



# CHENNAI SAHODAYA SCHOOLS COMPLEX

- ❖ This question paper contains 7 printed pages.
- ❖ This question paper contains 39 questions.
- ❖ Write down the question number before attempting.
- ❖ An additional reading time of 15 minutes will be given.

## **General Instructions**

- i. This question paper consists of 39 questions in 5 sections.*
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
- iii. **Section A** consists of 20 objective type questions carrying 1 mark each.*
- iv. **Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.*
- v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words*
- vi. **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.*
- vii. **Section E** consists of 3 source-based/case-based units of assessment of 04 mark each with sub-parts.*

## **COMMON EXAMINATION 2022-23**

### **Class-10 (SET-3)**

### **Science (086)**

**Time Allowed: 3 hours Maximum Marks:80 Roll No.: Date: 21/01/2023**

### **SECTION –A**

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

1. A boy records that 4000 joule of work is required to transfer 10 coulombs of charge between two points of a resistor of 50  $\Omega$ . The current passing through it is  
(a) 2 A (b) 4 A (c) 8 A (d) 16 A
2. Explanation: A cylindrical conductor of length 'l' and uniform area of cross-section 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
3. Which of the following statement is incorrect?  
(a) The bending of a ray of light on passing from different media to one medium is called reflection .

- (b) The phenomenon of splitting of white light into seven constituent colours is known as the dispersion of light.
- (c) Refractive index of medium depends upon its temperature.
- (d) Refractive index is directly proportional to the optical density of the medium.

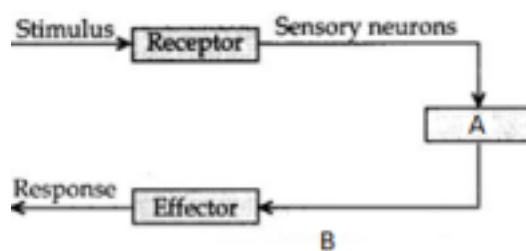
4. A cylindrical conductor of length 'l' and uniform area of Cross-section 'A' has resistance R'. The area of cross-section of another conductor of same material and same resistance but with the length '2l' is:  
 (a) 0.5 A (b) 1.5 A (c) 2 A (d) 3 A

5. Which of the pairs belong to the same trophic level?  
 (a) Rabbit: Tiger  
 (b) Vulture: Rat  
 (c) Grasshopper: Hawk  
 (d) Frog: Lizard

6. Raw materials required in the autotrophic mode of nutrition are:  
 i. Carbon dioxide and water  
 ii. Chlorophyll  
 iii. Nitrogen  
 iv. Sunlight  
 a) (i), (ii) and (iii) b) (i) and (ii) c) (i), (ii) and (iv) d) (i), (ii), (iii) and (iv)

7. Which plant hormone promotes cell division?  
 (a) Auxin  
 (b) Gibberellin  
 (c) Cytokinin  
 (d) Abscisic acid

8. Asexual reproduction takes place through budding in  
 (a) Amoeba and yeast  
 (b) Yeast and hydra  
 (c) Plasmodium and yeast  
 (d) Leishmania and yeast



9. Give the missing terms- A and B  
 (a) Spinal cord and motor neuron  
 (b) Brain and sensory neuron  
 (c) Cranial nerves and motor neuron  
 (d) Brain and relay neuron

10. Which among the following statements is incorrect for magnesium metal?  
 (a) It burns in oxygen with a dazzling white flame.  
 (b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas.  
 (c) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas. (d) It

reacts with steam to form magnesium hydroxide and evolves hydrogen gas. <sup>11.</sup> Consider the following table:

Substance	
Lemon	2.3
Battery acid	$x$
Sea water	8.5
Apple	3.1

The value of  $x$  in above table is:

- (a) 0 (b) 7.3 (c) 12.5 (d) 6.9



12. The reaction  $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$  is an example of

- (a) combination reaction  
 (b) decomposition reaction  
 (c) displacement reaction  
 (d) double displacement reaction

13. Which among the following is (are) double displacement reaction(s)?

- 1)  $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$   
 2)  $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$   
 3)  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$   
 4)  $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

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

14. What is the balanced chemical equation?

- (a) The atom of each element is different before and after chemical reaction.  
 (b) The atoms and elements are equal in chemical reactions  
 (c) The no. of atoms of all elements are equal after the chemical reaction. (d) The number of atoms of each element remains the same, before and after chemical reaction

15. The reaction that differs from the rest of the reaction given is-

- (a) formation of calcium oxide from limestone  
 (b) formation of aluminium from aluminium oxide  
 (c) formation of sodium carbonate from sodium hydrogen carbonate  
 (d) formation of mercury from mercuric oxide

16. Which of the following statements is true for acids?

- (a) Bitter and change red litmus to blue (b) Sour and change red litmus to blue (c) Sour and change blue litmus to red (d) Bitter and change blue litmus to red

**Q.no. 17 to 20 are Assertion –Reasoning based questions. These consist of two statements-Assertion(A) and Reason (R). Answer these questions selecting the appropriate option given below:**

- (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 correct explanation of the Assertion. (c) 'A' is true but 'R' is false. (d) 'A' is false but 'R' is true.

