# Sample Paper 1

## Class X 2022-23

## Science (086)

**Time: 3 Hours** **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.

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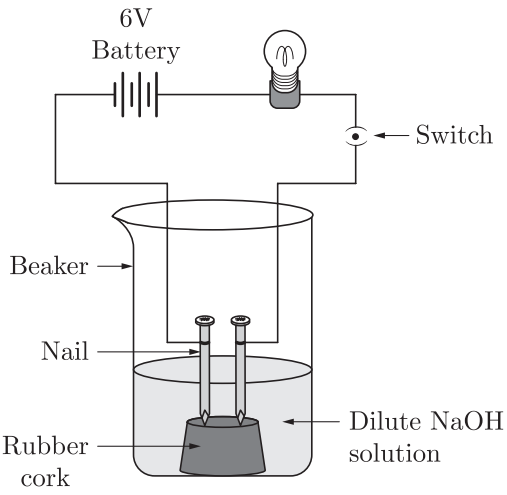
# SECTION-A

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

**1.** In an attempt to demonstrate electrical conductivity through an electrolyte, the following apparatus (figure) was set up.




Which among the following statement (s) is (are) correct?

1. Bulb will not glow because electrolyte is not acidic.
2. Bulb will glow because NaOH is a strong base and furnishes ions for conduction.
3. Bulb will not glow because circuit is incomplete.
4. Bulb will not glow because it depends upon the type of electrolytic solution.

Continue on next page.....

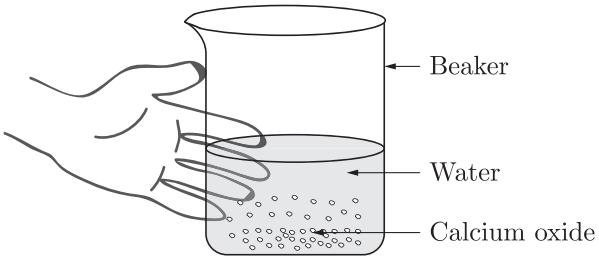
(a) 1 and 3
(b) 2 and 4
(c) Only 2
(d) Only 4

**2.** The following reaction is an example of a
$4NH_3(g) + 5O_2(g) \longrightarrow 4NO(g) + 4H_2O(g)$

1. displacement reaction
2. combination reaction
3. redox reaction
4. neutralisation reaction

(a) 1 and 4
(b) 2 and 3
(c) 1 and 3
(d) 3 and 4

**3.** Calcium oxide reacts vigorously with water.




Which of the following is the incorrect observation of the reaction shown in the above set up?
(a) It is an endothermic reaction.
(b) Slaked lime is produced.
(c) It is an exothermic reaction.
(d) It is a combination reaction.

**4.** $N_2 + 3H_2 \longrightarrow 2NH_3$
With the reference of above reaction which one of the option in the table is correct?

| | **Reactants** | **Products** |
|---|---|---|
| (a) | $N_2$, $H_2$ | $NH_3$ |
| (b) | $NH_3$ | $N_2$, $H_2$ |
| (c) | $N_2$ | $H_2$, $NH_3$ |
| (d) | $N_2NH_3$ | $H_2$ |

**5.** Which one of the following properties is not general exhibited by ionic compounds?
(a) Solubility in water
(b) Electrical conductivity in solid state
(c) High melting and boiling points
(d) Electrical conductivity in molten state

**6.** A student require hard water for an experiment in his laboratory which is not available in the neighbouring area. In the laboratory there are some salts, which when dissolved in distilled water can convert it into hard water. Select from the following groups of salts, a group, each salt of which when dissolved in distilled water will make it hard.

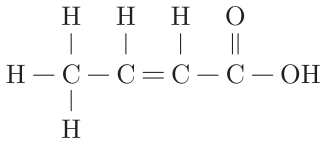
(a) Sodium chloride, Potassium chloride

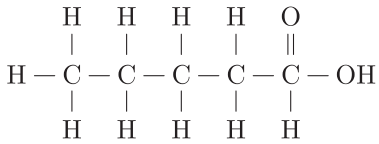
(b) Sodium sulphate, Potassium sulphate

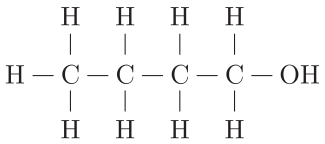
(c) Sodium sulphate, Calcium sulphate

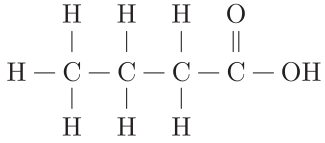
(d) Calcium sulphate, Calcium chloride

**7.** The correct structural formula of butanoic acid is

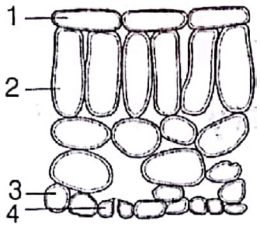
(a)


(b)


(c)


(d)


**8.** The diagram shows the arrangement of cells inside the leaf of a green plant. (No cell contents are shown).




Which of the following cells normally contain chloroplasts?

