

CBSE
Class X Science
Sample Paper 2

Time: 3 hrs

Total Marks: 80

General Instructions:

1. The question paper comprises three sections – A, B and C. Attempt all the sections.
2. All questions are compulsory.
3. Internal choice is given in each section.
4. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
5. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50–60 words each.
6. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80–90 words each.
7. This question paper consists of a total of 30 questions.

SECTION A

1. Which alloy is used for making the heating element of electrical appliances? (1)
2. Write the scientific term used for ‘science of heredity and variation’. (1)

3. **Answer question numbers 3(a)–3(d) on the basis of your understanding of the following information:**

Zinc is extracted from its ore zinc blende. During the process, zinc blende is roasted. The solid product is mixed with coke in a blast furnace from which zinc vapour emerges.

- (a) What is the chemical name and formula of zinc blende? (1)
 - (b) Give the chemical equation for roasting of zinc blende. (1)
 - (c) What is the type of reaction carried out after roasting in order to obtain zinc? (1)
 - (d) What is the name of the alloy formed by copper and zinc? (1)
4. **Question numbers 4(a)–4(d) are based on the table given below. Observe the table and answer the questions:**

Fuel	Calorific Value
Wood	17 kJ/g
Alcohol	30 kJ/g
Methane	55 kJ/g
Hydrogen gas	150 kJ/g

- (a) What does the calorific value of a fuel indicate? (1)
- (b) Which of the fuels mentioned in the table above can be termed 'extremely good fuel'? (1)
- (c) 'The calorific value of alcohol is 30 kJ/g'. Explain the meaning of this statement. (1)
- (d) Which of the following characteristics does not belong to a good fuel?
 - i) High calorific value
 - ii) High ignition temperature
 - iii) Easily available
 - iv) Safe for transportation (1)

5. If a magnification of -1 is to be obtained using a convex lens of focal length 6 cm, then the object must be placed (1)
- i) within 12 cm
 - ii) at 6 cm
 - iii) at 12 cm
 - iv) beyond 12 cm

OR

Which of the following always forms a virtual image which is smaller than the object?

- i) Concave lens
 - ii) Concave mirror
 - iii) Convex lens
 - iv) Convex mirror
6. Due to atmospheric refraction, the time from sunrise to sunset is lengthened by about (1)
- i) 2 minutes
 - ii) 4 minutes
 - iii) 8 minutes
 - iv) 16 minutes
7. What is the phenomenon behind the uptake of water from ATP? (1)
- i) Water potential
 - ii) Osmotic pressure
 - iii) Diffusion pressure deficit
 - iv) Turgor pressure
8. Which of the following statements is correct? (1)
- i) Dominant trait cannot be expressed in the heterozygous condition.
 - ii) Dominant trait is expressed in the homozygous condition.
 - iii) Recessive trait can only be expressed in the homozygous condition.
 - iv) Recessive trait can always be expressed in the heterozygous condition.

OR

Crossing two pink-coloured flowers resulted in a progeny of 1 red flower, 2 pink flowers and 1 white flower. The nature of the cross will be

- i) Double fertilisation
- ii) Self-pollination
- iii) Cross-pollination
- iv) Artificial pollination

9. Autonomic movement is seen in (1)

- i) Indian telegraph plant
- ii) *Chlamydomonas*
- iii) Roots
- iv) Tendrils

10. What will happen when an acid reacts with metal oxide? (1)

- i) Oxyacid is formed.
- ii) Salt and water are formed.
- iii) Metal hydride is formed.
- iv) Salt and hydrogen gas are formed.

11. During electrolysis, when electricity was passed through a sodium chloride solution, the bulb started glowing. What does this indicate? (1)

- i) Sodium chloride is a covalent compound and it conducts electricity.
- ii) Sodium chloride is an ionic compound and it conducts electricity.
- iii) Sodium chloride is a covalent compound and it transfers heat.
- iv) Sodium chloride is an ionic compound and it transfers heat.

12. In a food chain comprising birds, green plants, fish and man, the concentration of harmful chemicals entering the food chain will be maximum in (1)

- i) green plants
- ii) man
- iii) birds
- iv) fish

OR

Which statement about the food chain and energy flow through the ecosystem is false?

- i) Food webs include two or more food chains.
- ii) All organisms which are not producers are consumers.
- iii) A single organism can feed at several trophic levels.
- iv) Detritivores feed at all trophic levels except the producer level.

For question numbers 13 and 14, two statements are given—one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below.

- (i) Both A and R are true, and R is the correct explanation of the assertion.
- (ii) Both A and R are true, but R is not the correct explanation of the assertion.
- (iii) A is true, but R is false.
- (iv) A is false, but R is true.

13.Assertion: Equal distribution of genes occurs because these genes are located on pairs of homologous chromosomes.

Reason: Acquired variations in somatic traits are not passed from generation to generation. (1)

14.Assertion: The Sun appears white when it is overhead in the sky.

Reason: Light coming from the Sun has to travel a relatively shorter distance through the atmosphere to reach us. (1)

SECTION B

15.What is a reflex action? Describe the steps involved in a reflex action. (3)

16. Explain natural selection with the help of suitable examples. (3)

OR

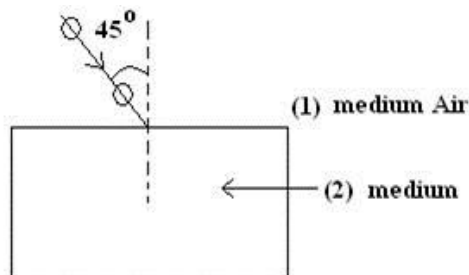
Distinguish between biodegradable and non-biodegradable substances. List two effects of each of them on our environment.

