CBSE EXAMINATION PAPER-2022

SCIENCE

(Solved)

Time allowed : 3 hours | Maximum Marks : 53

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **23 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 2** are case based questions

iv. **Section B** – questions number **3 to 12** are very short answer

v. **Section C** – questions number **13 to 15** are long answer

vi. **Section D** – questions number **16 to 23** are short answer

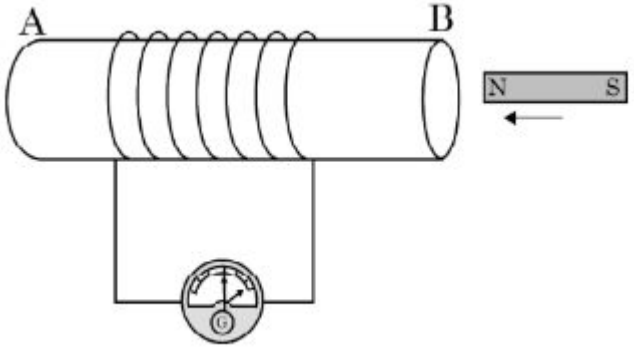
vii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

viii. Use of calculator is NOT allowed.

Section A

Question 1.

AB coil of copper wire having an ample number of turns. The ends of the coil are connected with a galvanometer as shown. When the north pole of a strong bar magnet is moved towards the end B of the coil, a deflection is observed in the galvanometer.



(1)

State the reason for using a galvanometer in the activity and why does its needle deflects momentarily when magnet is moved towards the coil.

[1 Marks]

(2)

What would be observed in the galvanometer in a situation when the coil and the bar magnet both move with the same speed in the same direction ? Justify your answer.

[1 Marks]

(3)

State the conclusion that can be drawn from this activity.

Will there be any change in the momentary deflection in the galvanometer if number of turns in the coil is increased and a more stronger magnet is moved towards the coil ?

[2 Marks]

(4)

What is electromagnetic induction ? What is observed in the galvanometer when a strong bar magnet is held stationary near one end of a coil of large number of turns ? Justify your answer.

[2 Marks]

Question 2.

Sex of an individual is determined by different factors in various species. Some animals rely entirely on the environmental cues, while in some other animals the individuals can change their sex during their life time indicating that sex of some species is not genetically determined. However, in human beings, the sex of an individual is largely determined genetically.

(1)

In what way are the sex chromosomes 'X' and 'Y' different in size? Name the mismatched pair of sex chromosomes in humans.

[1 Marks]

(2)

Write the number of pairs of sex chromosomes present in human beings. In which one of the parent (male/female) perfect pair / pairs of sex chromosomes are present?

[1 Marks]

(3)

Citing two examples to justify the statement 'Sex of an individual is not always determined genetically.

[2 Marks]

(4)

Draw a flowchart to show that sex is determined genetically in human beings.

[2 Marks]

Section B

Question 3.

Explain giving reason why although the nuclear charge in atoms increases in moving from left to right in a period as well as in moving from top to bottom in a group in the Modern periodic table, but the

size of the atoms does not vary similarly in both situations.

[2 Marks]

Question 4.

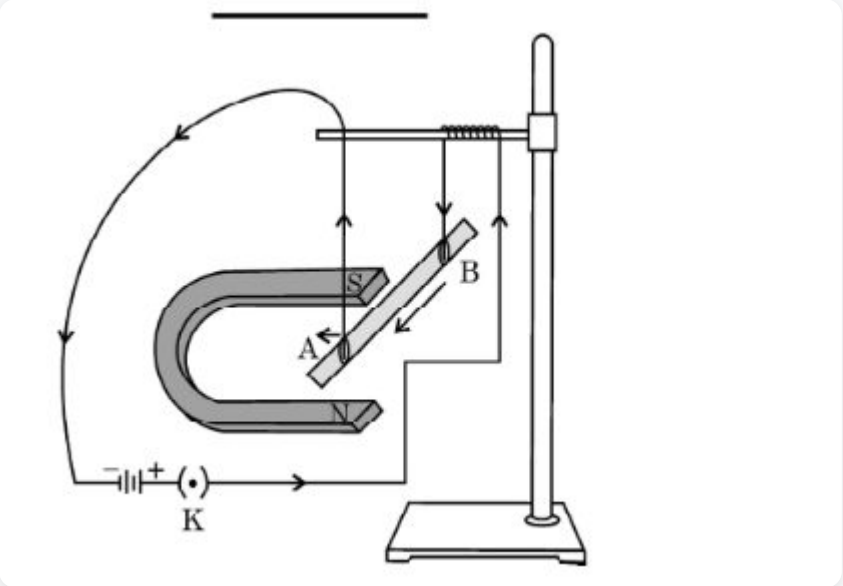
As shown in the diagram an aluminium rod 'AB' is suspended horizontally between the two poles of a strong horse shoe magent in such a way that the axis of rod is horizontal and the direction of the magnetic field is vertically upward. The rod is connected in series with a battery and a key.

State giving reason:

(a) What is observed when a current is passed through the aluminum rod from end B to end A?

(b) What change is observed in a situation in which the axis of the rod 'AB' is moved and aligned parallel to the magnetic field and current is passed in the rod in the same direction ?

[2 Marks]



Question 5.

Using height (tallness/ dwarfness) of a plant as an example , show that genes control the characteristics or traits in an organism.

[2 Marks]

Question 6.