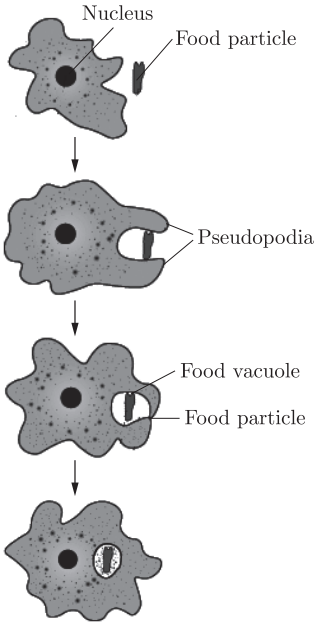
(a) 2 and 4

(b) 2 and 3

(c) 1 and 2

(d) 1 and 4

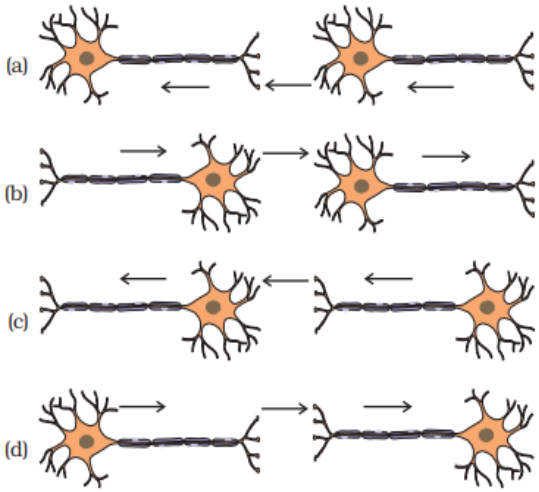
**9.** Identify the micro-organism whose nutrition type is shown below :



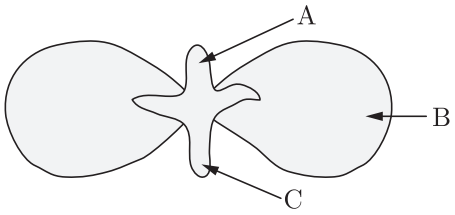

(a) Food bacteria
(b) Yeast
(c) Fungus
(d) Amoeba

**10.** Structure present in a cell which is responsible for determination of the sex of a baby is :
(a) cytoplasm (b) cell membrane
(c) nucleus (d) chromosome

**11.** What is the correct direction of flow of electrical impulses ?



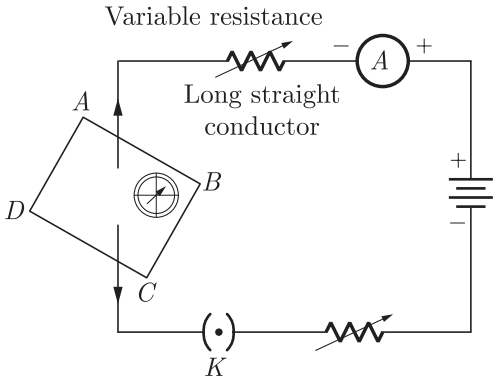
**12.** In following diagram the parts A, B and C are sequentially




(a) cotyledon, plumule and radicle
(b) plumule, radicle and cotyledon
(c) plumule, cotyledon and radicle
(d) radicle, cotyledon and plumule

**13.** At the time of short circuit, the electric current in the circuit :
(a) vary continuously
(b) does not change
(c) reduces substantially
(d) increases heavily

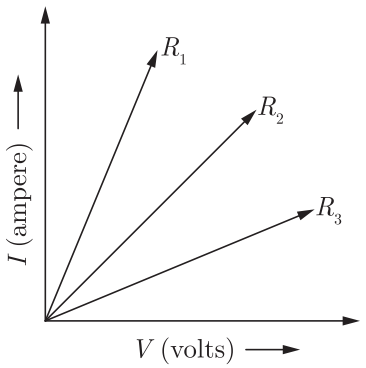
**14.** If the key in the arrangement taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane $ABCD$, the lines are




(a) concentric circles
(b) elliptical in shape
(c) straight lines parallel to each other
(d) concentric circles near the point $O$ but of elliptical shapes as we go away from it.

