

SAMPLE PAPER-1
SCIENCE
GRADE: X

Max. Marks: 80

Time Allowed: 3 hours

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 Answer type 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 marks each with sub-parts.*

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions 1 - 20. There is no negative mark for incorrect response.

- 1. Identify 'x' & 'y' in the following balanced reaction**

1



- a. 2, 1
- b. 2, 2
- c. 1, 2
- d. 3, 2

2. A sample of soil is mixed with water and allowed to settle. The clear supernatant solution turns the pH paper yellowish-orange. Which of the following would change the color of this pH paper to greenish-blue? 1
- Lemon juice
 - Vinegar
 - Common salt
 - Baking soda
3. Reaction between X and Y, forms compound Z. X loses electrons and Y gains electrons. Which of the following properties is **not** shown by Z? 1
- Has high melting point
 - Has low melting point
 - Conducts electricity in molten state.
 - Occurs as solid.
4. In the soap micelles 1
- the ionic end of soap is on the surface of the cluster while the carbon chain is in the interior of the cluster.
 - ionic end of soap is in the interior of the cluster and the carbon chain is out of the cluster.
 - both ionic end and carbon chain are in the interior of the cluster
 - both ionic end and carbon chain are on the exterior of the cluster
5. Exposure of silver chloride to sunlight for a long duration turns gray due to 1
- the formation of silver by decomposition of silver chloride
 - sublimation of silver chloride
 - decomposition of chlorine gas from silver chloride
 - oxidation of silver chloride

Which among the following statement(s) is (are) true?

- (I) only
- (I) and (III)
- (II) and (III)
- (IV) only

6. Consider the following statements about an aqueous solution of an acid and of a base? 1

- I. Higher the pH, stronger the acid
- II. Higher the pH, weaker the acid
- III. Lower the pH, stronger the base
- IV. Lower the pH, weaker the base

Which of the following statements is correct

- a. (I) and (III)
- b. (II) and (III)
- c. (I) and (IV)
- d. (II) and (IV)

7. Consider the equation given below- 1



Identify the substance oxidized in the above equation.

- a. MnCl_2
- b. HCl
- c. H_2O
- d. MnO_2

8. If salivary amylase is lacking in saliva, which of the event in mouth will be affected? 1

- a. Proteins breaking down into amino acids
- b. Starch breaking down into sugars
- c. Fats breaking down into fatty acids and glycerol
- d. Absorption of vitamins

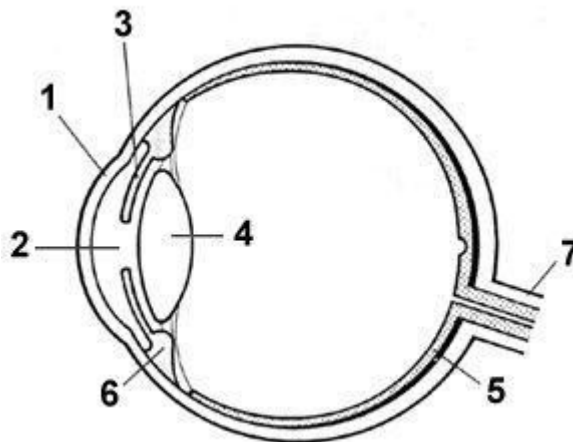
9. Involuntary actions including blood pressure, salivation and vomiting are controlled by 1

- a. Hypothalamus
- b. Cerebellum
- c. Medulla
- d. Cerebrum

10. Which of the following is the correct sequence regarding sexual reproduction in plants- 1

- a. Pollination, fertilisation, seedling, embryo
- b. Seedling, embryo, fertilisation, pollination
- c. Pollination, fertilisation, embryo, seedling
- d. Embryo, seedling, pollination, fertilisation

11. Which of the following does not contain any digestive enzyme however plays an important role in the digestion process- 1
- a. Pancreatic Juice
 - b. Saliva
 - c. Bile
 - d. Gastric Juice
12. The dramatic changes in the body features associated with puberty are mainly because of the secretions of- 1
- a. Estrogen from the testis and testosterone from the ovary
 - b. Estrogen from the adrenal gland and testosterone from the pituitary
 - c. Testosterone from the testis and estrogen from the ovary
 - d. Testosterone from the thyroid and Oestrogen from ovary
13. For an object placed in front of a convex mirror, the image formed is- 1
- a. real, inverted and magnified
 - b. real, inverted and diminished
 - c. virtual, erect and magnified
 - d. virtual, erect and diminished
14. Consider the diagram given below. 1



The correct labeling for the parts mentioned as 2 and 6 respectively is:

- a. Iris and Pupil.
- b. Pupil and Ciliary Muscles.
- c. Iris and Ciliary Muscles.
- d. Cornea and Pupil.

