A and R are true and R is the correct explanation of A

(2) Both A and R are true and R is not the correct explanation of A

(3) A is true but R is false

(4) A is false but R is true

17. **Assertion** : Reaction between barium chloride and sodium sulphate is a double displacement and precipitation reaction.

Reason : Reaction between barium chloride and sodium sulphate involves the exchange of ions between the reactants and a white precipitate of barium sulphate is formed.

18. **Assertion :** Respiration is a biochemical process opposite to photosynthesis.

Reason : Energy is released during respiration.

19. **Assertion :** Glomerular filtration requires expenditure of energy by kidney.

Reason : It occurs due to pressure difference in glomerular capillaries and Bowman's capsule.

20. **Assertion:** A fuse wire is always connected in parallel with the main line.

Reason: If a current larger than the specified value flows through the circuit, fuse wire melts.

SECTION-B

Q. no. 21 to 26 are very short answer questions.

21. Give reason for the following :

(a) Hydrogen gas is not evolved when most of the metals react with nitric acid.

(b) Zinc oxide is considered as an amphoteric oxide.

OR

Samples of four metals A, B, C and D were taken and added to the following solutions one by one. The results obtained have been tabulated as follows :

Metal	Solutions to which metal is added			
	Iron (II) sulphate	Copper (II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement	–	–
B	Displacement	–	No reaction	–
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the table given above to answer the following questions :

(a) Which is the most reactive metal?

(b) Arrange the metals A, B, C and D in order of increasing reactivity.

22. State how concentration ot auxın stımulates the cells to grow longer on the side of the shoot which is away from light?

23. "Transpiration is necessary evil" Justify the statement.

24. How is required pH maintained in the stomach and small intestine ?

25. State whether an alpha particle will experience any force in a magnetic field if :

(i) It is placed in the field at rest.

(ii) It moves in the magnetic field, parallel to field lines.

(iii) It moves in the magnetic field, perpendicular to field lines.

OR

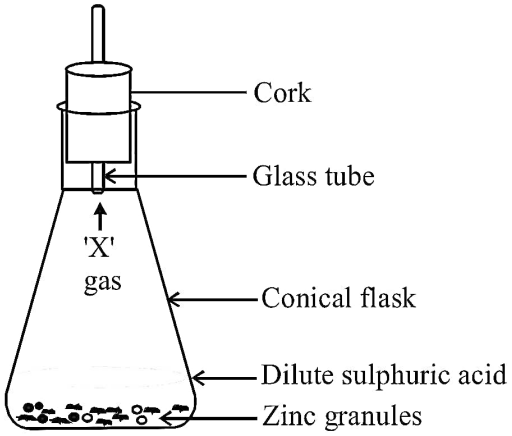
Write the three ways to produce magnetic field.

26. Kidney produces 180 litre of filtrate per day but the amount of urine released is 1.5-2 litre per day. Justify this statement.

SECTION-C

Q.no. 27 to 33 are short answer questions.

27. Observe the given figure and answer the questions that follow :



(a) How will you test for the gas which is liberated in the experiment?

(b) Write the chemical reaction involved. Which type of chemical reaction is taking place?

(c) Is it an exothermic reaction or an endothermic reaction?

28. A metal 'M' which is one of the good conductors of heat and electricity used in making electric wires is found in nature as sulphide ore M_2S?

(a) Name the metal 'M'.

(b) Which process will be suitable for concentration of its ore M_2S?

(c) With the help of a labelled diagram, explain the process of electrolytic refining of the metal.

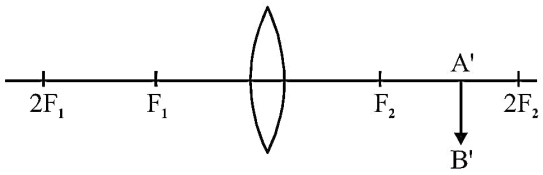
29. List the three events that occur during the process of photosynthesis ? Write two functions of stomata.

OR

(i) The breathing cycle is rhythmic whereas exchange of gases is a continuous process. Justify this statement.

(ii) How many molecules of ATP are produced by oxidation of glucose under anaerobic condition ?

30. (i) Observe the following incomplete ray diagram for an object, where the object's image A'B' is formed by a convex lens.



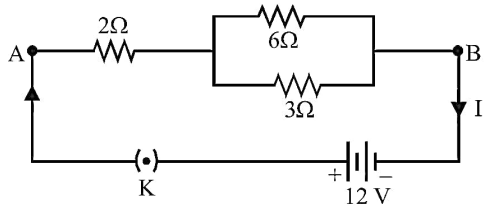
Based upon the above information, fill in the blanks:

(a) The position of object AB would have been.....

(b) Size of the object would have been .....than the size of image.

(ii) Refractive indices of water and glass are $\frac{4}{3}$ and $\frac{3}{2}$ respectively. A light ray travelling in water is incident on water-glass interface at 45°. What is the angle of refraction for light ray? (Take, sin 38.9° = 0.6284)

31. An electric network of resistors is shown below, which is supplied by a battery of 12 V.



Find :

(i) Effective resistance between the points A and B in the network.

