

CLASS X (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-14

Time : 3 Hours

Maximum Marks : 80

General Instructions :

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
 - (ii) All questions are compulsory.
 - (iii) Internal choice is given in each sections.
 - (iv) 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.
 - (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
 - (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
 - (vii) This question paper consists of a total of 30 questions.
-

SECTION A

Q1. Why does a ray of light bends when it travels from one medium to another medium? [1]

Q2. Why are iron grills painted frequently? [1]

Q3. **Answer question numbers 3.1–3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**

In our country, ultrasound imaging (echography) is used to take images of the developing babies (foetus). It is considered safe for both the mother and the foetus. In this method, the doctor holds a probe and moves it across the abdomen of the mother.

Ultrasound waves which are transmitted into the abdomen are reflected from the surface of the foetus. These reflected waves are picked up by the probe and relayed to a machine that produces the image of the developing baby. In some parts of our country, ultrasound is done illegally.

3.1 What could be the reason of performing ultrasound illegally? [1]

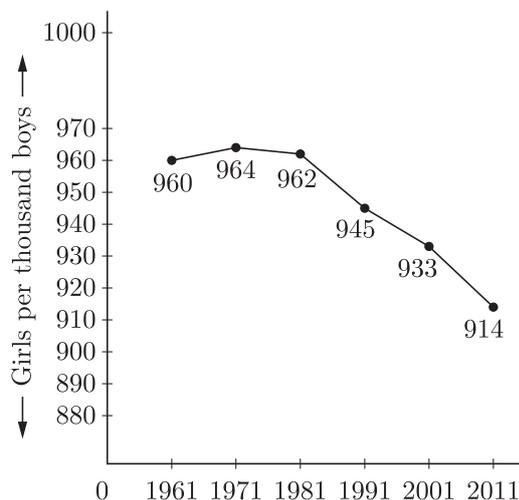
3.2 “Man, and not the woman is responsible for the birth of a girl child.” What is meant by this statement? [1]

3.3 Can ultrasound examination of expecting mothers answer the following questions? Write ‘Yes’ or ‘No’.

(a) What is the colour of the baby’s eyes?

(b) Is there more than one foetus? [1]

3.4 Based on the data shown in the graph alongside, state what could be the reason for the decline in the boys child sex ratio ? [1]



Q4. Question numbers 4.1–4.4 are based on the tables given below and the related studied concepts. Analyse the tables and answer the questions that follow.

Table (i)

A	B	C	D	E	F	G
3	4	5	6	7	8	9
I	J	K	L	M	N	O
11	12	13	14	15	16	17

Table (ii)

Element	Electronic Configuration
A ₁	2 8 1
B ₁	2 8 7
C ₁	2 8 8
D ₁	2 4

Table (i) shows a part of a periodic table in which the elements are arranged according to their atomic numbers (the letters in figure are not the chemical symbols of the element).

Table (ii) shows the electronic configurations of four elements A, B, C and D.

4.1 Refer Table (i) and name the element which has the atomic number 7. To which group does it belong? [1]

4.2 'Element I of Table (i) and element A₁ of Table (ii) are the same element. This element is the most electro-positive.' Justify this statement. [1]

4.3 Refer Table (i) to answer this question.

Element J reacts with element F to form a new compound. Which of the following represents the correct symbols of J and F respectively; and the correct chemical equation? [1]

- (a) J – Mg, F – O; $2\text{Mg} + \text{O}_2 \longrightarrow 2\text{MgO}$
 (b) J – Na, F – Cl; $2\text{Na} + \text{Cl}_2 \longrightarrow 2\text{NaCl}$
 (c) J – Mg, F – Cl; $2\text{Mg} + \text{Cl}_2 \longrightarrow 2\text{MgCl}_2$
 (d) J – Na, F – O; $2\text{Na} + \text{O}_2 \longrightarrow 2\text{NaO}$

4.4 Refer Tables (i) and (ii) to answer this question.

A salt is formed when element Al is combined with element O. The aqueous solution of this salt produces [1]

- (a) an acidic solution (b) a basic solution.
 (c) a neutral solution. (d) an alkaline solution.

- Q5. Consider the following statements about the magnetic field due to a current carrying long solenoid:
- A. The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
 - B. The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
 - C. The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
 - D. The N-pole and the S-pole exchange positions when the direction of current through the solenoid is reversed.

