SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

SCIENCE

Class 10 - Science

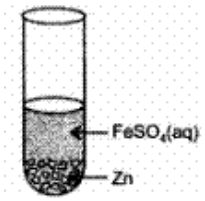
Time Allowed: 3 hours **Maximum Marks: 80**

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. On adding zinc granules to freshly prepared ferrous sulphate solution, a student observes that **[1]**



a) a dull brown coating is formed
b) a greyish black coating is formed
c) a white coating is formed
d) no coating is formed

2. Select the appropriate state symbols of the products given as X and Y in the following chemical equation by choosing the correct option from table given below: **[1]**

$Zn_{(s)} + H_2SO_{4(l)} \rightarrow ZnSO_{4(X)} + H_{2(Y)}$

	(X)	**(Y)**
(a)	(s)	(l)
(b)	(aq)	(g)
(c)	(aq)	(s)
(d)	(g)	(aq)

a) Option (c)
b) Option (d)
c) Option (a)
d) Option (b)

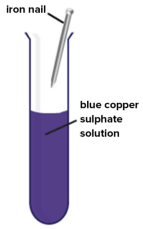
3. Juice of tamarind turns blue litmus to red. It is because of the presence of an acid called: **[1]**

a) tartaric acid
b) oxalic acid
c) methanoic acid
d) acetic acid

4. The chemical compound present in a fruit is**:** **[1]**

a) $CH_3COOC_2H_5$
b) C_2H_5COOH
c) C_2H_5OH
d) All of these

5. An iron nail is suspended in $CuSO_4$ solution and kept for a while. The solution: **[1]**



a) Turns green and no coating will be formed on the nail.
b) Turns green and a coating will be formed on the nail
c) Remains blue and a coating is found on the nail
d) Remain blue and no coating will be formed on the nail.

6. Roasting is a method of heating ore: **[1]**

a) In the absence of water
b) In the presence of water
c) In the absence of air
d) In the presence of air

7. IUPAC name of following compound is: **[1]**

$$CH_3 - CH_2 - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3$$

a) 2-butanol
b) Iso-butanol
c) Propanol
d) Butanol

8. Some raisins weighed 10 gm before they were placed in water for four hours. The raisins were then removed, wiped and weighed again. Their weight was now found to be 12.5 gm. The percentage of water absorbed by them is **[1]**

a) 12.5%
b) 5%
c) 2.5%
d) 25%

9. The branch of biology-related with heredity and variation is called **[1]**

a) Livinglogy
b) Genetics
c) Evolution
d) Taxonomy

10. Characters that are transmitted from parents to offspring during reproduction show - **[1]**

a) only variations with parents
b) Both similarities and variations with parents
c) neither similarities nor variations
d) only similarities with parents

11. Alternative forms of a gene are called **[1]**

a) Chromosomes
b) Multiples
c) Loci
d) Alleles

12. Which component of blood transports, carbon dioxide, and nitrogenous wastes in dissolved form? **[1]**

a) RBC
b) Plasma
c) Platelets
d) WBC

13. The strength of an electromagnet after the limit cannot be increased by increasing the current through the solenoid. What is the reason behind this phenomenon? **[1]**

a) Voltage through the solenoid gradually starts to decrease.
b) Electrons start to corrode the solenoid.
c) Resistance of the solenoid increases.
d) Current flowing through the solenoid is saturated.

14. A wire of resistance R is cut into five equal pieces. These pieces are connected in parallel and the equivalent resistance of the combination is R'. Then the ratio $\frac{R}{R'}$ is: **[1]**

a) 25:1
b) 5:1
c) 1:25
d) 1:5

15. In the following groups of materials, which group contains only non-biodegradable materials? **[1]**

a) Polythene, Detergent, PVC
b) Wood, Paper, Leather
c) Plastic, Detergent, Grass
d) Plastic, Bakelite, Cloth

16. For the management of wastes, we should follow: **[1]**

a) 3Ps
b) 3Rs
c) 3Qs
d) 3As

17. **Assertion (A):** In the following reaction **[1]**

$ZnO + C \rightarrow Zn + CO$

ZnO undergoes reduction.

Reason (R): Carbon is a reducing agent that reduces ZnO to Zn.

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.

18. **Assertion (A):** Fusion of gametes gives rise to a single cell called zygote. **[1]**

Reason (R): Zygote is a fertilised ovum.

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):** Magnetic field lines forms closed loops in nature. **[1]**

Reason (R): Mono-magnetic pole does not exist in nature.

