CBSE 2020 Science — Set 1

English Medium

Time Allowed: 3 Hours | Maximum Marks: 80

General Instructions:

1. This question paper contains 39 questions. All questions are compulsory.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 6 questions carrying 2 marks each.
4. Section C has 7 questions carrying 3 marks each.
5. Section D has 3 questions carrying 5 marks each.
6. Section E has 3 case-study based questions carrying 4 marks each.
7. Draw neat diagrams wherever required.

Section A

Multiple Choice Questions (1 mark each)

Q.1 [1 mark]

Name a cyclic unsaturated carbon compound.

Q.2 [1 mark]

The change in magnetic field lines in a coil is the cause of induced electric current in it. Name the underlying phenomenon.

Q.3(a) [1 mark]

The growing size of the human population is a cause of concern for all people. The rate of birth and death in a given population will determine its size. Reproduction is the process by which organisms increase their population. The process of sexual maturation for reproduction is gradual and takes place while general body growth is still going on. Some degree of sexual maturation does not necessarily mean that the mind or body is ready for sexual acts or for having and bringing up children. Various contraceptive devices are being used by human beings to control the size of population.

(a) List two common signs of sexual maturation in boys and girls.

Q.3(b) [1 mark]

The growing size of the human population is a cause of concern for all people. Various contraceptive devices are being used by human beings to control the size of population.

(b) What is the result of reckless female foeticide?

Q.3(c) [1 mark]

The growing size of the human population is a cause of concern for all

people. Various contraceptive devices are being used by human beings to control the size of population.

(c) Which contraceptive method changes the hormonal balance of the body?

Q.3(d) [1 mark]

The growing size of the human population is a cause of concern for all people. The rate of birth and death in a given population will determine its size.

(d) Write two factors that determine the size of a population.

Q.4(a) [1 mark]

Human body is made up of five important components, of which water is the main component. Food as well as potable water are essential for every human being. The food is obtained from plants through agriculture. Pesticides are being used extensively for a high yield in the fields. These pesticides are absorbed by the plants from the soil along with water and minerals and from the water bodies these pesticides are taken up by the aquatic animals and plants. As these chemicals are not biodegradable, they get accumulated progressively at each trophic level. The maximum concentration of these chemicals gets accumulated in our bodies and greatly affects the health of our mind and body.

(a) Why is the maximum concentration of pesticides found in human beings?

Q.4(b) [1 mark]

Pesticides are absorbed by the plants from the soil along with water and minerals. As these chemicals are not biodegradable, they get accumulated progressively at each trophic level.

(b) Give one method which could be applied to reduce our intake of pesticides through food to some extent.

Q.4(c) [1 mark]

Various steps in a food chain represent:

(a) Food web
(b) Trophic level
(c) Ecosystem
(d) Biomagnification

Q.4(d) [1 mark]

With regard to various food chains operating in an ecosystem, man is a:

(a) Consumer
(b) Producer
(c) Producer and consumer
(d) Producer and decomposer

Q.5 [1 mark]

Calcium oxide reacts vigorously with water to produce slaked lime.

$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq)$

This reaction can be classified as:

Which of the following is a correct option?

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

OR

Q.5 [1 mark]

When hydrogen sulphide gas is passed through a blue solution of copper

sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of a:

(a) Combination reaction
(b) Displacement reaction
(c) Decomposition reaction
(d) Double displacement reaction

Q.6 [1 mark]

In a double displacement reaction such as the reaction between sodium sulphate solution and barium chloride solution:

The correct option is:

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

Q.7 [1 mark]

Baking soda is a mixture of:

(a) Sodium carbonate and acetic acid
(b) Sodium carbonate and tartaric acid
(c) Sodium hydrogen carbonate and tartaric acid
(d) Sodium hydrogen carbonate and acetic acid

Q.8 [1 mark]

The chemical formula for plaster of Paris is:

(a) $CaSO_4 \cdot 2H_2O$
(b) $CaSO_4 \cdot H_2O$
(c) $CaSO_4 \cdot \frac{1}{2}H_2O$
(d) $2CaSO_4 \cdot H_2O$

Q.9 [1 mark]

The laws of reflection hold true for:

(a) plane mirrors only
(b) concave mirrors only
(c) convex mirrors only
(d) all reflecting surfaces

OR

Q.9 [1 mark]

When an object is kept within the focus of a concave mirror, an enlarged image is formed behind the mirror. This image is:

(a) real
(b) inverted
(c) virtual and inverted
(d) virtual and erect

Q.10 [1 mark]

At the time of short circuit, the electric current in the circuit:

(a) varies continuously
(b) does not change
(c) reduces substantially
(d) increases heavily

OR

Q.10 [1 mark]

Two bulbs of 100 W and 40 W are connected in series. The current through the 100 W bulb is 1 A. The current through the 40 W bulb will be:

(a) 0.4 A
(b) 0.6 A
(c) 0.8 A
(d) 1 A

Q.11 [1 mark]

Which one of the following is responsible for the sustenance of underground water?

(a) Loss of vegetation cover
(b) Diversion for high water demanding crops
(c) Pollution from urban wastes
(d) Afforestation

Q.12 [1 mark]

Incomplete combustion of coal and petroleum:

The correct option is:

(a) (A) and (B)
(b) (A) and (D)
(c) (B) and (C)
(d) (C) and (D)

Q.13 [1 mark]

Assertion (A): Esterification is a process in which a sweet smelling substance is produced.
Reason (R): When esters react with sodium hydroxide an alcohol and sodium salt of carboxylic acid are obtained.