The correct statements are [1]

- (a) A and B only
- (b) C and D only
- (c) B, C and D
- (d) A, B and D

- Q6. Convex lens forms a real, point sized image at focus, when the object is placed [1]
- (a) at $2F$
 - (b) between F and $2F$
 - (c) at focus
 - (d) at infinity

OR

The radius of curvature of concave mirror is 12 cm. Then, the focal length will be [1]

- (a) 12 cm
- (b) 6 cm
- (c) -24 cm
- (d) -6 cm

- Q7. Ocean thermal energy is due to the [1]
- (a) energy stored by waves in the ocean.
 - (b) temperature difference at different levels in the ocean.
 - (c) pressure difference at different levels in the ocean.
 - (d) tides arising in the ocean.

- Q8. In which of the following the image of an object placed at infinity will be highly diminished and point sized? [1]
- (a) Concave mirror only
 - (b) Both concave and convex lens
 - (c) Convex mirror only
 - (d) Both concave mirror and convex lens

- Q9. Our eyes form the image of an object at [1]
- (a) cornea
 - (b) pupil
 - (c) retina
 - (d) optic nerve

OR

The following one is not a primary colour

- (a) Yellow
- (b) Red
- (c) Green
- (d) Blue

- Q10. Consider the following statements related to biodiversity:
- A. Biodiversity refers to the different species of flora and fauna present in an area.
 - B. Biodiversity refers to only the flora of a given area.
 - C. Biodiversity is greater in a forest.
 - D. Biodiversity refers to the total number of individuals of a particular species living in an area.
- The statement(s) that correctly describe(s) the concept of biodiversity is/are [1]
- (a) A only
 - (b) C only
 - (c) A and C only
 - (d) A, B and D

- Q11. In a hydroelectric power plant, more electrical power can be generated if water falls from a greater height because [1]
- (a) its temperature increases.
 - (b) larger amount of potential energy is converted into kinetic energy.
 - (c) the electricity content of water increases with height.
 - (d) more water molecules dissociate into ions.

- Q12. The focal length of the eye lens increases when eye muscles [1]
- (a) contract and lens becomes thicker
 - (b) contract and lens becomes thinner
 - (c) are relaxed and lens becomes thicker
 - (d) are relaxed and lens becomes thinner

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 (a), (b), (c) and (d) as given below.

- (a) Both A and R are true and R is the correct explanation of the assertion.
 - (b) Both A and R are true but R is not the correct explanation of the assertion.
 - (c) A is true but R is false.
 - (d) A is false but R is true.
- Q13. **Assertion :** Copper articles, when exposed to moist air for a long time, react with oxygen to form a green coating. [1]
Reason : The green substance formed on the surface of copper articles is copper carbonate $[\text{Cu}_2\text{CO}_3(\text{OH})_2]$.
- Q14. **Assertion :** The concentration of harmful chemicals is more in human beings. [1]
Reason : Man is at the apex of the food chain.

OR

Assertion : Green plants of the ecosystem are the transducers.

Reason : Producers trap the radiant energy of the sun and change it into chemical energy.

SECTION B

- Q15. On heating blue coloured powder of copper (II) nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas X is formed. [3]
- (a) Write a balanced chemical equation of the above reaction.
 - (b) Identify the brown gas X evolved.
 - (c) Identify the type of reaction.
 - (d) What could be the pH range of an aqueous solution of the gas X?

OR

Write the balanced chemical equations for the following reactions:

- (a) Sodium carbonate on reaction with hydrochloric acid in equal molar concentrations gives sodium chloride and sodium hydrogen-carbonate.
 - (b) Sodium hydrogen-carbonate on reaction with hydrochloric acid gives sodium chloride, water and liberates carbon dioxide.
 - (c) Copper sulphate on treatment with potassium iodide precipitates cuprous iodide (Cu_2I_2), liberates iodine gas and also forms potassium sulphate. [3]
- Q16. An element A burns with a golden flame in air. It reacts with another element B, (atomic number 17) to give a product C. An aqueous solution of the product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also write down the equations for the reactions involved. [3]