(ii) Current flowing through resistor of 6 Ω.

32. A 6 cm tall object is placed perpendicular to the principal axis of a concave mirror of focal length 30 cm. The distance of the object from the mirror is 45 cm. Use mirror formula to determine the position, nature and size of the image formed. Also, draw labelled ray diagram to show the image formation in this case.

OR

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.

33. Draw a neat diagram of human brain and label following parts in it.

(i) Midbrain (ii) Pituitary

SECTION-D

Q.no. 34 to 36 are Long answer questions.

34. On dropping a small piece of sodium in a test tube containing carbon compound 'X' with molecular formula C_2H_6O, a brisk effervescence is observed and a gas 'Y' is produced. On bringing a burning splinter at the mouth of the test tube the gas evolved burns with a pop sound.

(a) Identify 'X' and 'Y'.

(b) Write the chemical equation for the reaction.

(c) Write the name and structure of the product formed, when you heat 'X' with excess conc. sulphuric acid.

OR

(a) Define the term isomer.

(b) Two compounds have same molecular formula C_3H_6O. Write the name of these compounds and their structural formula.

(c) How would you bring about the following conversions :

(i) Ethanol to ethene (ii) Propanol to propanoic acid

35. (i) What is placenta ? Write 2 functions of it.

(ii) Explain any 3 methods of contraception.

OR

(i) Why did Mendel choose garden pea for his experiments? Write two reasons.

(ii) Explain three laws of inheritance.

36. (a) Explain why two magnetic lines do not intersect each other.

(b) State the rule for determining the direction of the magnetic field produced around a current carrying straight conductor. Draw a sketch of the pattern of field lines due to the current flowing through a straight conductor.

(c) Explain on what factors does the magnetic field produced by a straight current carrying conductor depend?

SECTION-E

Q.no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. Oxidation is the process of gaining of oxygen, or losing of hydrogen. Reduction is the process of losing of oxygen or gaining of hydrogen. The substance which undergoes oxidation is the reducing agent while the substance which undergoes reduction is known as the oxidising agent. Oxidation and reduction always take place together and these type of reactions are known as redox reactions. Some of the examples of redox reactions are given below :

I. $Pb_3O_4 + 8HCl \longrightarrow 3PbCl_2 + Cl_2 + 4H_2O$

II. $2Mg + O_2 \longrightarrow 2MgO$

III. $CuSO_4 + Zn \longrightarrow Cu + ZnSO_4$

IV. $V_2O_5 + 5Ca \longrightarrow 2V + 5CaO$

V. $3Fe + 4H_2O \longrightarrow Fe_3O_4 + 4H_2$

VI. $CuO + H_2 \longrightarrow Cu + H_2O$

(a) Give two examples of oxidation reaction from your everyday life.

(b) Explain using reaction, the oxidising agent present in the reaction III and VI.

OR

(b) Out of oxidation and reduction, which reaction takes place at anode and cathode?

38. An ecosystem may be defined as a structural and functional unit of the biosphere comprising living organisms and their non-living environment which interact by means of food chains and biogeochemical cycles resulting in energy flow, biotic diversity, and material cycling to form a stable, self-supporting system.

(a) Give any two examples of artificial ecosystem?

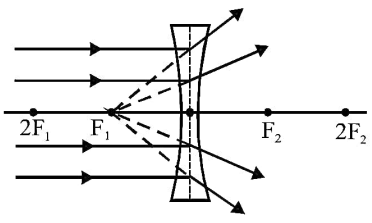
(b) Give some examples of biotic factors of an ecosystem?

(c) What are decomposers? State the role of decomposers in an ecosystem.

OR

(c) The number of trophic level in a food chain is limited. Why ?

39. A lens is a piece of transparent glass bound by spherical surfaces. A concave lens is a piece of transparent glass bound by two bent-in (or bulging-in) surfaces. This is thin in the middle but thicker at the edges. It is also called 'double concave' or 'biconcave lens'. A concave lens is a 'diverging lens' because the parallel beam of light rays after refraction through it, appears to diverge from a single point.



A concave lens

The image formed by a concave lens is always on the same side as the object and it is always virtual and erect. Also, the size of image is always diminished, that is, its size is always smaller than that of the object. The table given below briefly describes the properties of the image formed by a concave lens for an object placed at different positions in front of it.

Image formation by a concave lens

Position of the object	Position of the image	Size of the image	Nature of the image
Between infinity & optical centre O	Between O & F_1 i.e., on same side as the object	Diminished	Virtual and erect
At infinity	At the focus F_1	Highly diminished, Point-sized	Virtual and erect

(a) Define focal length of a concave lens.

(b) Draw a ray diagram to show the formation of image of an object when it is placed at a position between F_1 and $2F_1$ in front of a concave lens.

(c) A divergent lens has a focal length of 30 cm. At what distance should an object of height 5 cm from the optical centre of the lens be placed so that its image is formed 15 cm away from the lens?

OR

(c) The image of an object formed by a concave lens is of magnification $+\frac{1}{2}$. If the sum of the distances of the object and its image, respectively from the lens, is 60 cm; what is the focal length of the lens?