Continue on next page.....

**15.** A student carries out an experiment and plots the $V$-$I$ graph of three samples of nichrome wire with resistances $R_1, R_2$ and $R_3$ respectively (Figure). Which of the following is true ?




(a) $R_1 = R_2 = R_3$ (b) $R_1 > R_2 > R_3$
(c) $R_3 > R_2 > R_1$ (d) $R_2 > R_3 > R_1$

**16.** Which of the following statement is not correct about the magnetic field?
(a) Magnetic field lines form a continuous closed curve.
(b) Magnetic field line do not interest each other.
(c) Direction of tangent at any point on the magnetic field line curve gives the direction of magnetic field at that point.
(d) Outside the magnet, magnetic field lines go from South to North pole of the magnet.

**Question no. 17 to 20 are Assertion-Reasoning based questions.**

**17.** **Assertion :** Corrosion of iron is a serious problem.
**Reason :** Every year an enormous amount of money is spent to replace damaged iron.
(a) Both Assertion and Reason are True and Reason is the correct explanation of the Assertion.
(b) Both Assertion and Reason are True but Reason is not the Correct explanation of the Assertion.
(c) Assertion is True but the Reason is False.
(d) Both Assertion and Reason are False.

**18.** **Assertion :** Dominant allele is an allele whose phenotype expresses even in the presence of another allele of that gene.
**Reason :** It is represented by a capital letter, e.g. T.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

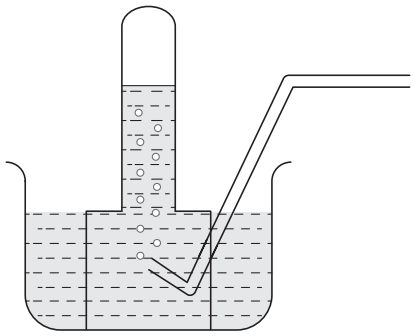
**19.** **Assertion :** All the plants possess autotrophic mode of nutrition.
**Reason :** Due to the presence of green coloured pigment chlorophyll in them.
(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) Assertion is true but Reason is false.
(d) Both Assertion and Reason are false.

**20.** **Assertion :** The magnetic field produced by a current carrying solenoid is independent of its length and cross-section area.
**Reason :** The magnetic field inside the solenoid is uniform.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

# SECTION-B

**Question no. 21 to 26 are very short answer questions.**

**21.** A metal is treated with dil $H_2SO_4$, the gas evolved is collected by the method shown in the figure. Answer the following :
(i) Name the gas.
(ii) Name the method of collection of the gas.



**or**

List any two observations when a highly reactive metal is dropped in water.

**22.** What do you mean by diffusion ?

**23.** Which are the first simple molecules of food produced during photosynthesis ? What happens to these simple molecules in the leaves later ?

**24.** What is the meaning of the term "assimilation" ?

**25.** Draw a neat diagram to show the refraction of a light ray through a glass prism and label on it the angle of incidence and angle of deviation.

**or**

What is the scattering of light ? Explain with the help of an example.

**26.** What will happen to the garbage and dead animals and plants in absence of microorganisms ?

Continue on next page.....

# SECTION-C

**Question no. 27 to 33 are short answer questions.**

**27.** State which of the following chemical reactions will take place or not, giving suitable reason for each :
(i) $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$
(ii) $Fe(s) + ZnSO_4(aq) \longrightarrow FeSO_4(aq) + Zn(s)$
(iii) $Zn(s) + FeSO_4(aq) \longrightarrow ZnSO_4(aq) + Fe(s)$

**28.** Give reasons for the following :
(i) Shining surfaces of metals become dull on exposure to air and moisture.
(ii) Aluminium is extracted from its ore by electrolysis of molten ore.
(iii) Gold is available in the native state.

**29.** Mention the three kinds of cells present in blood. Write one function of each.

**or**

With the help of diagram explain how exchange of gases occurs in leaf of a plant.

**30.** Manju is uses a concave mirror for image formation for different positions of an object. What inferences can be drawn about the following when an object is placed at a distance of 10 cm from the pole of a concave mirror of focal length 15 cm ?
(a) Position of the image
(b) Size of the image
(c) Nature of the image
Draw a labelled ray diagram to justify your inferences.

**31.** (a) Define optical centre of a spherical lens.
(b) You are given a convex lens of focal length 30 cm. Where would you place an object to get a real, inverted and highly enlarged image of the object ? Draw a ray diagram showing the image formation.
(c) A concave lens has a focal length of 20 cm. At what distance should an object be placed so that it forms an image at 15 cm away from the lens ?