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):** Decomposers help in recycling of nutrients between living and non-living components of ecosystem. **[1]**

Reason (R): Decomposers help in decomposing dead bodies of organisms and return various nutrient elements to their source viz soil, water and air.

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. Apart from the organic compounds, where else do we find carbon? **[2]**
Mention the form in which it is available there and also its percentage.

22. Name the most suitable method of raising a banana plant. Is this mode of reproduction sexual or asexual? List three advantages of growing plants by such a method. **[2]**

23. Describe the structure of human kidney. **[2]**

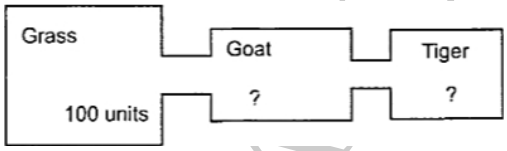
OR

i. What is double circulation?

ii. Why is the separation of the right side and the left side of the heart useful? How does it help birds and mammals?

24. An object of size 7.0 cm is placed at 27 cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror should a screen be placed, so that a sharp focussed image can be obtained? Find the size and the nature of the image. **[2]**

25. Given below is an energy flow diagram. Study it carefully and answer the following questions: **[2]**



a. How much energy (in units) will pass from grass to goat?

b. How much energy (in units) will pass from goat to tiger?

c. Which law operates during the transfer of energy from grass to goat to tiger?

OR

Give scientific terms for the following-

(a) The process of eating and being eaten.

(b) The relationship between abiotic and biotic component.

(c) Increasing concentration of a non biodegradable substance, such as a toxic chemical, in the tissues of organisms at successively higher levels in a food chain.

26. When is a person said to have developed cataract? How is the vision of such a person restored? **[2]**

Section C

27. In a chemistry laboratory, students were instructed to set up three experiments, details of which are given below: **[3]**

Experiment No.	**Set up details**

1.	2 iron nails in a cork capped test tube + Tap water immersing the nails +
2.	2 iron nails in a cork capped test tube + Boiled water immersing the nails + Oil on top of water layer.
3.	2 iron nails In a cork capped test tube + Cotton wool on top of the iron nails + Granules of calcium chloride on cotton wool.

Indicate the changes observed in the nails kept in all the three setups, with reasons.

28. i. Which types of metals can be obtained in their pure form by just heating their oxides in air? Give one example. **[3]**

ii. Consider the reaction given below used to obtain Manganese metal in pure form:

$3MnO_2(s) + 4Al(s) \longrightarrow 3Mn(l) + 2Al_2O_3(s) + Heat$

a. What type of reaction is it?

b. What is the role of aluminium in this reaction?

OR

You are given a hammer, a battery, a bulb, wires and switch.

(a) How would you use them to distinguish between samples of metals and non metals?

(b) Assess the usefulness of these tests to distinguish between metals and non-metals.

29. Why the leaf is boiled in alcohol for a few minutes using a water bath in an experiment to show that sunlight is necessary for photosynthesis? **[3]**

30. A red-eyed individual is crossed with a white-eyed individual to produce F_1 progeny with red eyes. When F_1 individuals are intercrossed, F_2 progeny is formed with both red as well as white-eyed individuals. **[3]**

a. How is the dominant trait identified?

b. What are recessive traits?

c. If 12 individuals are produced in F_2 generation, then how many white-eyed individuals would be obtained? Calculate the ratio of red-eyed individuals to white-eyed individuals.

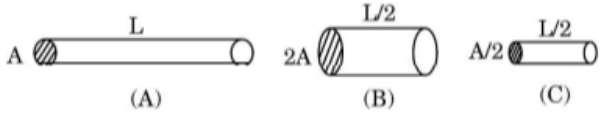
31. A student wants to project the image of a candle flame on a screen 80 cm in front of a mirror by keeping the candle flame at a distance of 20 cm from its pole. **[3]**

i. Which type of mirror should the student use?

ii. Find the magnificent of the image produced.

iii. Find the distance between the object and its image.

32. i. In the following figure, three cylindrical conductors A, B and C are shown along with their lengths and areas of cross-section. If these three conductors are made of the same material and R_A, R_B and R_C be their respective resistances, then find (a) $\frac{R_A}{R_B}$, and (b) $\frac{R_A}{R_C}$. **[3]**



ii. If the conductor A is made of copper and the conductor C is made of constantan (alloy of copper and nickel), then which one of the two will have more electrical resistance and why?

33. A household uses the following electric appliances: **[3]**

i. The refrigerator of rating 400 W for 10 h each day and Two electric fans of rating 80 W each for 6 h daily.

ii. Six electric tubes of rating 18 W each for 6 h daily.