15. Which of the following statements is true about the heart? 1
- a. Left atrium receives oxygenated blood from different parts of body while right atrium receives deoxygenated blood from lungs
 - b. Left ventricle pumps oxygenated blood to different body parts while right ventricle pumps deoxygenated blood to lungs
 - c. Left atrium transfers oxygenated blood to the right ventricle which sends it to different body parts
 - d. Right atrium receives oxygenated blood from different parts of the body while left ventricle pumps oxygenated blood to different parts of the body.
16. The number of chromosomes present in parents and offspring of a particular species remains constant due to the following processes occurring one after the other- 1
- a. Fertilization and Meiosis
 - b. Meiosis and Fertilization
 - c. Only Meiosis
 - d. Mitosis and Meiosis

**Question No. 17 to 20 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):** Weak acids have low electrical conductivity 1
Reason(R): Strong acids and weak acids having the same concentration, have equal concentration of hydrogen ions in their solution.
18. **Assertion(A):** Flow of energy in a food chain is unidirectional. 1
Reason(R): Energy captured by autotrophs does not revert back to the sun and it passes to the herbivores.
19. **Assertion (A):** The domestic circuit at homes is preferred to be in parallel combination. 1
Reason(R): Parallel combination offers variable voltage and less current thus keeping people safe.
20. **Assertion(A):** The walls of the intestine have numerous villi. 1
Reason(R): These villi increase the surface area of digestion.

SECTION-B

Question No. 21 to 26 are very short answer questions

21. Metal 'X' used in galvanization of metals is found as XS. How will you extract the metal 'X' from its sulphide form? 2
Support your answers with balanced chemical equations.
22. Explain the following terms- 2
a. Emulsification.
b. Peristalsis.
23. "Only variations that confer a survival advantage to an individual organism will be selected in a population." Justify this statement. 2

OR

Differentiate between inherited traits and acquired traits giving one example of each.

24. a. Define lateral displacement for a rectangular glass slab. 2
b. What will be the effect on lateral displacement under identical conditions, if the rectangular glass slab is replaced by a similar rectangular slab of higher refractive index?
25. With the help of a diagram, show how will you connect three resistors of resistances $2\ \Omega$, $3\ \Omega$ and $6\ \Omega$ each, in order to get an effective resistance of- 2
a. $1\ \Omega$.
b. $4.5\ \Omega$.

OR

A proton is moving in a direction from East to west where it interacts with a magnetic field in a direction from geographical South to North.

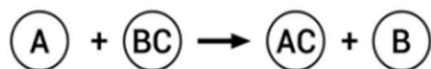
- a. Determine the direction of movement of the proton due to the magnetic field.
b. Name and state the law you used in this situation.
26. Give reasons: 2
a. Pituitary is often termed as a master endocrine gland.
b. Most of the salts available in the market are iodised.

SECTION-C

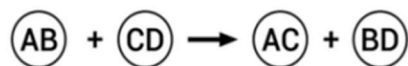
Question No. 27 to 33 are short answer questions.

27. a. Identify the reaction in each case: 3

i)



ii)



- b. On heating, white coloured crystalline powder of Lead (II) nitrate in a boiling tube, compound **Y**, O_2 and a brown gas **X** is formed.

- Identify the type of reaction.
- Predict one visible observation of the above reaction (other than the observation mentioned in the question)
- Write balanced chemical equation of the reaction

28. A compound **X** of sodium is commonly used in the kitchen for making crispy pakoras. It is also used for curing acidity in the stomach. 3

- Identify '**X**'. Give its common name and chemical formula.
- State the reaction which takes place when it is heated during cooking.
- Why is '**X**' used in soda-acid fire extinguishers?