Select the correct option:
(a) Both A and R are true and R is 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.

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Q.14 [1 mark]

Assertion (A): In the process of nuclear fission, the amount of nuclear energy generated by the fission of an atom of uranium is so tremendous that it produces 10 million times the energy produced by the combustion of an atom of carbon from coal.

Reason (R): The nucleus of a heavy atom such as uranium, when bombarded with low energy neutrons, splits apart into lighter nuclei. The mass difference between the original nucleus and the product nuclei gets converted to tremendous energy.

Select the correct option:

(a) Both A and R are true and R is 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.

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Q.15 [1 mark]

1 g of copper powder was taken in a china dish and heated. What change takes place on heating? When hydrogen gas is passed over this heated substance, a visible change is seen in it. Give the chemical equations of reactions, the name and the colour of the products formed in each case.

Q.16 [1 mark]

List the important products of the Chlor-alkali process. Write one important use of each.

OR

Q.16 [1 mark]

How is washing soda prepared from sodium carbonate? Give its chemical equation. State the type of this salt. Name the type of hardness of water which can be removed by it.

Q.17 [1 mark]

3 mL of ethanol is taken in a test tube and warmed gently in a water bath. A 5% solution of alkaline potassium permanganate is added first drop by drop to this solution, then in excess.

(i) How is 5% solution of $KMnO_4$ prepared?

(ii) State the role of alkaline potassium permanganate in this reaction. What happens on adding it in excess?

(iii) Write the chemical equation of this reaction.

Q.18 [1 mark]

A squirrel is in a scary situation. Its body has to prepare for either fighting or running away. State the immediate changes that take place in its body so that the squirrel is able to either fight or run.

OR

Q.18 [1 mark]

Why is chemical communication better than electrical impulses as a means of communication between cells in a multi-cellular organism?

Q.19 [1 mark]

Define the term pollination. Differentiate between self pollination and cross

pollination. What is the significance of pollination?

Q.20 [1 mark]

What are homologous structures? Give an example. Is it necessary that homologous structures always have a common ancestor? Justify your answer.

Section B

Very Short Answer Questions (2 marks each)

Q.21 [2 marks]

Why is Tyndall effect shown by colloidal particles? State four instances of observing the Tyndall effect.

OR

Q.21 [2 marks]

Differentiate between a glass slab and a glass prism. What happens when a narrow beam of (i) a monochromatic light, and (ii) white light passes through (a) a glass slab and (b) a glass prism?

Q.22 [2 marks]

Draw a labelled diagram to show (i) reddish appearance of the sun at the sunrise or the sunset and (ii) white appearance of the sun at noon when it is overhead.

Q.23 [2 marks]

A V-I graph for a nichrome wire is given below. What do you infer from this graph? Draw a labelled circuit diagram to obtain such a graph.

Q.24(a) [2 marks]

(a) Write the mathematical expression for Joule's law of heating.

Q.24(b) [2 marks]

(b) Compute the heat generated while transferring 96000 coulomb of charge in two hours through a potential difference of 40 V.

Q.25 [2 marks]

Carbon cannot reduce the oxides of sodium, magnesium and aluminium to their respective metals. Why? Where are these metals placed in the reactivity series? How are these metals obtained from their ores? Take an example to explain the process of extraction along with chemical equations.

Q.26 [2 marks]

The position of certain elements in the Modern Periodic Table are shown below.

Group:	1	2	3 to 12	13	14	15	16	17	18
Period 1:								G	H
Period 2:		A			I			B	C
Period 3:		D				E			F

Using the above table answer the following questions giving reasons in each case:

(i) Which element will form only covalent compounds?

(ii) Which element is a non-metal with valency 2?

(iii) Which element is a metal with valency 2?

(iv) Out of H, C and F which has largest atomic size?

(v) To which family does H, C and F belong?

OR

Q.26 [2 marks]

Define atomic size. Give its unit of measurement. In the modern periodic table what trend is observed in the atomic radius in a group and a period and

why is it so?

Q.27(a) [3 marks]

(a) Why is there a difference in the rate of breathing between aquatic organisms and terrestrial organisms? Explain.

(b) Draw a diagram of human respiratory system and label — pharynx, trachea, lungs, diaphragm and alveolar sac on it.

OR

Q.27 [3 marks]

OR

(a) Name the organs that form the excretory system in human beings.

(b) Describe in brief how urine is produced in human body.

Section C

Short Answer Questions (3 marks each)

Q.28 [3 marks]

(a) What is the law of dominance of traits? Explain with an example.

(b) Why are the traits acquired during the life time of an individual not inherited? Explain.

Q.29 [3 marks]

Draw a ray diagram in each of the following cases to show the formation of image, when the object is placed:

(i) between optical centre and principal focus of a convex lens.

(ii) anywhere in front of a concave lens.

(iii) at 2F of a convex lens.

State the signs and values of magnifications in the above mentioned cases (i) and (ii).

OR

Q.29 [3 marks]

An object 4.0 cm in size, is placed 25.0 cm in front of a concave mirror of focal length 15.0 cm.

(i) At what distance from the mirror should a screen be placed in order to obtain a sharp image?

(ii) Find the size of the image.

(iii) Draw a ray diagram to show the formation of image in this case.

Q.30 [3 marks]

(a) What is an electromagnet? List any two uses.

(b) Draw a labelled diagram to show how an electromagnet is made.

(c) State the purpose of soft iron core used in making an electromagnet.

(d) List two ways of increasing the strength of an electromagnet if the material of the electromagnet is fixed.