



# SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

## SCIENCE

### Class 10 - Science

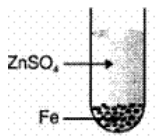
Time Allowed: 3 hours

Maximum Marks: 80

#### General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective-type questions carrying 1 mark each.
4. 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.
5. 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.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

#### Section A

1. What happens in the test tube shown here? [1]  


The diagram shows a test tube containing a dark granular substance labeled 'Fe' at the bottom. An arrow labeled 'ZnSO<sub>4</sub>' points to the liquid above it.

a) H<sub>2</sub>O will produce  
b) SO<sub>2</sub> will produce  
c) No reaction  
d) FeO will produce
2. The crystals of ferrous sulphate on heating gives: [1]  

a) Fe<sub>2</sub>O<sub>3</sub> + H<sub>2</sub>SO<sub>4</sub> + H<sub>2</sub>O  
b) FeO + H<sub>2</sub>O + SO<sub>2</sub>  
c) FeO + SO<sub>3</sub> + H<sub>2</sub>SO<sub>4</sub> + H<sub>2</sub>O  
d) Fe<sub>2</sub>O<sub>3</sub> + SO<sub>2</sub> + SO<sub>3</sub> + H<sub>2</sub>O
3. Plaster of Paris hardens by [1]  

a) Releasing out a molecule of water  
b) Changing into CaCO<sub>3</sub>  
c) Combining with water  
d) Passing of CO<sub>2</sub> gas
4. **Statement 1:** The molecular mass of every two adjacent members of a homologous series differ by 14 u. [1]  
**Statement 2:** All compounds in a homologous series are composed of same elements and contain the same functional group.

- a) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.
- b) Both statements 1 and 2 are false.
- c) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
- d) Statement 1 is true but statement 2 is false

5. The slag obtained during the extraction of copper pyrites is composed mainly of: [1]



- a)  $\text{Cu}_2\text{S}$
- b)  $\text{SiO}_2$
- c)  $\text{CuSiO}_3$
- d)  $\text{FeSiO}_3$

6. **Statement 1:** Metal sulphides and carbonates are converted to metal oxides before the process of reduction. [1]  
**Statement 2:** The reduction of metal oxides is easier than the reduction of metal sulphides and carbonates.

- a) Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.
- b) Statement 1 is true and statement 2 is false
- c) Both statements 1 and 2 are false.
- d) Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

7. Which of the following represents a saponification reaction? [1]

- a)  $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5$
- b)  $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{C}_2\text{H}_5\text{OH}$
- c)  $\text{CH}_3\text{COONa} + \text{NaOH} \xrightarrow{\text{CaO}} \text{CH}_4 + \text{Na}_2\text{CO}_3$
- d)  $2\text{CH}_3\text{COOH} + 2\text{Na} \rightarrow 2\text{CH}_3\text{COONa} + \text{H}_2$

8. A portion of each of four destarched leaves of a plant was covered with paper strips of various kinds. The plant was exposed to sunlight for 5 hours. There after the strips were removed and the leaves tested for starch in the covered portion. [1]

Which one out of the four leaves gave the starch test in the covered portion?

- a) That covered with white paper strip.
- b) That covered with green paper strip.
- c) That covered with a transparent paper strip.
- d) That covered with black paper strip.

9. Which of the following is not a character selected by Mendel? [1]

- A. Flower shape
- B. Pod colour
- C. Pod position
- D. Branch length

- a) A and C
- b) A, B and D



- c) A is true but R is false. d) A is false but R is true.
18. **Assertion (A):** Characteristics of parental plants can be preserved through asexual reproduction. [1]  
**Reason (R):** Vegetative reproduction involves only mitosis.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false. d) A is false but R is true.
19. **Assertion (A):** A compass is kept near a wire carrying current gets deflected. [1]  
**Reason (R):** Electric current is capable of producing a magnetic effect.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false. d) A is false but R is true.
20. **Assertion (A):** Chemicals and toxins accumulate more and more as you move up the food chain. [1]  
**Reason (R):** Anything that gets into biological tissue, that is not normally there, has the potential to accumulate and magnify.
- a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false. d) A is false but R is true.

