SAMPLE PAPER TEST 01
BOARD EXAM 2023

SUBJECT: SCIENCE **MAX. MARKS : 80**
CLASS : X **DURATION : 3 HRS**

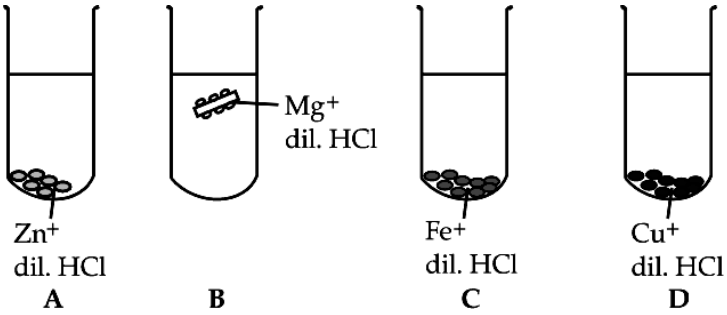
General Instruction:

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 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 in the range of 50 to 80 words
6. **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.
7. **Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION – A

Questions 1 to 20 carry 1 mark each.

1. The diagram shows the reaction between metal and dil. acid. What is the reason for different behaviour of Mg in test tube B?

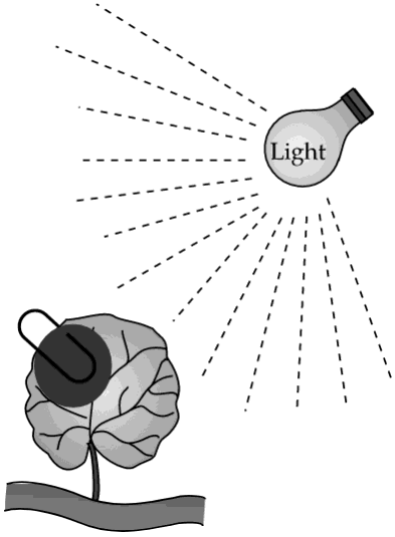


(a) Mg is lighter element than dil. HCI.
(b) Mg reacts with dil. HC1 to produce H2 gas which helps in floating.
(c) Mg reacts with dil. HC1 to produce N2 gas which helps in floating.
(d) Mg reacts with dil. HCI to produce CO2 gas which helps in floating.

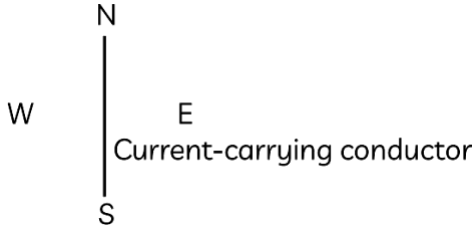
2. What is the difference in the molecular mass of any two adjacent homologues?
(a) 14 amu (b) 15 amu (c) 16 amu (d) 17 amu

3. What is the focal length of a plane mirror?
(a) Infinity (b) Zero (c) 1 (d) + 1

4. The diagram below shows a leaf that was covered by a piece of black paper for a period of 3 days. After 3 days, the paper was removed. On testing, it was found that the area under the black paper tested negative for starch and the rest tested positive for starch. What was the experiment trying to test?
(a) If plants make their own food
(b) If light is required for plants to make food
(c) If plants can respire in the absence of light
(d) If plants can survive even in the absence of light



5. A current-carrying conductor is held as shown:

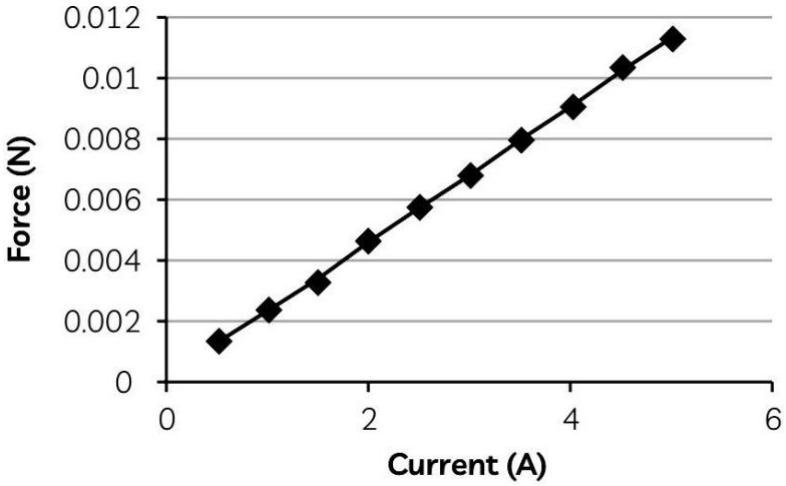


In which direction should current be passed in the conductor in order to produce a clockwise magnetic field around the conductor?
(a) North to South (b) South to North (c) East to West (d) West to East

6. For a current in a long straight solenoid N-pole and S-pole are created at the two ends. Among the following statements, the incorrect statement is:
(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.
(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.
(d) The N-pole and S-pole exchange position when the direction of current through the solenoid is reversed.

