



# D.A.V. PUBLIC SCHOOLS

(BIHAR ZONE)

Half-Yearly Examination : 2023 – 2024

Class – X

Time – 3 Hrs.

Subject – SCIENCE

F.M. – 80

## General Instructions:

- (i) This question paper contains 39 questions. All questions are compulsory.
- (ii) Question paper is divided into FIVE sections viz. Section A, B, C, D and E.
- (iii) In section A – question number 1 to 20 are Multiple Choice Questions (MCQs) carrying 1 mark each.
- (iv) In section B – question number 21 to 26 are Very Short Answer (VSA) type questions carrying 2 marks each. Answer to these questions should be in range of 30 to 50 words.
- (v) In section -C- question number 27 to 33 are Short Answer (SA) type questions carrying 3 marks each. Answer to these questions should be in the range of 50 to 80 words.
- (vi) In section -D- question number 34 to 36 are Long Answer (LA) type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vii) In section E- question number 37 to 39 are of 3 source-based / case-based units of assessment carrying 4 marks each with sub-parts.
- (viii) There is no overall choice. However, an internal choice has been provided in some sections.

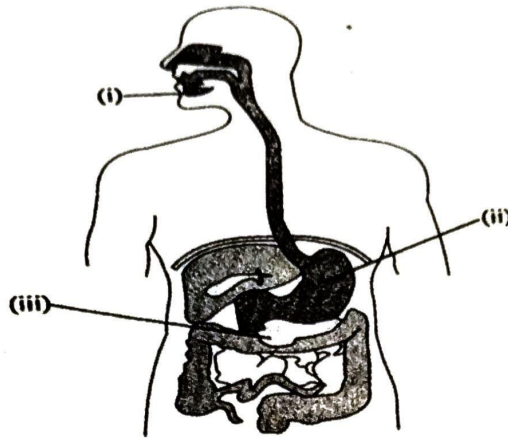
## SECTION – A

Select and write one most appropriate option out of the four options given for each of the questions 1 to 20.

1. In the given equation, what does 'X' stand for? 1  
(2)  $Al + (X) H_2SO_4 \rightarrow Al_2(SO_4)_3 + (3)H_2$   
(A) 2 (B) 3  
(C) 1 (D) 5
2. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved? 1  
(i) Displacement reaction (ii) Precipitation reaction  
(iii) Combination reaction (iv) Double displacement reaction  
(A) (i) only (B) (ii) only  
(C) (iv) only (D) (ii) and (iv)
3. A compound is prepared from gypsum upon heating to a temperature of 373 K and it changes back to gypsum on adding water. Which is the incorrect statement about the compound? 1  
(A) The compound is used for setting fractured bones.

P.T.O.

- (B) The compound is called plaster of Paris which is calcium sulphate dehydrate with a formula  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ .
- (C) If heated at higher temperature, the compound becomes dehydrated and is called dead burnt plaster.
- (D) Both (A) and (C). *13 added to*
4. An aqueous solution 'A', phenolphthalein solution colour is pink. On addition of an aqueous solution 'B' to 'A', the pink colour disappears. The following statement is true for solution 'A' and 'B'. 1
- (A) A is strongly basic and B is a weak base.
- (B) A is strongly acidic and B is a weak acid.
- (C) A has pH greater than 7 and B has pH less than 7.
- (D) A has pH less than 7 and B has pH greater than 7.
5. The gases produced during heating of  $\text{FeSO}_4$ . 1
- (A)  $\text{H}_2, \text{O}_2$  (B)  $\text{H}_2\text{O}, \text{SO}_2$
- (C)  $\text{SO}_2, \text{SO}_3$  (D)  $\text{Fe}_2\text{O}_3, \text{SO}_2$
6. Which of the following two combinations are correct according to the given chemical equation? 1
- Metal + dil.  $\text{HCl} \rightarrow$  Metal Salt + Gas
- Metal, Gas evolved
- (i) Copper, Yes (ii) Iron, Yes
- (iii) Magnesium, No (iv) Zinc, Yes
- (A) (i) and (iii) (B) (ii) and (iii)
- (C) (i) and (iv) (D) (ii) and (iv)
7.  $a\text{Mg}_3\text{N}_2 + b\text{H}_2\text{O} \rightarrow c\text{Mg}(\text{OH})_2 + d\text{NH}_3$   $\text{Mg}_3\text{N}_2 + 2\text{H}_2\text{O} \rightarrow c + d$
- When the equation is balanced the sum of the coefficients  $a+b+c+d$  is equal to 1
- (A) 11 (B) 12
- (C) 13 (D) 14
8. In living organisms during respiration which of the following products are not formed if oxygen is not available? 1
- a. Carbon dioxide + Water b. Carbon dioxide + Alcohol
- c. Lactic acid + Alcohol d. Carbon dioxide + Lactic acid.
9. Identify the option indicates the correct enzyme that is secreted in location (i), (ii) and (iii) 1