#### Section B

21. In electron dot structure, the valence shell electrons are represented by crosses or dots. [2]  
i. The atomic number of chlorine is 17. Write its electronic configuration.  
ii. Draw the electron dot structure of chlorine molecule.
22. a. Which of the following flowers will have higher possibility of self-pollination? [2]  
Mustard, Papaya, Watermelon, Hibiscus  
b. List the two reproductive parts of a bisexual flower.
23. Give scientific reasons : Amount of energy released during anaerobic respiration is much less than the amount of energy released during aerobic respiration. [2]

OR

Why does absorption of digested food occur mainly in the small intestine?

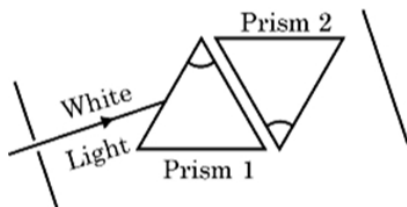
24. Where should an object be placed in front of a concave mirror of focal length 20 cm so as to obtain a two times magnified virtual image of the object? [2]
25. What is ozone? How is it formed in the upper layers of the Earth's atmosphere? How does ozone affect our ecosystem? [2]

OR

Microorganisms are often referred to as the 'scavengers of the environment.' Explain.

26. i. State the relation between colour of scattered light and size of the scattering particle. [2]  
ii. The apparent position of an object, when seen through the hot air, fluctuates or wavers. State the basic cause of this observation.

iii. Complete the path of white light when it passes through two identical prisms placed as shown:



### Section C

27. Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it. [3]

What will be the action of gas on

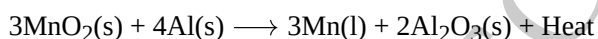
- Dry litmus paper?
- Moist litmus paper?

Write a balanced chemical equation for the reaction taking place.

28. A zinc plate was kept in a glass container having copper sulphate solution. On examining it was found that the blue colour of the solution is fading slowly. After a few days when the zinc plate was taken out of the solution, a number of small holes were noticed in it. State the reason and give chemical equation of the reaction involved. [3]

OR

- Which types of metals can be obtained in their pure form by just heating their oxides in air? Give one example.
- Consider the reaction given below used to obtain Manganese metal in pure form:



- What type of reaction is it?
- What is the role of aluminium in this reaction?

29. Name the following [3]

- The process in plants that links light energy with chemical energy.
- Organisms that can prepare their own food.
- The cell organelle where photosynthesis occurs.
- Cells that surround a stomatal pore.
- Organisms that cannot prepare their own food.
- An enzyme secreted from gastric glands in the stomach that act on proteins.

30. A green stemmed tomato plant denoted by (GG) is crossed with a tomato plant with purple stem denoted by (gg). [3]

- What colour of the stem would you expect in their  $F_1$  progeny?
- In what ratio would you find the green and purple coloured stem in plants of  $F_2$  progeny?
- What conclusion can be drawn for the above observations?

31. The refractive indices 1.0003, 1.31 1.5 respectively of Air, Ice and Benzine in which of these does the light travels fastest? [3]

32. What kind of graph is obtained by plotting values of V and I? Why? [3]

- What is the meaning of electric power of an electrical device? Write its SI unit. [3]
- An electric kettle of 2 kW is used for 2h. Calculate the energy consumed in (i) kilowatt hour and (ii) joules.

### Section D

34. i. Name a commercially important carbon compound having functional group -OH and write its molecular [5]

formula.

ii. Write chemical equation to show its reaction with

1. Sodium metal
2. Excess conc. sulphuric acid
3. Ethanoic acid in the presence of an acid catalyst
4. Acidified potassium dichromate

iii. Also write the name of the product formed in each case.

OR

Differences between soaps and synthetic detergents.

35. State the basic requirements for sexual reproduction? Write the importance of such reproduction in nature? [5]

OR

What are hormones? State their role in the working of the human body. Or Define 'Hormone'. What are the general functions of 'hormones'?