17. **Assertion(A):** Brown fumes are produced when lead nitrate is heated.

**Reason (R):** Nitrogen dioxide gas is produced as a by-product due to the decomposition of lead nitrate.

18. **Assertion(A):** The curvature of the eye lens can be modified to some extent by the ciliary muscles.

**Reason (R):** The ciliary muscles are used to modify the curvature of lens.

19. **Assertion(A):** Molecular movements are needed for life.

**Reasoning(R):** Body structures are made up of these molecules which need continuous repair and maintenance.

20. **Assertion(A):** Mutation is sudden change in the genetic material.

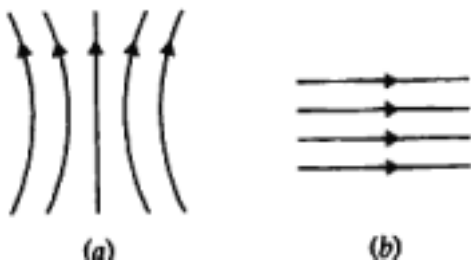
**Reason (R):** Variation is useful for the survival of species over time.

### SECTION-B

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

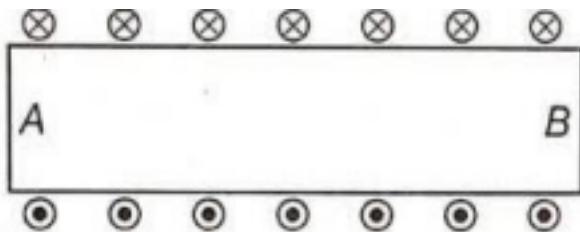
21. How is brain protected from injury and shock?

22. (i) State two ways by which the strength of an electromagnet can be increased. (ii) Identify the type of magnetic fields represented by the figure given below and name the type of conductors which can provide them.



**OR**

Diagram shows the lengthwise section of a current carrying solenoid.  $\otimes$  indicates current entering into the page,  $\odot$  indicates current emerging out of the page. Decide which end of the solenoid A or B, will behave as north pole. Give reason for your answer. Also draw field lines inside the solenoid



4

23. A metal **A**, which is used in thermit process, when heated with oxygen gives an oxide **B**, which is amphoteric in nature. Identify **A** and **B**. Write down a balanced chemical equation for the reaction between oxide **B** and NaOH.

**OR**

In one method of rust prevention, the iron is coated with another element. Name the method and define it.

24. What happens at the synapse between two neurons?  
 25. Why is it necessary to conserve our environment? (Any two points) 26. How does reproduction help in providing stability to populations of species?

### SECTION-C

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

27. Give reasons for the following:  
 (a) It is dangerous to touch the live wire of the main supply rather than the neutral wire.  
 (b) In the household circuit, parallel combination of resistances is used.  
 (c) Using a fuse in a household electric circuit is important.
28. An ore on treatment with dil. HCl gives the smell of rotten eggs. Name the type of this ore. Write the chemical equations involved to obtain the metal from its concentrated ore
29. Name the three processes in urine formation. Draw the structure of a nephron and label the parts where they take place.
- OR**
- With an example show how Gregor Mendel explained law of independent inheritance.
30. (a) Draw a schematic diagram of a common domestic circuit showing provision of (i) Earth wire,  
 (ii) Main fuse  
 (iii) Electricity meter and  
 (iv) Distribution box  
 (b) Distinguish between short circuiting and overloading
31. A copper wire has diameter 0.5 mm and resistivity  $1.6 \times 10^{-8} \Omega \text{ m}$ . Calculate the length of this wire to make its resistance 100  $\Omega$ . How much does the resistance change if the diameter is doubled without changing its length?
32. (a) A non-metal **X** exists in two different forms **Y** and **Z**. **Y** is the hardest natural substance whereas **Z** is a good conductor of electricity. Identify **X**, **Y**, **Z**.  
 (b) An element **X** on reaction with oxygen forms an oxide **XO<sub>2</sub>**. The oxide when dissolved in water turns blue litmus red. State whether element **X** is a metal or non metal. Identify that element.

(c) Name the metal which is alloyed with copper to make bronze.

33. What could be the reasons for adopting contraceptive methods? Write one contraceptive method of both genders.

5

### SECTION-D

Question no. 34 to 36 are long answer questions.

34. (a) How is the movement of leaves of a sensitive plant different from the movement of a shoot towards light?  
(b) List out the plant hormones and mention their functions.