- a. (i)-lipase, (ii)-trypsin, (iii)-pepsin  
 b. (i)-salivary amylase, (ii)-pepsin, (iii)-trypsin  
 c. (i)-trypsin, (ii)-salivary amylase, (iii)-carboxylase  
 d. (i)-permease, (ii)-carboxylase, (iii)-oxidase

10. Match the words of column (i) with that of column (ii)

1

Column(i)	Column(ii)
(A) Phloem	(i) Transport of water
(B) Xylem	(ii) Translocation of food
(C) Veins	(iii) Clotting of blood
(D) Platelets	(iv) Deoxygenated blood

- a. A-(ii), B-(i), C-(iv), D-(iii)  
 b. A-(iii), B-(ii), C-(iv), D-(i)  
 c. A-(iii), B-(iv), C-(i), D-(ii)  
 d. A-(ii), B-(iv), C-(i), D-(iii)

11. The directional movement in plants as shown in figure is due to which plant hormone? 1



- a. Cytokinin  
 b. Abscisic acid  
 c. Ethylene  
 d. Auxin

12. **The growth of tendril in pea plant is due to:** 1
- effect of light
  - rapid cell divisions of tendrillar cells that are away from the support.
  - effect of gravity
  - rapid cell divisions in tendrillar cells in contact with support
13. **A diminished image of an object is to be obtained on a screen 1m from it. This can be achieved by a appropriately placing** 1
- A concave mirror of suitable focal length
  - A convex mirror of suitable focal length
  - A convex lens of suitable focal length
  - Both 'a' and 'c' are correct
14. **A convex mirror has a focal length 'f'. A real object is placed at a distance 'f' in front of it from the pole produces an image at** 1
- |         |        |
|---------|--------|
| (a) 2f  | (b) f  |
| (c) f/2 | (d) 4f |
15. **What is common between extensive network of blood vessels around walls of alveoli and in glomerulus of nephron?** 1
- Thick-walled arteries richly supplied with blood.
  - Thin-walled veins poorly supplied with blood.
  - Thick-walled capillaries poorly supplied with blood.
  - Thin-walled capillaries richly supplied with blood.
16. **The substance that triggers the fall of mature leaves and fruits from plants is due to:** 1
- |                   |                  |
|-------------------|------------------|
| (a) Auxin         | (b) Gibberellins |
| (c) Abscisic acid | (d) Cytokinin    |

**Directions (Question Numbers 17 to 20) are Assertion-Reasoning based questions.**

*These consists of two statements -Assertion (A) and Reasoning (R). Answer these questions selecting the appropriate option given below:*

- Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of (A).
  - Both Assertion (A) and Reason (R) Reason are true, and Reason (R) is not the correct explanation of (A).
  - Assertion (A) is true, but R) is false.
  - Assertion (A) is false, but Reason (R) is true.
17. **Assertion (A) : Gas bubbles are observed when sodium carbonate is added to dilute hydrochloric acid.** 1

Reason (R) : Carbon dioxide is released in the reaction

18. Assertion (A) : It is necessary to separate oxygenated and deoxygenated blood in mammals and birds. 1

Reason(R) : Mammals and birds are warm blooded animals, and they depend on environment for their body temperature regulation.

19. **Assertion:- The clouds in sky generally appear to be whitish.** 1

Reason:- Scattering due to clouds is efficient in equal measure at all wavelengths.

20. Assertion (A): Movement of leaves of sensitive plant is different from movement of a shoot towards light. 1

Reason(R): Sensitive plant shows nastic movement which are due to turgidity of cells whereas the movement of shoot is a tropic movement.

### Section-B

**Q.NO. 21 to 26 are very Short Answer Questions.**

21. Generally, when metals are treated with mineral acids, hydrogen gas is liberated, but when metals (except Mn and Mg) are treated with  $\text{HNO}_3$ , hydrogen is not liberated. Why? 2

22. How are fats digested in our body? 2

Or

What is a pacemaker? Why is it called so?

23. Draw a well-labelled diagram of Human respiratory system. 2

24. The magnification produced by a convex lens is +3. What is the, 2

(a) Nature and size of the image formed.

(b) What is the position of the object in front of the lens.

