SAT 2

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.
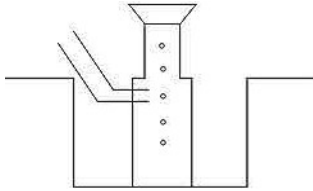
Section A

1. The food items like cheese that is shown in the given below image become unfit for eating. This happens due to: **[1]**

    a) Corrosion   b) Rusting

    c) None of these   d) Rancidity

2. In the electrolysis of water, at which electrodes are hydrogen and oxygen collected?   **[1]**

    a) graphite rods, metal rods   b) cathode, anode

    c) anode, cathode   d) graphite rods, non-metal rods

3. Which of the following gas is evolved when $NaHCO_3$ is heated?   **[1]**

    a) CO_2 b) CO

    c) O_2 d) NO

4. Clove oil and onion are examples of   **[1]**

a) basic indicator

b) acid- base indicator

c) olfactory indicator

d) artificial indicator

5. A metal is heated with dil H_2SO_4. The gas evolved is collected by the method shown in the figure. Answer the **[1]** following questions based on it:

Name the method used for the collection of gas.

a) Upward displacement method

b) Downward replacement method

c) Downward displacement method

d) Upward replacement method

6. Iron pillar at Delhi is made up of: **[1]**

a) Mixture of both peat and wrought

b) Peat Iron

c) Wrought Iron

d) None of these

7. The bond between two identical non-metallic atom has a pair of electron: **[1]**

a) with identical spins.

b) unequally shared between two atoms.

c) transferred completely from one atom to another.

d) equally shared between them.

8. Which of these is not a part of the small intestine? **[1]**

a) Jejunum

b) Rectum

c) Duodenum

d) Ileum

9. Which of the following is not associated with the growth of a plant? **[1]**

a) Abscisic acid

b) Gibberellins

c) Cytokinins

d) Auxin

10. Which among the following is not the function of testes at puberty? **[1]**

 i. formation of germ cells

 ii. secretion of testosterone

iii. development of placenta

 iv. secretion of estrogen

a) (i) and (ii)

b) (iii) and (iv)

c) (ii) and (iii)

d) (i) and (iv)

11. The maleness of a child is determined by **[1]**

a) the Y chromosome in zygote

b) the cytoplasm of germ cell which determines the sex

c) the X chromosome in the zygote

d) sex is determined by chance

12. What is the mode of nutrition seen in Amoeba? **[1]**

a) Parasitic

b) Holozoic

c) Saprotrophic

d) Autotrophic

13. The focal length of a concave mirror whose radius of curvature is 32cm: **[1]**

    a) None of these

    b) 32 cm

    c) 12 cm

    d) 16 cm

14. What is the value of refractive index of the medium if the critical angle of incidence in a denser – rarer inter face **[1]** is equal to 45°?

    a) 3.25

    b) 2.0

    c) 1.414

    d) 2.414

15. Which of the following is/are terrestrial ecosystem(s)? **[1]**

  A. Forest

  B. Aquarium

  C. Grassland

  D. Desert

    a) A, B and D

    b) A and D

    c) A and B

    d) A, C and D

16. Accumulation of non-biodegradable pesticides in the food chains in increasing amount at each higher trophic **[1]** level is known as:

    a) Biological magnification

    b) Accumulation

    c) Eutrophication

    d) Pollution

17. **Assertion (A):** AgBr is used on photographic and X-ray film. **[1]**

Reason (R): AgBr is photosensitive and changes to Ag and bromine in presence of sunlight and undergoes a decomposition reaction.
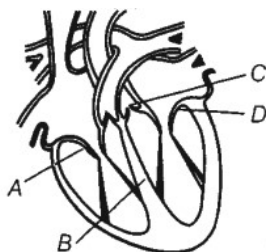
    a) Both A and R are true and R is the correct explanation of A.

    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):** DNA copying is necessary during reproduction. **[1]**

Reason (R): DNA copying leads to the transmission of characters from parents to offspring.

    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):** Copper is used to make electric wires. **[1]**

Reason (R): Copper has very low electrical resistance.

    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):** Supersonic jets cause pollution as they thin out ozone. **[1]**

Reason (R): Depletion of ozone cause a greenhouse 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.

<p align="center">Section B</p>

21.   Define neutralization reaction. Give two examples.   **[2]**

22.   We hear and read about female foeticide, which is really a wrong practice. In some families, be it rural or urban, females are tortured for giving birth to a girl child. They do not seem to understand the scientific reason behind the birth of a boy or a girl. In your opinion, the approach of the society towards mother in this regard is correct or not? Explain the scientific reason.   **[2]**

23.   Write a note on dental caries.   **[2]**

<p align="center">OR</p>

In the given diagram that shows a vertical section through the human heart, which structure separates out the oxygenated blood from deoxygenated blood.

24.   Draw ray diagrams showing the image formation by a convex mirror when an object is placed at infinity.   **[2]**

25.   Give a note on Magnetism in Human beings.   **[2]**

<p align="center">OR</p>

What is (a) the highest, (b) the lowest total resistance that can be secured by combinations of four coils of resistance $4\,\Omega, 8\,\Omega, 12\,\Omega, 24\,\Omega$?

26.   **The improvement in our lifestyle has led to the generation of large amount of waste material.** List two reasons to justify this statement.   **[2]**

<p align="center">Section C</p>

27.   A, B and C are 3 elements which undergo chemical reactions according to following equations: **[3]**

a) $A_2O_3 + 2B \rightarrow B_2O_3 + 2A$

b) $3CSO_4 + 2B \rightarrow B_2(SO_4)_3 + 3C$

c) $3CO + 2A \rightarrow A_2SO_3 + 3C$

Answer of the following:

i) Which element is most reactive?

ii) Which element is least reactive?