OR

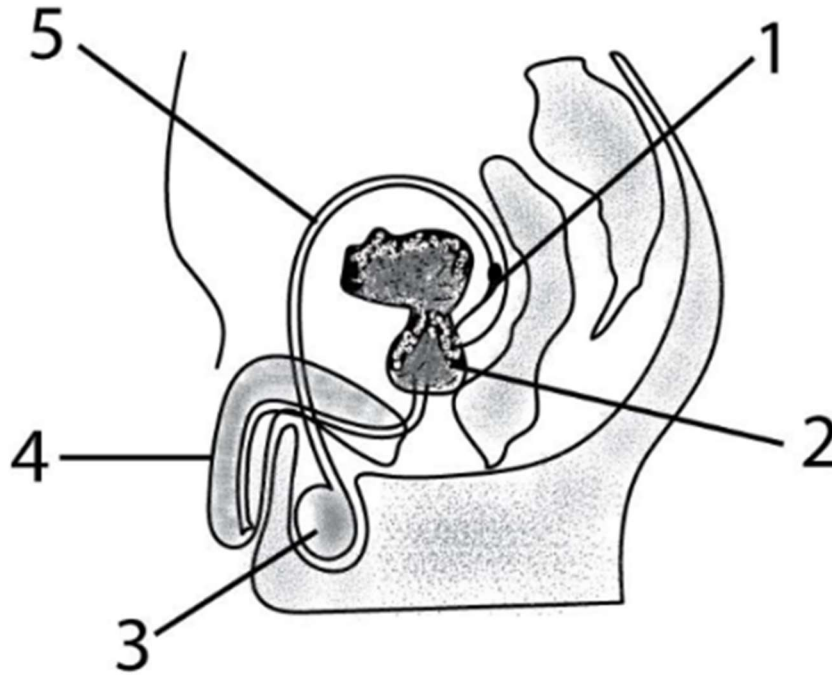
A compound '**Y**' which is prepared from gypsum has the property of hardening when mixed with proper quantity of water.

- Identify the compound '**Y**'. Give its name and chemical formula.
- Write the balanced chemical equation for its preparation.
- Mention any two important use of this compound.

29. How is lymph an important fluid involved in transportation? If lymphatic vessels get blocked, how would it affect the human body? Explain. 3

30.

3



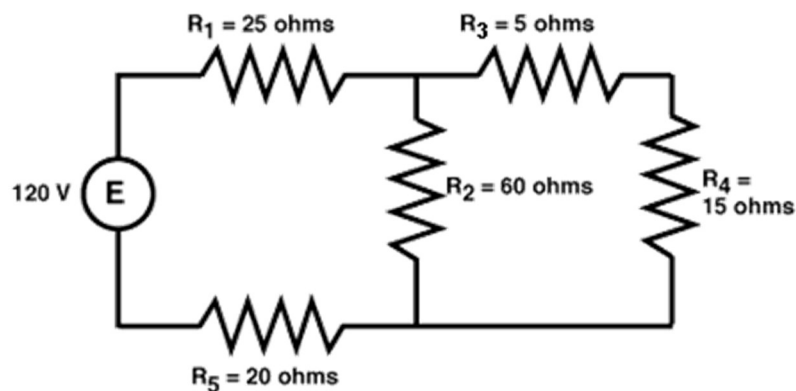
- Label any three parts of the diagram given above.
- Give the function of each identified part.

31. An object of size 4 cm is placed in front of a diverging lens of focal length 8 cm at a distance of 12 cm. What will be the position, nature and size of the image formed? Represent the situation with a suitable diagram (**not to be scaled**).

3

32.

3
(1.5+0.5+1)



Refer to the circuit diagram given above and find:

- Effective resistance of the circuit.
- Net Current in the circuit.
- Current through 15 ohm resistor.

33. a. State any two characteristics of the magnetic field lines. 3
 b. Define a solenoid. Draw a diagram to represent the magnetic field lines generated around a current carrying solenoid.

SECTION-D

Question No. 34 to 36 are long answer questions.

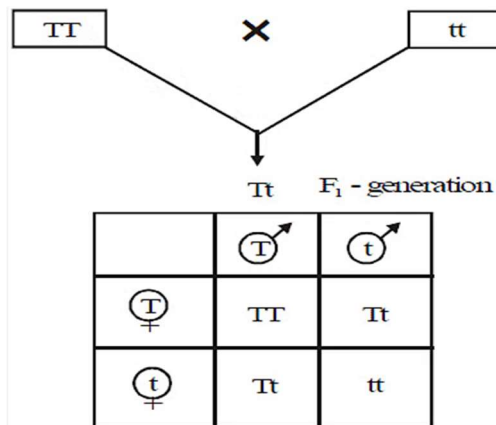
34. I. Ethene is formed when ethanol at 443 K is heated with excess concentrated sulphuric acid. 5
 a. What is the role of sulphuric acid in this reaction?
 b. Write the balanced chemical equation of this reaction.
- II. A gas is evolved when ethanol reacts with sodium.
 Name the gas evolved and also write the balanced chemical equation of the reaction involved.
- III. How will you bring about the following conversion:
 a. Ethanol to Ethanoic acid
 b. Name the process and write the chemical reaction involved.