7. 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

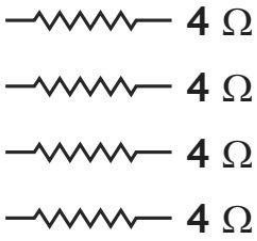
8. The graph below shows the variation of force acting on a conductor with current:



After analyzing the graph, a student noted the following. Select the correct statement:
(a) The force acting on a conductor increases exponentially with increase in current.
(b) The force acting on a conductor decreases exponentially with increase in current.
(c) The force acting on a conductor increases linearly with increase in current.
(d) The force acting on a conductor decreases linearly with increase in current.

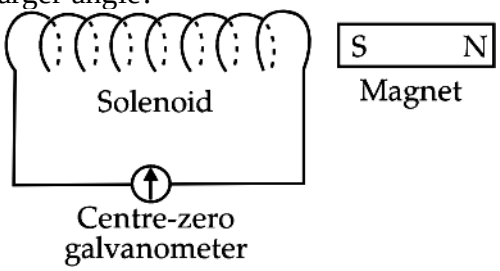
9. In a study it was found that fused ear lobes were found in more numbers within a population rather than free ear lobes. What can you infer from the above observation with respect to dominant/ recessive trait?
(a) Fused ear lobes – dominant (b) Free ear lobes – dominant
(c) Fused ear lobes – recessive (d) Both are dominant

10. What is the minimum resistance which can be made using the following resistors?



(a) 1 Ω (b) 2 Ω (c) 4 Ω (d) 3 Ω

11. In the given diagram, when the magnet is pushed into the solenoid, the pointer of the galvanometer deflects slightly to the left. Which of the following changes would cause the pointer to deflect through a larger angle?



(a) Move the magnet faster. (b) Move the magnet away from the solenoid.
(c) Unwind some of the turns of the solenoid. (d) Keep the magnet stationary.

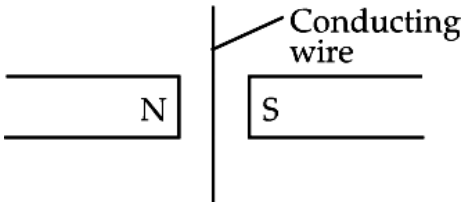
12. Manish's mother was baking cake in the kitchen. When Manish came back from school, he detected smell of hot cake from the drawing room. Why?
(a) Due to the presence of olfactory receptors in forebrain
(b) Due to the presence of taste buds
(c) Due to the presence of olfactory receptors in midbrain
(d) Due to the presence of olfactory receptors in hindbrain

13. Which of the following is not the role of decomposers in the ecosystem?
(a) They clean the environment.
(b) They decompose non-biodegradable substances.
(c) They participate in food chain.
(d) They replenish the nutrients in the soil.

14. In the given reaction : $ZnO + C \rightarrow Zn + CO$.
I. ZnO is being oxidised.
II. CO is being reduced.
III. C is being oxidised.
IV. ZnO is being reduced.
Choose the correct statement.
(a) I and II only (b) III and IV only (c) I, II, and III only (d) All of these

15. Common salt besides being used in kitchen can also be used as the raw material for making :
(i) washing soda (ii) bleaching powder (iii) baking soda (iv) slaked lime
(a) (i) and (ii) (b) (i), (ii) and (iv) (c) (i) and (iii) (d) (i), (iii) and (iv)

16. A straight wire is placed between two poles of a magnet as shown in figure. If an alternating current passing through a wire then wire will



(a) Move into the page only (b) Move out of the page only
(c) Move out and into the page (d) Remain stationary

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 the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

17. Assertion (A): In Fleming's left hand rule, the direction of magnetic field, force and current are mutually perpendicular.
Reason (R): Fleming's left hand rule is applied to measure the induced current.