**32.** Pawan is connected a galvanometer with a coil of insulated copper wire .What would happen if a bar magnet is :
(i) Pushed into the coil ?
(ii) Withdrawn from inside the coil ?
(iii) Held stationary inside the coil ?

**or**

You are given two identical looking iron bars. Just using these two bars how will you identify whether any or both of these bars is/are a magnet ?

**33.** Explain the phenomenon of Biological Magnification. How does it affect organisms belonging to different trophic levels particularly the tertiary consumers ?

# SECTION-D

**Question no. 34 to 36 are Long answer questions.**

**34.** An organic compound $A$ is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet smelling compound $B$.

(a) Identify the compound $A$.
(b) Write the chemical equation for the reaction with ethanol to form compound $B$.
(c) How can we get compound $A$ from $B$?
(d) Name the process and write corresponding chemical equation.
(e) Which gas is produced when compound $A$ reacts with washing soda ? Write the chemical equation.

**or**

(a) The formula of an ester is $CH_3COOC_2H_5$. Write the structural formulae of the corresponding alcohol and the acid.
(b)
  (i) Mention the experimental conditions involved in obtaining ethene from ethanol.
  (ii) Write the chemical equation for the above reaction.

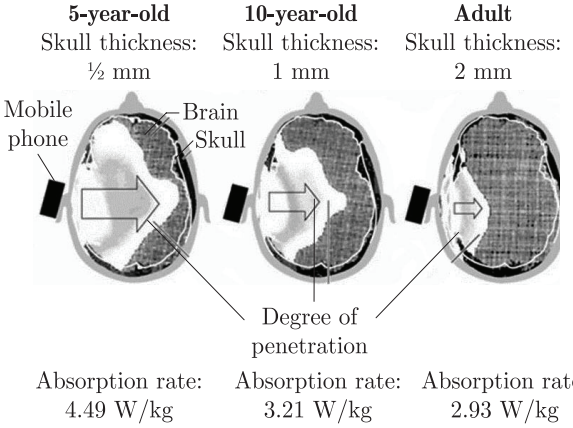
**35.** (a) Write the function of following parts in human female reproductive system :
  (i) Ovary
  (ii) Oviduct
  (iii) Uterus
(b) Describe in brief the structure and function of placenta.

**or**

Define the terms :
(i) Syngamy
(ii) Triple fusion
(iii) Implantation
(iv) Placenta
(v) Gestation.

**36.** The mobile phone is an excellent communication device. Mobile phones uses electromagnetic radiation in the microwave range. Part of the radio wave emitted by the mobile phone handset will be absorbed by the head. Head is in the 'near field' of radiation, so that most of the heating effect occurs in the head. Temperature in the internal ear, brain increases by 1 degree or more. This adversely affect the functioning of these organs since these have fluid filled cavities. But prolonged heating effect can alter brain functions and hearing ability also. Other harmful effects such as Premature Cataract, Confusion and loss of memory may also be possible. Following figure shows that how mobile phone radiation penetrates the brain.

How mobile phone radiation penetrates the brain




Source: Institute of Electrical and Electronic Engineer's journal on Microwave Theory and Techniques

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(i) What precautions should be taken while using mobile phones ?
(ii) Which radiations are used in mobile phones ?
(iii) How does prolonged heating effect due to mobile radiations can effect adversely ?
(iv) In which part of our body, most of the heating effect occurs due to use of mobiles ?

# SECTION-E

**Question 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.** The reactivity series is a list of metals arranged in the order of their decreasing activities. The metal at the top of the reactivity series is the most reactive and metal at the bottom is the least reactive. The more reactive metal displaces less reactive metal from its salt solution.

| | | |
|---|---|---|
| K | Potassium | More reactive |
| Na | Sodium | |
| Ca | Calcium | |
| Mg | Magnesium | |
| Al | Aluminium | |
| Zn | Zinc | Reactivity decreases. |
| Fe | Iron | |
| Pb | Lead | |
| [H] | [Hydrogen] | |
| Cu | Copper | |
| Hg | Mercury | |
| Ag | Silver | |
| Au | Gold | Least reactive |

(i) Name the metals which react with steam but not with hot water.
(ii) What happen when calcium react with nitric acid and which method is used to extract metal present at the top of the reactivity series?