25. A boy uses spectacles of focal length +50cm. Name the defect of vision he is suffering from. Compute the power of the lens. 2

26. Name the plant hormones responsible for the followings. 2

(i) elongation of cells

(ii) growth of stem

### Section – C

**NO.27 to 33 are Short Answer Questions.**

A student prepared solutions of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions, and no indicators were available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two? Write the involved chemical equation. 3

28. Salt A is commonly used in bakery products on heating gets converted into another salt B, which is used to remove the hardness of water, and a gas C is evolved. The gas C, when passed through lime water, turns it milky. Identify A and B. Also write the balanced chemical equations involved. 3
29. (i) Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of word equations. 3
- (ii) In the process of respiration, state the function of alveoli.
30. Draw a well labelled diagram of a neuron. Write its two functions. 3

Or

Name the hormones secreted by the following endocrine glands and specify one function each:

- (i) Thyroid gland
- (ii) Adrenal gland
- (iii) Pancreas
31. A student holding a mirror in his hand, directed the reflecting surface of the mirror towards the sun. He then directed the reflected light on to a sheet of paper held close to the mirror. 3
- (a) What should he do to burn the paper?
- (b) Which type of mirror does he have?
- (c) Will he be able to determine the approximate value of focal length of this mirror from this activity? Draw ray diagram to justify your answer in this case.
32. Name two old age eye defect problem. What is the cause of these two eye defect and What is their correction? 3

OR

- (a) Name a natural phenomenon in the atmosphere that is caused due to dispersion of light.
- (b) What is the condition for seeing the above phenomenon?
- (c) What is the cause of dispersion of light?
33. A needle placed 45cm from a lens forms an image on a screen placed 90cm on the other side of the lens. Identify the type of lens and determine its focal length. What is the size of the image if the size of the needle is 5cm? 3

#### Section -D

**Q.NO. 34 to 36 are Long Answer Questions.**

34. (A) Compound X and aluminium are used to join railway tracks. 5
- (i) Identify the compound X. Name the type of reaction taking place.
- (ii) write the main characteristic of the reaction.
- (iii) Write down its balanced chemical equation.

(B) The following reaction takes place when the aluminium powder is heated with  $\text{MnO}_2$



- i. (i) Name the substance getting oxidised.
- ii. (ii) Name the substance getting reduced.

OR

- a) When zinc metal is treated with a dilute solution of a strong acid, a gas is evolved, which burns with an explosion. Name the gas evolved. Write the chemical equation involved of the reaction if sulphuric acid is taken.
- b) What happens when Zn metal reacts with sodium hydroxide solution. Write the balanced chemical equation.

35. (i) Draw a diagram of human excretory system and label on it the following parts: 5

- |                     |             |
|---------------------|-------------|
| (a) Kidney          | (b) Ureter  |
| (c) Urinary bladder | (d) Urethra |

(ii) Write one main function each of the labelled parts.

Or

What is meant by reflex action. With the help of a labelled diagram trace the sequence of events which occurs when we touch a hot object.

36. (a) State Snell's law. 5

(b) One-half of a convex lens of focal length 20cm is covered with a black paper.

- (i) Will the lens produce a complete image of the object?
- (ii) How will the intensity of the image formed by half-covered lens compare with non-covered lens?
- (iii) Show the formation of image of an object placed at 2F of such covered lens with the help of a ray diagram.

OR

(a) An object is kept at a distance of 18cm, 20cm, 22cm, and 40cm respectively from a lens of power +5D.

- (i) In which case or cases would you get a magnified image.
- (ii) Which of the magnified image can be got on a screen?

(b) If two lenses have their focal length  $f_1$  and  $f_2$  respectively then what is their equivalent focal length.

(c) Define S.I unit of power of a lens and write the relation between the S.I unit of power of a lens and S.I unit of its focal length.

Section -E

**Q.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. 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 vigorous reaction takes place. It is an exothermic process. (1+1+2=4)



- If we have hydrochloric acid and acetic acid of equal concentration, which will be a stronger acid?
- How will the concentration of hydrogen ions gets affected if an acid is diluted?
- Why is it recommended that the acid should be added to water and not water to the acid?

38. Arteries, veins and capillaries are blood vessels through which blood flows in our body. Arteries carry blood from heart to different parts of the body whereas veins deliver blood back to the heart. Arteries are connected to veins by thin capillaries. (1+1+2=4)

- Which two chambers of the human heart have arteries connected to them?
- which blood vessels carry deoxygenated blood from the heart to the lungs, and from which chamber.
- What is blood pressure. How is it measured.

39. A person remarked that he has seen wavering of objects when seen through a stream of hot air rising above a fire. He said that the air just above the fire becomes hotter than the air further higher us. He further said that this wavering can also be seen in the earth's atmosphere as the earth's atmosphere is not evenly distributed and several observations can be explained on the basis of this phenomenon. (1+1+2=4)

- Name the phenomenon about which the person remarked.
- Give one observation which can be explained by the above phenomenon.
- Explain with the help of diagram for the observation in Q.(ii).