18. Assertion (A): Unisexual flowers have separate male and female flowers.
Reason (R): Cucumber, pumpkin and watermelon are the examples of unisexual flowers.

19. Assertion (a): Non–biodegradable substances are those substances which cannot be broken down into simpler harmless substances in nature.
Reason (R): Non–biodegradable substances can cause air pollution and make the air poisonous when burnt.

20. Assertion (a): The effect of root pressure in transport of water is more important during daytime.
Reason (R): Transpiration pull is the major driving force in movement of water during the day.

SECTION – B

Questions 21 to 25 carry 2 marks each.

21. Identify the displacement and the double displacement reaction from the following reactions.
(a) $HC1(aq) + NaOH(aq) \rightarrow NaCI(aq) + H2O(l)$
(b) $Fe(s) + CuSO4(aq) \rightarrow FeSO4(aq) + Cu(s)$

OR

A teacher provided acetic acid, water, lemon juice, aqueous solution of sodium hydrogen carbonate and sodium hydroxide to students in the school laboratory to determine the pH values of these substances using pH papers. One of the students reported the pH values of the given substances as 3, 12, 4, 8 and 14 respectively. Which one of these values is not correct? Write its correct value stating the reason.

22. (a) Which plant hormone is present in greater concentration in the areas of rapid cell division?
(b) Give one example of a plant growth promoter and a plant growth inhibitor.

23. (a) What is the unit of current? Express it in terms of charge and time.
(b) The following table gives the value of resistivity of some materials:

Material	Resistivity (Ohm-m)
A	44×10^{-6}
B	$10^{10} - 10^{12}$
C	1.62×10^{-6}
D	$10^{15} - 10^{17}$

Which material would you suggest to be used in electric heating devices? Give reason for your choice.

OR

(a) On what factors does the resistance of a conductor depend?
(b) Calculate the resistance of an aluminium cable of length 10 km and diameter 2.0 mm if the resistivity of aluminium is 2.7×10^{-8} Ωm.

24. What is a rainbow? Draw a well labelled diagram to show the formation of a rainbow.

25. What are the differences between the transport of materials in xylem and phloem?

26. Give reasons for the following observations:
(a) Covalent compounds are poor conductors of electricity.
(b) Highly reactive metals cannot be obtained from their oxides by heating them with carbon.

SECTION – C

Questions 27 to 33 carry 3 marks each.

27. Give reasons for the following:
(a) Ionic compounds have high melting and boiling point
(b) Ionic compounds conduct electricity in molten state
(c) Ionic compounds are solid at room temperature and are somewhat hard.

28. (a) What is a solenoid?
(b) Draw the pattern of magnetic field lines of (i) a current carrying solenoid and (ii) a bar magnet.

OR

Suppose your parents have constructed a two room house and you want that in the living room there should be a provision of one electric bulb, one electric fan, a refrigerator and a plug point for appliances of power upto 2 kilowatt. Draw a circuit diagram showing electric fuse and earthing as safety devices.

29. Sahil took five solutions A, B, C, D and E and tested with universal indicator showed pH as 4, 1, 11, 7 and 9 respectively. Which solution is: (a) Neutral (b) Strongly alkaline (c) Strongly acidic (d) Weakly acidic (E) Weakly alkaline?
Arrange the pH in increasing order of hydrogen ion concentration.

30. (a) Describe how a squirrel uses its hormonal system to react to a dangerous situation.
(b) How do sensory and motor neurons differ from one another?

31. Identify the acid and base which form sodium hydrogen carbonate. Write chemical equation in support of your answer. State whether this compound is acidic, basic or neutral. Also, write its pH value.

32. (a) What is an ecosystem? List its two main components.
(b) 'The number of trophic levels in a food chain is limited'. Justify the statement.

33. Trace the sequence of events which occur when a bright light is focused on your eyes.

OR

List in tabular form three distinguishing features between autotrophic nutrition and heterotrophic nutrition.

SECTION – D

Questions 34 to 36 carry 5 marks each.

34. A student wants to project the image of a candle flame on a screen 60 cm in front of a mirror by keeping the candle flame at a distance of 15 cm from its pole.

(a) Which type of mirror should the student use?

(b) Find the magnification of the image produced.

(c) Find the distance between the object and its image.

(d) Draw a ray diagram to show the image formation in this case and mark the distance between the object and its image.

OR

(a) Name the lens which can be used as a magnifying glass. For which position of the object a convex lens form: (i) a real and inverted image of the same size as that of the object? (ii) a virtual and erect image? Draw ray diagram to justify your answer in each case.