36. What is lens formula ? Give its sign conventions and assumptions. [5]

OR

- a. If the image formed by a mirror for all positions of the object placed in front of it. it is always diminished, erect and virtual, state the type of the mirror and also draw a ray diagram to justify your answer. Write one use such mirrors are put to and why?
- b. Define the radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is + 24 cm.

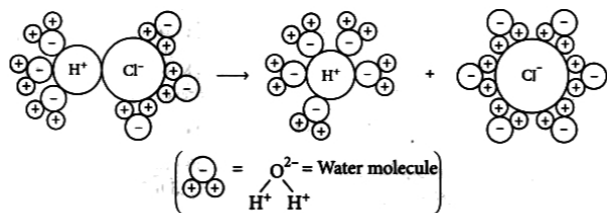
### Section E

37. Read the following text carefully and answer the questions that follow: [4]

The acidic behaviour of acids is due to the presence of hydrogen ( $H^+$ ) ions in them. They produce hydrogen ions in the presence of water. Water is a polar solvent and this property of water helps in weakening the bond between the ions and makes them soluble.

Hence, acids and bases produce ions in aqueous solutions. It may be noted that a dry HCl gas or a solution of hydrogen chloride in organic, non-polar solvents like toluene or benzene do not show acidic properties. This is because hydrogen chloride does not undergo ionization in toluene.

The reason why HCl splits into  $H^+$  and  $Cl^-$  ions in presence of water lies in the fact that water molecules, being polar, pull the  $H^+$  and  $Cl^-$  ions apart and thus, the bond in HCl is broken.



- i. Which acids are present in bee stings? (1)
- ii. If the pH of a solution is 8, then find its  $[H^+]$  ion. (1)
- iii. If you are given water, Hydrochloric acid, and Acetic acid, then mention increasing the order of acid strength. (2)

OR

If you are provided  $\text{H}_3\text{PO}_4$ ,  $\text{C}_2\text{H}_5\text{OH}$ ,  $\text{H}_2\text{CO}_3$ , and  $\text{CH}_3\text{COOH}$ , then which compound does not give  $\text{H}^+$  ions in an aqueous solution? (2)

38. Following questions are based on the two tables given below. Study these tables related to blood sugar levels: [4]

**Table A (Blood glucose chart)**

	Mean Blood Glucose Level (mg/dL)
Doctor's advice needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

**Table B (Blood Report of Patient X and Y)**

Time of check	Blood Glucose ranges (mg/dL)	
	Patient X	Patient Y
Before breakfast (Fasting)	<100	70-130
Before lunch, supper and snack	<110	70-130
Two hours after meals	<140	<180
Bedtime	<120	90-15

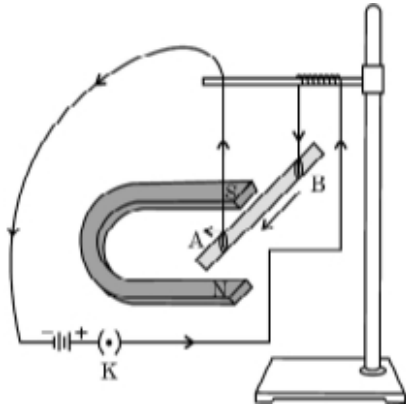
- Refer to Table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data. (1)
- Identify the hormone whose level in the blood is responsible for the above disease. (1)
- High/low sugar and a low/high-fat diet What would you recommend to the affected patient? (2)

**OR**

Refer to Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary. (2)

39. A student was asked to perform an experiment to study the force on a current carrying conductor in a magnetic field. He took a small aluminum rod AB, a strong horse shoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed. On the basis of your understanding of [4]

this phenomenon, answer the following questions:



- i. Why does the rod get displaced on passing current through it? (1)
- ii. State the rule that determines the direction of the force on the conductor AB. (1)
- iii. a. If the U shaped magnet is held vertically and the aluminum rod is suspended horizontally with its end B towards due north, then on passing current through the rod from B to A as shown, in which direction will the rod be displaced?  
b. Name any two devices that use current carrying conductors and magnetic field. (2)

**OR**

Draw the pattern of magnetic field lines produced around a current carrying straight conductor held vertically on a horizontal cardboard. Indicate the direction of the field lines as well as the direction of current flowing through the conductor. (2)