- Q17. How and why does the chemical reactivity of the elements vary on moving down the (a) group 1 and (b) group 17 of the periodic table? Explain by giving a suitable example. [3]
- Q18. (a) Why is transpiration important for plants?
(b) Why and how does water enter continuously into the root xylem? [3]
- Q19. How will you demonstrate that light is necessary for photosynthesis? [3]
- Q20. (a) How is the sex of a newborn determined in humans?
(b) Does the genetic combination of mothers play a significant role in determining the sex of a newborn? [3]

OR

Mention three important features of fossil which help in the study of evolution. [3]

- Q21. Analyse the following observation table showing variation of image-distance (v) with object-distance (u) in case of a convex lens and answer the questions that follow, without doing any calculations:

S. No.	Object distance u (cm)	Image distance v (cm)
1.	- 60	+ 12
2.	- 30	+ 15
3.	- 20	+ 20
4.	- 15	+ 30
5.	- 12	+ 60
6.	- 9	+ 90

- (a) What is the focal length of the convex lens? Give reason for your answer.
(b) For what object-distance (u) is the corresponding image-distance (v) not correct? How did you arrive at this conclusion?
(c) Choose an appropriate scale to draw a ray diagram for the observation at S. No. 4, and find the approximate value of magnification. [3]

OR

The distance between the object and its inverted image formed by a concave mirror is 15 cm. If the magnification produced by the mirror is -2 , use the mirror formula to determine the object distance, image distance and focal length of the mirror. Draw a ray diagram to illustrate the image formation in this case and also mark these distances. [3]

- Q22. Three resistors R_1 , R_2 and R_3 are connected in parallel and the combination is connected to a battery, an ammeter, a voltmeter and a key. Draw a suitable circuit diagram. Obtain an expression for the effective resistance of the combination of resistors in parallel. [3]
- Q23. Two identical resistors of $7\ \Omega$ each are connected to a battery of 6 V. Calculate the ratio of the powers consumed by the resulting combinations with minimum resistance and maximum resistance. [3]
- Q24. You have been selected to speak on the topic "Ozone layer and its protection" in the school assembly on Environment Day.
(a) Why should the ozone layer be protected to save the environment?
(b) List any two ways to bring awareness amongst your fellow students that would also help in protection of the ozone layer as well as the environment. [3]

SECTION C

Q25. With the help of an example, explain the term 'neutralisation reaction'. Also give suitable examples to show the formation of acidic, basic and neutral salts. [5]

Q26. (a) Explain the nature of the covalent bond using the bond formation of CH_3Cl .

(b) Give reason:

(i) Why carbon compounds are bad conductors of electricity?

(ii) Why carbon compounds generally have low melting and boiling points? [5]

OR

What is a homologous series of carbon compounds? Write its two characteristics. Giving reason select two compounds from the following which belong to the same homologous series: C_2H_2 , C_2H_4 , C_2H_6 , C_3H_4 , C_4H_5 , C_6H_6 [5]

Q27. What are reflex actions? Give two examples. Explain a reflex arc. [5]

OR

(a) (i) State the function of plant hormones. Name a plant hormone which is essential for cell division.

(ii) Name the plant hormone which is involved in phototropism. Explain its role.

(b) (i) Identify the glands that secrete insulin and thyroxine.

(ii) Explain with an example how the timing and the amount of hormones secreted are regulated in the human body.

Q28. Define vegetative propagation giving suitable examples. List five advantages of vegetative propagation. [5]

Q29. (a) Name the defect of vision which is also called old age hypermetropia. What is its cause and how is it corrected?

(b) A person can see objects if they are placed beyond 1 m. What kind of lens would he require to read a book at a distance of 25 cm? Calculate the power of the lens used. [5]

Q30. Explain different ways to induce current in a coil. [5]

OR

Describe an activity to show that a current carrying conductor experiences a force perpendicular to its length and the external magnetic field. How does Fleming's left-hand rule help us to find the direction of the force acting on the current carrying conductor? [5]

WWW.CBSE.ONLINE

Download Solved version of this paper from
www.cbse.online

This sample paper has been released by website www.cbse.online for the benefits of the students. This paper has been prepared by subject expert with the consultation of many other expert and paper is fully based on the exam pattern for 2019-2020. Please note that website www.cbse.online is not affiliated to Central board of Secondary Education, Delhi in any manner. The aim of website is to provide free study material to the students.