(b) One half of a convex lens is covered with a black paper. Will this lens produce a complete image of the object? Draw ray diagram to justify your answer.

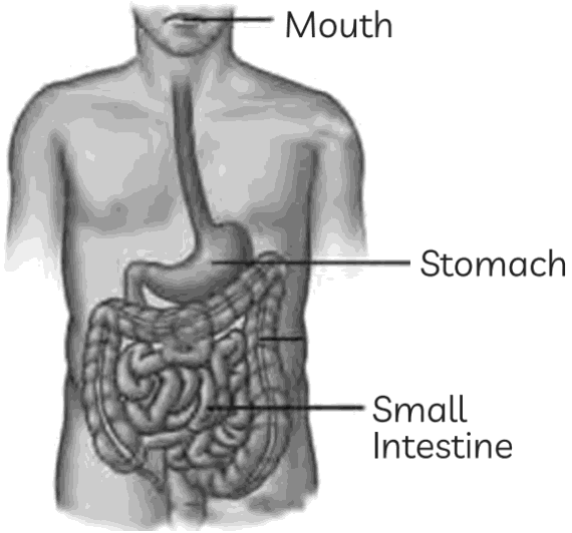
35. Why are certain compounds called hydrocarbons? Write the general formula for homologous series of alkanes, alkenes and alkynes and also draw the structure of the first member of each series. Write the name of the reaction that converts alkenes into alkanes and also write a chemical equation to show the necessary conditions for the reaction to occur.

OR

(a) Explain why carbon forms covalent bond ? Give two reasons for carbon forming a large number of compounds.

(b) Explain the formation of ammonia molecule.

36. Name three different glands associated with the structures labelled in digestive system as shown in figure. Also write their secretions and their functions.



OR

(a) Define excretion.

(b) Name the basic filtration unit present in the kidney.

(c) Draw excretory system in human beings and label the following organs of excretory system which perform following functions: (i) form urine. (ii) is a long tube which collects urine from kidney. (iii) store urine until it is passed out.

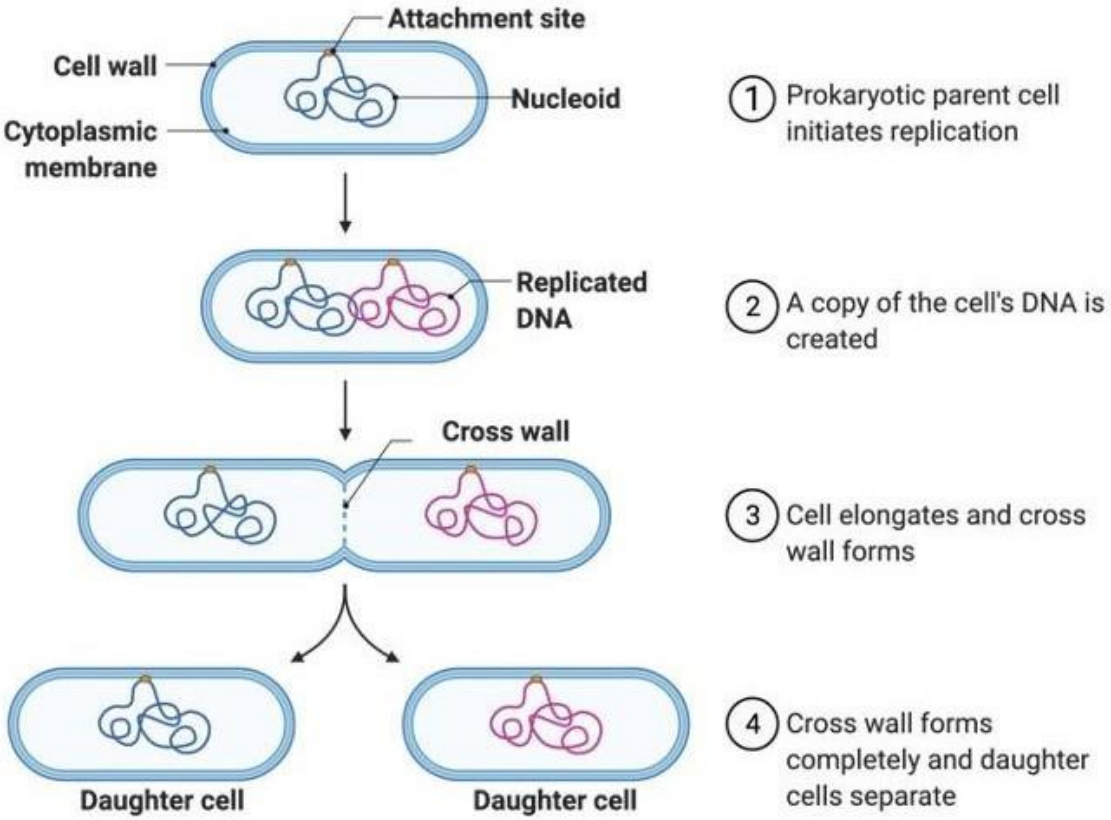
SECTION – E (Case Study Based Questions)