Calculate the electricity bill for the household for the month of June, if the cost of electrical energy is Rs 3 per unit.

Section D

34. a. Why does carbon show catenation to maximum extent? List two reasons. **[5]**

b. Draw electron dot structures of (i) ethane, and (ii) ethene.

c. An organic compound **A** (molecular formula $C_2H_4O_2$) is used for preserving pickles and gives hydrogen gas with sodium metal.

i. Identify **A**, and

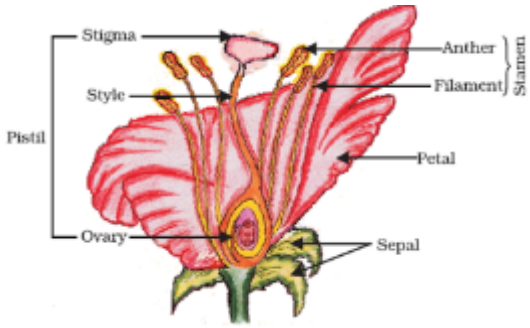
ii. Write its structural formulae.

OR

i. Name the compound formed when ethanol is heated at 443 K in the presence of conc. H_2SO_4 and draw its electron dot structure. State the role of conc. H_2SO_4 in this reaction.

ii. What is hydrogenation? Explain it with the help of a chemical equation. State the role of this reaction in industry.

35. The labelled diagram of a flower is shown below: **[5]**



Using the above diagram, answer the following questions:

i. Where is the egg cell present in a flower?

ii. Which part of the flower produces pollen grains?

iii. What is the difference between a uni-sexual and a bisexual flower?

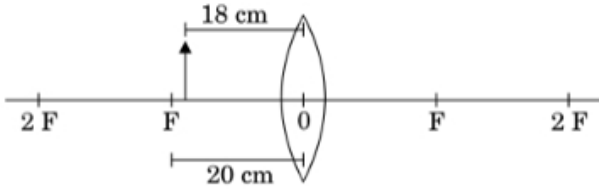
iv. What happens when a pollen grain falls on the stigma of the carpel?

v. How a zygote is formed in a flower?

OR

Why do we call pituitary gland as the master gland? Where is it located and what are its functions?

36. a. Complete the following ray diagram: **[5]**



b. Find the nature, position and size of the image formed.

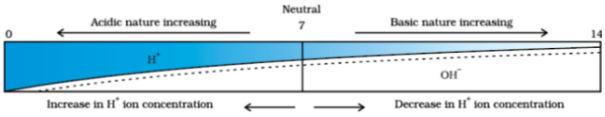
c. Use lens formula to determine the magnification in this case.

OR

One-half of a convex lens is covered with a black paper. Will this lens produce a complete image of the object? Verify your answers experimentally. Explain your observations.

Section E

37. A scale for measuring hydronium ion in a solution is called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration in solution i.e a basic solution. **[4]**



i. What is the pH range of the Human Body? (1)

ii. The strength of acid and bases depends on which factor? (1)

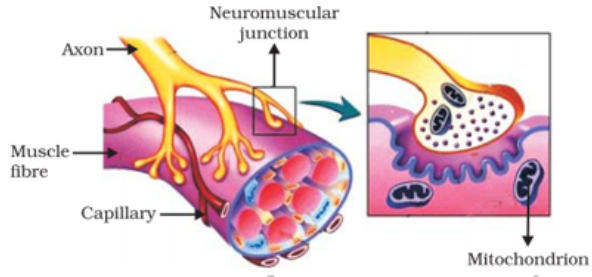
iii. If the pH of soil X is 7.5 while that of soil Y is 4.5, then which soil should be treated with powdered chalk to adjust its pH? (2)

OR

Tooth decay starts when the pH of the mouth is lower than which pH? (2)

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in the dendrite of the next neuron. This is a general scheme of how nervous impulses travel in the body. A similar synapse finally allows the delivery of such impulses from neurons to other cells, such as muscles cells or glands.



i. Why does the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron take place but not in the reverse direction? (1)

ii. From where the electrical impulse travels? (1)

iii. Name the chemical which released at the end of axon to transmit the signal to the other neuron. (2)

OR

What happens at the synapse between 2 neurons? (2)

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

A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.

i. What makes iron filings arrange in a definite pattern?

ii. Draw a diagram to show this pattern of iron filings.

iii. How is the direction of magnetic field at a point determined using the field lines? Why do two magnetic field lines not cross each other?

OR

How are the magnetic field lines of a bar magnet drawn using a small compass needle? Draw one magnetic field line each on both sides of the magnet.