Mention the function of (a) Placenta (b) Fallopian tubes (c) Uterus and (d) Ovary in the human female reproductive system.

[2 Marks]

Question 7.

" The improvement in our lifestyle has led to the generation of large amount of waste material." List two reasons to justify this statement.

[2 Marks]

Question 8.

(a) Differentiate between binary fission in Amoeba and binary fission in Leishmania.

(b) How does reproduction take place in malarial parasite ?

[2 Marks]

Question 9.

Consider the carbon compounds having following molecular formula :

(i) C_3H_6 (ii) C_3H_8 (iii) C_4H_6 (iv) C_6H_6 (v) C_6H_{12}

(a) State the number of double covalent bonds present in C_3H_6 .

(b) Write the formula of first member of the homologous series to which the carbon compound C_4H_6 belongs.

(c) which one of the above compounds forms ring structure of carbon atoms ?

(d) Identify, which of the above compounds, is a member of alkane series.

[2 Marks]

Question 10.

" Magnetic field is a physical quantity that has both direction and magnitude". How can this statement be proved with the help of magnetic field lines of a bar magnet ?

[2 Marks]

Question 11.

In a cross between red coloured and white coloured flowers, when plants with red coloured flowers of F1 generation were self pollinated, plants of F2 generation were obtained in which 75% of plants were with red flowers and 25% plants were with white flowers.

Explain the inheritance of traits in the above cross with the help of a flow chart only along with the ratio of plants obtained.

[2 Marks]

Question 12.

" The change in packaging has resulted in waste becoming non-biodegradable."

Giving two examples from daily life, justify this statement.

[2 Marks]

Section C

Question 13. Mention the functions of (i) Placenta (ii) Fallopian tubes (iii) Uterus and (iv) Ovary in the human female reproductive system.

[2.5 Marks]

Question 14. The improvement in our lifestyle has led to the generation of large amounts of waste material. List two reasons to justify this statement.

[2.5 Marks]

Question 15.

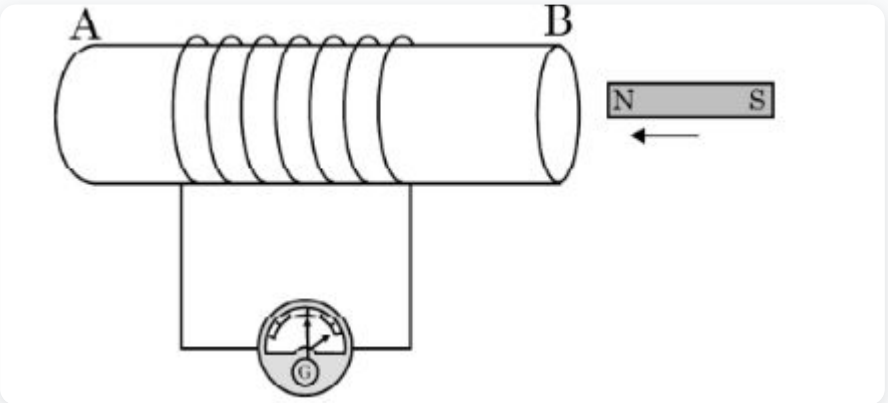
AB is coil of copper wire having a large number of turns. The Ends of the coil are connected with a galvanometer as shown. When the north pole of a strong bar magnet is moved towards the end B of the coil, a deflection is observed in the galvanometer.

(a) State the reason for using galvanometer in the activity and why does its needle deflects momentarily when magnet is moved towards the coil.

(b) What would be observed in the galvanometer in a situation when the coil and the bar magnet both move with the same speed in the same direction ? Justify your answer.

(c) State the conclusion that can be drawn from this activity.

[4 Marks]



Section D

Question 16.

Name the elements whose compounds formed the basis of classification in Mendeleeve's periodic table. Why did Mendeleev choose these elements ? How the formulae of these compounds had helped Mendeleev in deciding the position of an elements in his periodic table ?

[3 Marks]

Question 17.

What are trophic levels ? Why re autotrophs considered to be at the first trophic level of all food chains ? State the reason for limited number of trophic levels in nature.

[3 Marks]

Question 18.

In flowering plants, the pollen grains are transferred to stigma by pollination but the female germ cells are present in the ovary. Explain with the help of a labelled diagram (only concerned parts), how the male germ cell reaches the ovary.

[3 Marks]

Question 19.

"Two different forms of carbon - diamond and graphite have different structures and very different physical properties even though their chemical properties are same." Explain why.

[3 Marks]

Question 20.

State the reasons, why carbon cannot

(i) Lose four electrons to form C^{4+} cation and

(ii) Grain four electrons to form C^{4-} anion.

How does carbon overcome this problem to form compounds?

[3 Marks]

Question 21.

(a) A student wants to use an electric heater, an electric bulb an electric fan simultaneously.

How should these gadgets be connected with the mains ? Justify your answer giving three reasons.

(b) What is an electric fuse ? How is it connected in a circuit ?

[3 Marks]

Question 22.

An electric motor rated 1100 W is connected to 220 V mains. Find :

(i) the current drawn from the mains,

(ii) Electric energy consumed if the motor is used for 5 hours daily for 6 days.

(iii) Total cost of energy consumed if the rate of one unit is Rs.5

[3 Marks]

Question 23.

Study the following circuit and find:

(i) Effective resistance of the circuit

(ii) Current drawn from the battery

(iii) Potential difference across the 5Ω resistor

[3 Marks]