Questions 35 to 37 carry 4 marks each.

37. Case Study – 1

Bacteria follow an asexual mode of reproduction, called binary fission. A single bacterium divides into two daughter cells. These are identical to the parent cell as well as to each other. Replication of DNA within parent bacterium marks the beginning of the fission. Eventually, cell elongates to form two daughter cells.

The diagram shows the process of binary fission in bacteria



The rate and timing of reproduction depend upon the conditions like temperature and availability of nutrients. When there is a favorable condition, E. coli or Escherichia coli produces about 2 million bacteria every 7 hours.

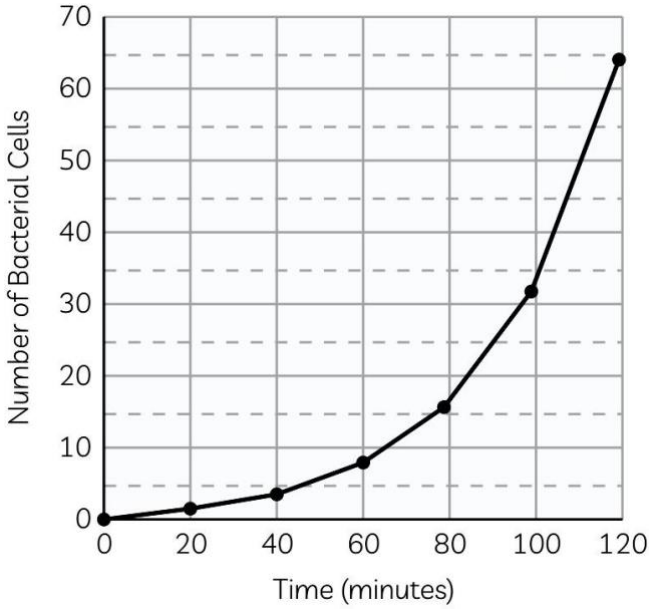
(a) (i) What is the process of the division of a cell into several cells during reproduction in Plasmodium?

(ii) A Planaria worm is cut horizontally in the middle into two halves P and Q such that the part P contains the whole head of the worm. Another Planaria worm is cut vertically into two halves R and S in such a way that both the cut pieces R and S contain half head each. Which of the cut pieces of the two Planaria worms could regenerate to form the complete respective worms?

(b) The rapid spreading of bread would on slices of bread is due to spore formation. Explain spore formation.

OR

(b) Suppose a bacterium reproduces by binary fission every 20 minutes. The new cells survive and reproduce at the same rate. The graph below shows how the bacterial population would grow from a single bacterium. What do you conclude?



38. Case Study – 2

Manoj performed an experiment to understand that heat is produced when a few drops of concentrated sulphuric acid is slowly added into a beaker containing water. For this, he took 10 mL water in a beaker and added a few drops of concentrated H_2SO_4 to it. Then, he swirled the beaker slowly. During the process, a vigourous reaction takes place. It is an exothermic process.

(a) Why is it recommended that the acid should be added to water and not water to the acid?
(b) How will the concentration of hydrogen ions gets affected if an acid is diluted?
(c) What is this process called? Define the process.

OR

If we have hydrochloric acid and acetic acid of equal concentration, which will be a stronger acid and why?

39. Case Study – 3

A student wants to project the image of a candle flame on the walls of the school laboratory by using a mirror.

(a) Which type of mirror should he use and why?
(b) At what distance, in terms of focal length of the mirror, should he place the candle flame to get the magnified image on the wall?
(c) Draw a ray diagram to show the formation of the image in this case.

OR

(d) (i) To get the diminished image of the candle flame, where the object must be placed?
(ii) If the image formed by this mirror is inverted and real, then what will be its magnification?