17.What is the focal length of a concave mirror if the radius of curvature is 12 cm?

What is the nature of the image formed by a concave mirror when an object is placed between its focus and pole? Draw the diagram for the same. (3)

OR

A ray of light is incident at an angle of 45° at the interface of medium (1) and medium (2) as shown in the above diagram. Redraw this diagram in the answer book and complete it. If the angle of refraction is 30° , find the refractive index of medium (2) with respect to medium (1).



$$\text{(Given that } \sin 45^\circ = \frac{1}{\sqrt{2}} \text{ and } \sin 30^\circ = \frac{1}{2} \text{)}$$

If the second medium is water in place of medium (2), will the angle of refraction increase or decrease? Why? (Refractive index of water = $\frac{4}{3}$)

18. Consider the following elements: Na, Ca, Al, K, Mg and Li. (3)

(a) Which of these elements belongs to Period 3 of the modern periodic table?

(b) Which of these elements belongs to Group 1 of the modern periodic table?

(c) Which of these elements shows a valency of +3?

19. Is it true that when a new species emerges, the old species is eliminated and why? (3)

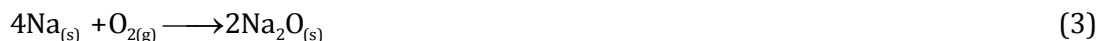
20. What is organic evolution? How do embryological studies provide evidence for evolution? (3)

21. A water-insoluble calcium compound (A) on reacting with dil. H_2SO_4 released a colourless and odourless gas (B) with brisk effervescence. When this gas (B) was passed through lime water, the lime water turned milky and again formed compound A. Identify A and B, and write the chemical equations for the reactions involved. (3)

OR

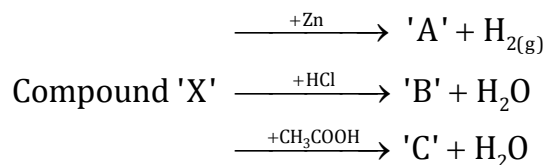
(a) With the help of a suitable example, explain oxidation and reduction in terms of gain or loss of oxygen.

(b) Identify the substances which are oxidised and the substances which are reduced in the following reaction:



22. What is electromagnetic induction? What are the three factors which cause a change in magnetic flux of the coil? (3)

23. Identify compound X on the basis of the reactions given below. Also, write the name and chemical formulae of A, B and C. (3)



24. How does recycling of waste materials helps in ecological balance? (3)

SECTION C

25. Explain with an example how metal X (which is low in the reactivity series) and metal Y (which is high in the reactivity series) are obtained from their compounds

by the reduction process.

(5)

(a) Write the electronic configurations of sodium and chlorine. Show the formation of sodium chloride from sodium and chlorine by the transfer of electrons.

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

26. Explain the process of photosynthesis in plants. List four factors which influence this process and describe how each of them affects the rate of photosynthesis. (5)

OR

(a) Write the three main steps which take place in chloroplasts during photosynthesis.

(b) How do stomata open and close?

(c) Which raw material is made available to plants for photosynthesis when stomata are open?

27. Draw a ray diagram for the following positions of the object placed in front of a convex lens: (5)

(a) Between optical centre and principal focus (F)

(b) Between F and 2F

(c) At 2F

How will the nature and position of the image formed change in cases (i) and (ii) in part (a) if the convex lens is replaced with a concave lens? Draw the corresponding ray diagram.

28. (5)

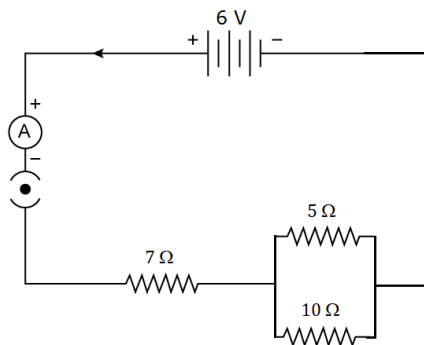
(a) Derive an expression for the heat produced in a conductor of resistance R when a current I flows through it for time t .

(b) Two identical resistors of resistance R are connected in series with a battery of potential difference V for time t . The resistors are then connected in parallel with the same battery for the same time t . Compare the heat produced in the two cases.

OR

(a) Deduce the expression for the equivalent resistance of the parallel combination of three resistors R_1 , R_2 and R_3 .

(b) Consider the following electric circuit:



Calculate:

- (i) Resultant resistance
- (ii) Total current
- (iii) Voltage across $7\text{-}\Omega$ resistor

29. (5)

- (a) Why are covalent compounds generally poor conductors of electricity?
- (b) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?
- (c) Write the structural formula of two isomers of n-pentane C_5H_{12} .

OR

Draw the structures for the following compounds.

- (a) Ethanoic acid
- (b) Bromopentane
- (c) Butanone
- (d) Hexanal

Give three possible structural isomers for bromopentane.

30. (5)

- (a) Draw a diagram showing the germination of pollen on the stigma. Label the style, male germ cell, ovule and female germ cell.
- (b) What happens to the following parts of a flower after fertilisation—ovule, zygote, ovary?