28.   A metal **M** which is one of the best conductors of heat and electricity used in making electric wires is found in nature as sulphide ore M_2S?   **[3]**

  i. Name the metal **M**.

  ii. Which process will be suitable for extraction of this metal M from its ore M_2S?

  iii. Write the balanced chemical reactions involved in the process of extraction.

  iv. With the help of a labelled diagram, explain the process of electrolytic refining of the metal.

<p align="center">OR</p>

What chemical process is used for obtaining a metal from its oxide.

29. List the steps of preparation of a temporary mount of a leaf peel to observe stomata. **[3]**

30.   i. Who provided the evidence of DNA as genetic material? **[3]**

  ii. Why DNA is called polynucleotide?

  iii. List three important features of double helical model of DNA.

31. What should be the position of an object with respect to focus of a convex lens of focal length 20cm, so that its real and magnified image is obtained? **[3]**

32. The values of current I flowing through a resistor for the corresponding values of potential difference V across it are given below: **[3]**

V(volts)	1.5	3.0	6.0	9.0
I(amperes)	0.5	1.0	2.0	3.0

  a. Plot a graph between V and I.

  b. Why should this graph pass through the origin?

  c. Name and state the law which is represented by the graph.

33.   a. Two electric lamps rated 100 W,220 V and 60 W,220 V are connected in parallel to electric mains supply. Calculate the current drawn from the mains if the supply voltage is 220 V? **[3]**

  b. A lamp consumes 50 W and is lighted 2 h daily in month of April. How many units of electric energy is consumed ?

Section D

34. Draw the structures for the following compounds. **[5]**

  i. Ethanoic acid

  ii. Bromopentane*

  iii. Butanone

  iv. Hexanal.

*Are structural isomers possible for bromopentane?

OR

What are carboxylic acids? Give the common names, IUPAC names and structural formula of first four members of the homologous series.

35. What is asexual reproduction? What are different types of asexual reproductions? **[5]**

OR

Draw the structure of a neuron and describe its function.

36. Find the size, nature and position of image formed when an object of size 1 is placed at a distance of 15 cm from a concave mirror of focal length 10 cm. **[5]**
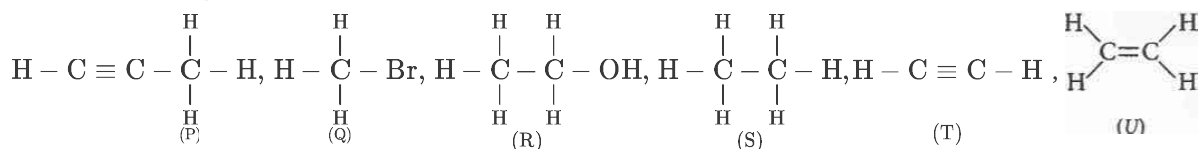
OR

What is lens formula ? Give its sign conventions and assumptions.

Section E

37. **Read the text carefully and answer the questions:** **[4]**

Read the following:

$$H-C \equiv C - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - H, \quad H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - Br, \quad H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - OH, \quad H - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - \underset{\underset{H}{|}}{\overset{\overset{H}{|}}{C}} - H, \quad H - C \equiv C - H, \quad \underset{H}{\overset{H}{>}}C = C\underset{H}{\overset{H}{<}}$$

(P)   (Q)   (R)   (S)   (T)   (U)

    (i)   Which of the compounds P, Q, R, S, T, U belong to same homologous series?

    (ii)   Write the name of compound R. Also write the functional group present in it.

<div align="center">OR</div>

What is the IUPAC name of compound T and U

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

The mechanism by which the sex of an individual is determined is called sex-determination. In human beings, sex of a newborn is genetically determined, whereas in some others it is not. There are 46 (23 pairs) chromosomes in human beings. Out of these, 44 (22 pairs) control the body characters and 2 (one pair) are known as sex chromosomes. The sex chromosomes are of two types-X chromosome and Y chromosome. At the time of fertilisation, depending upon which type of male gamete fuses with the female gamete, the sex of the newborn child is decided.

    (i)   What is the statistical probability of getting either a male or a female child? Justify your answer.

    (ii)   Out of male or female, which of them has a perfect pair of sex chromosomes? In case of a perfect pair, will the gametes produced be of the same kind or of a different kind?

    (iii)   Name two animals whose sex is not genetically determined. Explain the process of their sex determination.

<div align="center">OR</div>

With the help of a flowchart only, show how sex is genetically determined in human beings.

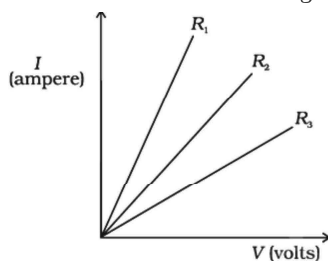39. **Read the text carefully and answer the questions:** [4]

In 1827, a German physicist Georg Simon Ohm (1787-1854) found out the relationship between the current I, flowing in metallic wire and the potential difference across its terminals. He stated that the electric current flowing through a metallic wire is directly proportional to the potential difference V, across its ends provided its temperature remains the same.

The resistance of a circuit is defined as the ratio between the voltage applied to the current flowing through it. Rearranging the above relation,

$R = \frac{V}{I}$

Electric charge flows easily through some materials than others. The electrical resistance measures how much the flow of this electric charge is restricted within the circuit.

    (i)   What is the unit of electrical resistance?

    (ii)   Define Ohm's law.

    (iii)   From graph which resistance have high resistance?

<div align="center">OR</div>

What does the slope of V-I graph at any point represent?

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