OR

An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'.

- Identify the compound 'A'.
- Write the chemical equation for its reaction with ethanol to form compound B.
- How can we get compound A back from B? Write the corresponding chemical equation.
- Which gas is produced when compound A reacts with washing soda? Write the chemical equation?

35. 5



Observe the diagram given above and answer the following questions-

- Give the scientific term for the genotype of the parents.
- Mention the genotype and phenotype of the F1 individuals.
- What will be the genotypic and phenotypic ratios in the F2 generation?
- 'Two organisms can have the same phenotype but may have different genotypes', justify the statement with an example.

OR

- Black fur color is dominant over white fur color in rabbits. Starting with a homozygous dominant father and a homozygous recessive mother, work out the cross from the parental generation and using the punnett square work out the genotypic and phenotypic ratios in the F2 generation..
- Will the F2 ratio remain the same if both the mother and the father are heterozygous for the fur color.

- 36.** A spherical mirror produces an image of magnification -1 on a screen placed at a distance of 40 cm from the mirror:

5
(1+1+1+2)

- Write the type of mirror and nature of the image formed.
- How far is the object located from the mirror?
- Draw the ray diagram to show the image formation in this case.
- What will be the image position if the object is moved towards the mirror by 30 cm?

OR

- State Snell's law.
- A fish under water is obliquely viewing a fisherman standing on the bank of a lake. Does the man look taller or shorter?
- Find the missing values in the table:

MEDIUM	SPEED OF LIGHT (m/s)	REFRACTIVE INDEX
AIR	3×10^8	1.00
DIAMOND	_____	2.42
BENZENE	2×10^8	_____

- Consider similar rectangular slabs made up of diamond and benzene. In which of these slabs, do you think, will the lateral displacement be more? Give reason with the help of diagram(s).

SECTION-E

Question 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. On the basis of reactivity of different metals with oxygen, water and acids as well as displacement reactions, the metals have been arranged in the decreasing order of their reactivities. This arrangement is known as the activity series or reactivity series of metals. The basis of reactivity is the tendency of metals to lose electrons. If a metal can lose electrons easily to form positive ions, it will react readily with other substances. Therefore, it will be a reactive metal. On the other hand, if a metal loses electrons less rapidly to form a positive ion, it will react slowly with other substances. Therefore, such a metal will be less reactive. 4
- A. What would you observe (any two observations) when you put some aluminium pieces in copper sulphate solution? Explain using balanced chemical equation.
- B. Give reason for the following:
- Hydrogen gas is not evolved when most of the metals react with nitric acid.
 - Zinc oxide is considered as an amphoteric oxide.
38. Ozone depletion and the ozone hole have generated worldwide concern over many negative effects. These concerns led to the adoption of the Montreal Protocol in 1987, which bans the production of CFCs, halons, and other ozone-depleting chemicals. The ban came into effect in 1989. Ozone levels stabilized by the mid-1990s and began to recover in the 2000s, as the shifting of the jet stream in the southern hemisphere towards the south pole has stopped and might even be reversing. Recovery is projected to continue over the next century, and the ozone hole was expected to reach pre-1980 levels by around 2075. In 2019, NASA reported that the ozone hole was the smallest ever since it was first discovered in 1982. The Montreal Protocol is considered the most successful international environmental agreement to date. Following the bans on ozone-depleting chemicals, the UN projects that under the current regulations the ozone layer will completely regenerate by 2045, thirty years earlier than previously predicted. 4
- Give the full form of UNEP.
 - What are UV rays? Why are they harmful?
 - How is Ozone formed in the atmosphere? What is its role?
- OR**
- Give the full form of CFCs. Give any 2 products where they are used.

39. The heating effect of current is obtained by the transformation of electrical energy into heat energy. Just as mechanical energy used to overcome friction is converted into heat, in the same way, electrical energy is converted into heat energy when an electric current flows through a resistance wire. The heat produced in a conductor, when a current flows through it, is found to depend directly on (a) strength of current (b) resistance of the conductor (c) time for which the current flows.

4
(1+1+2)

The mathematical expression is given by $H = I^2Rt$.

The electrical fuse, electrical heater, electric iron, electric geyser, etc. all are based on the heating effect of current.

- What are the properties of heating elements?
- When the current is doubled in a heating device and time is halved, what would be the heat energy produced?
- When a current of 0.5 A passes through a conductor for 5 min and the resistance of conductor is 10 ohm, what will be the amount of heat produced?

OR

- What is an electric fuse? How is it based on the principles of heating effects of current?

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