**or**

(ii) Which of the following metals exist in their native states in nature?
I. Cu
II. Au
III. Zn
IV. Ag

**38.** Question numbers i - iv are based on the table given below. Study the table and answer the following questions.

**Table-A**

| | **Characters** | **Males** | **Females** |
|---|---|---|---|
| 1. | Total no. of chromosomes | 23 pairs | 23 pairs |
| 2. | No. of autosome | 22 pairs | 22 pairs |
| 3. | No. of sex chromosome | 1 pair | 1 pair |

(i) What is sex determination?
(ii) What are the sex chromosomes in the males?

(iii) What are the sex chromosomes in the females?

**or**

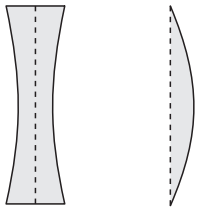
(iv) Is the father responsible for the sex of the child?

**39.** Lenses are objects made of transparent materials such as glass or clear plastic that has curved surfaces. Diverging lenses are thicker at their edges than at their centres and makes light rays passing through them spread out. Converging lenses are thicker in their middle than at this edges and make light rays passing through them focus at a point. These are used in spectacles to help people with poor vision see better. The converging lenses magnify by bending the rays of light that pass through them to meet at a point called focus. Thicker the converging lens is at its centre, the more its magnifies and closer the focus is to the lens.

(i) Ravi uses two lenses A and B of same size and same material as shown. $P_1$ and $P_2$ are the powers of A and B. An object is kept at the same distance from the lens between F and 2F of each lens on the principal axis in turn. Let $I_1$ and $I_2$ be the image formed by two lenses respectively. What is the relation of image distances of both lens ?

(ii) Write down the relation between the power of lens of both lenses ?

(iii) Meenakshi uses above two lenses A and B along with another two lenses C and D, as shown :




She is able to see the subject matter on the black board while sitting in the front row in the classroom but is unable to see the same matter while sitting in the last row.

Which of the above four lenses will she require to correct the defect in her vision? Why ?

**or**

(iv) Natasha places an object on the principal axis of above given lens A. One end of this object coincides with the focus F and the other end with 2F. What will be the nature of the image formed by the lens on the other side ?

□□□□□□□

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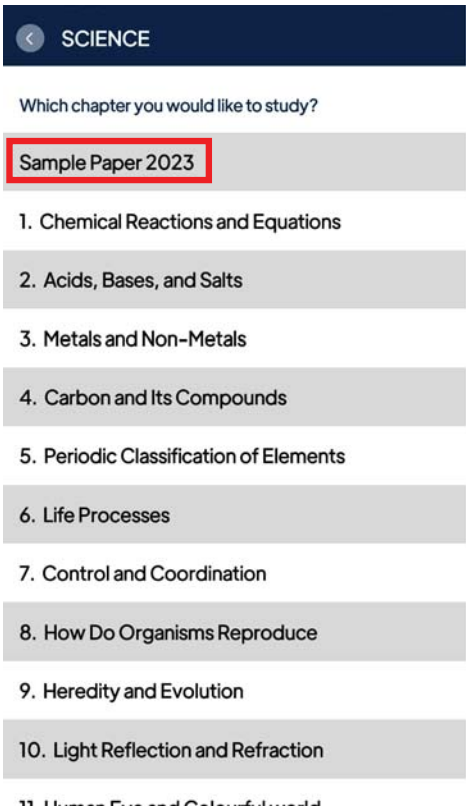


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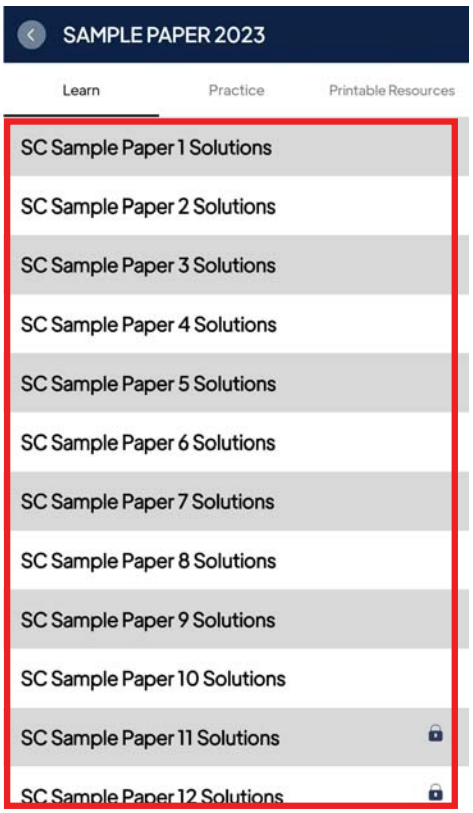


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