**OR**

(a) What is meant by the term 'Biomass'?  
(b) What is meant by biological magnification?  
(c) What are decomposers? List two important roles they play in the environment

35. A student suffering from myopia is not able to see distinctly the objects placed beyond 5m  
(a) List two possible reasons due to which this defect of vision may have arisen. Explain with the help of ray diagrams.  
(b) If in this case, the numerical value of the focal length of the corrective lens is 5 m, find the power of the lens as per the new Cartesian sign convention. Explain why the image distance in the eye does not change when we change the distance of an object from the eye?

36. (a) Write the molecular formula of an organic compound having its name suffixed with '*ol*' and having two carbon atoms in the molecule. With the help of balanced chemical equation indicate what happens when it is heated with excess of concentrated H<sub>2</sub>SO<sub>4</sub>. (b) Write names of the following compounds:

- (i) HCOOH
- (ii) CH<sub>3</sub>COCH<sub>2</sub>CH<sub>3</sub>.

(c) Explain with two valid reasons why carbon generally forms compounds by covalent bonds and not by ionic bonds.

**OR**

(a) Define catenation. Explain why no other element exhibits the properties of catenation to the extent seen in carbon compounds? Name one another element that exhibits this property of catenation other than carbon.  
(b) Name the compound formed by the reaction of an organic acid and an alcohol. Write the chemical equation for the reaction involved.

### SECTION-E

Questions 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. **Read the passage given below and answer the following questions from (i) to (v).** The electrical energy consumed by an electrical appliance is given by the product of its power rating and the duration for which it is used. SI unit of electrical energy is the joule. Where a large quantity of energy is involved, using a joule is not convenient as a unit. So, for commercial purposes, bigger units of electrical energy are involved.

1 kilowatt-hour is equal to  $3.6 \times 10^6$  joules of electrical energy.

(i) The value of energy dissipated by a certain heater is E. If the duration of operation of the heater is doubled. What will be the energy dissipated? (1)

- (ii) 60 W is the power of a lamp. What is the energy dissipated in one minute? (1)  
 (iii) Calculate the energy transformed by a 5 A current flowing through a resistor of  $2\ \Omega$  for 30 minutes. (1)

6

- (iv) which one has a higher resistance 100W bulb or 60W bulb? (1)

**OR**

- (iv) An electric bulb is rated at 220V, 100W. What is its resistance? (1)

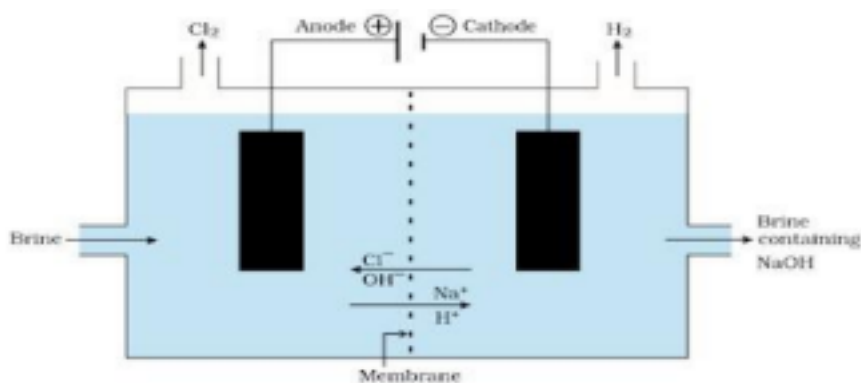
38. If the body design in the squirrel relied only on electrical impulses via nerve cells, the range of tissues instructed to prepare for the coming activity would be limited. On the other hand, if a chemical signal were to be sent as well, it would reach all cells of the body and provide the wide-ranging changes needed. This is done in many animals, including human beings, using a hormone called adrenaline that is secreted from the adrenal glands.

- Which is the target organ for the adrenaline hormone? (1)
- Which hormone is released by thyroid gland? (1)
- What is the function of insulin? (1)
- Name the hormones released by ovary? (1)

**OR**

- iv) Name the endocrine glands located in the brain? (1)

39. **Read the following and answer the questions :**



‘A **neutralization reaction**’ is a reaction where an acid and a base react to form water and a salt. The familiar example of salt is sodium chloride which we use in our food on daily basis. It is prepared by the reaction of hydrochloric acid and sodium hydroxide solution. This salt is used to prepare various compounds. When electricity is passed through an aqueous solution of sodium chloride (called brine), it decomposes to form sodium hydroxide, chlorine gas and hydrogen gas.

A metal carbonate **X** on heating with acid gives a gas which when passed through a solution **Y** gives the metal carbonate **X** back. On the other hand, a gas **G** that is obtained at anode during electrolysis of brine is passed on dry **Y**, it gives a compound **Z**, used for disinfecting drinking water.

- Identify **X**, **Y**, **G** and **Z**. (2)
- What is the nature of the gas that evolves when **X** is heated? (1)

(iii) Write the reaction involved in the formation of **G**? (1)

**OR**

(iii) Write the reaction involved when **G** reacts with **Y**. (1)