विद्या सर्वार्थ साधिका

ANANDALAYA

PERIODIC TEST - 2

Class: X

Subject: Science MM : 80

Date : 22-09-2025 Time: 3 hours

General Instructions:

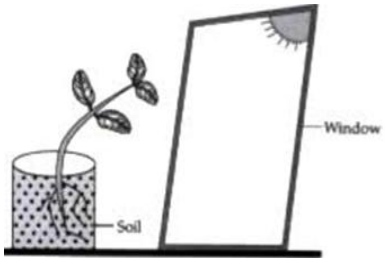
1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

SECTION A

1. The thymus gland is an endocrine gland located _____. (1)
   (A) beneath the stomach (B) in the upper part of the abdomen
   (C) beside the liver and gall bladder (D) behind the sternum

2. A patient's urine sample contains a high amount of glucose. This indicates improper functioning of _____. (1)
   (A) kidney tubules (B) pancreas (C) heart (D) duodenum

3. The bending of a potted plant, as shown in the diagram, takes place because of _____. (1)



   (A) equal distribution of auxin in the shoot
   (B) higher auxin concentration on the shaded side
   (C) presence of more chlorophyll on one side
   (D) water moving towards lighted side

4. Which of the following statements about xylem and phloem is correct? (1)
   (A) Xylem transports water upward while phloem transports food in both the directions.
   (B) Both xylem and phloem transport food only towards the upper part of the plant.
   (C) Xylem transports food whereas phloem transports water in both directions.
   (D) Phloem consists of dead cells, while xylem is made up of living cells.

5. If the cerebrum of the brain is damaged, which activity will be the most directly affected? (1)
   (A) Walking in upright posture (B) Breathing and swallowing
   (C) Thinking and reasoning (D) Blood pressure and salivation

6. Carbon and energy requirements of autotrophs are fulfilled by _____. (1)
   (A) photosynthesis only (B) double circulation
   (C) anaerobic respiration only (D) cellular respiration only

7. Which of the following correctly matches the animal with its chambered heart? (1)
   (A) Frog – four chambered heart (B) Rohu – three chambered heart
   (C) Crocodile – two chambered heart (D) Pigeon – four chambered heart

   Answer the following two questions by 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.

8. A: The diaphragm flattens and moves downward during inhalation. (1)
   R: This increases the volume of the thoracic cavity and allows air to exit from the lungs.

9. A: Abscisic acid is called a growth inhibitor. (1)
R: It promotes wilting of leaves and closure of stomata during water stress.

10. Differentiate between a synapse in the nervous system and the neuromuscular junction. (2)

11. Attempt either option A or B. (2)
A. What is blood plasma? Write its main functions in our body.

OR

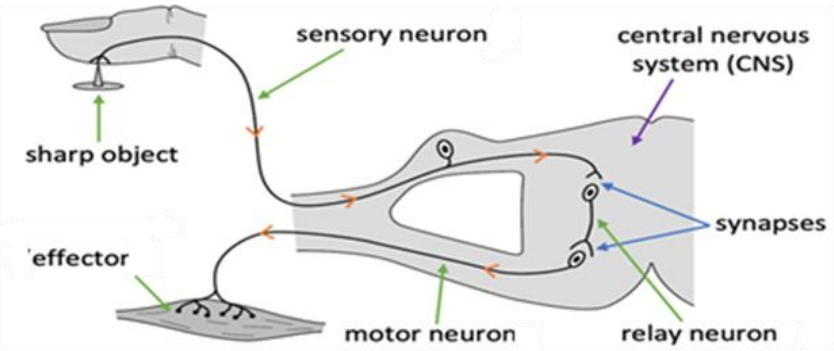
B. What is lymph? How is it formed in the human body?

12. When a student touches the leaves of a *Mimosa pudica* plant, they fold instantly. How does this response benefit the plant, and why is it classified as a nastic movement? (2)

13. (a) What will happen if mucus is not secreted by the gastric glands of our stomach? (3)
(b) State the form in which the following are stored:
(i) Unused carbohydrates in plants. (ii) The energy derived from food in humans.

14. (a) What are hormones? How do they differ from enzymes? (3)
(b) A 14-year-old boy shows stunted growth. The doctor suggests a deficiency of a hormone. Which gland and its hormone are responsible for this condition?

15. A reflex arc is the neural pathway that mediates a reflex action, an involuntary and nearly instantaneous response to a stimulus. It involves a series of components: a receptor, sensory neuron, integrating centre (often in the spinal cord), motor neuron, and effector (muscle or gland). This pathway allows for quick responses to stimuli without conscious brain involvement. Study the given diagram on reflex arc and answer the questions that follow:



(i) What is the function of relay neuron? (1)
(ii) Name the receptor and effector in the given reflex arc. (1)
(iii) (A) Explain why reflex actions do not require thinking. (2)

OR

(iii) (B) Write two differences between reflex arc and reflex action.

16. Attempt either option A or B. (5)
A. (a) Draw the structure of nephron and label the following parts:
(i) Site of blood filtration that leads to urine formation.
(ii) Structure that collects urine from several nephrons.
(iii) U shaped segment of the renal tubule.
(iv) Tubular part that reabsorbs useful substances.
(b) Name the two major processes of urine formation in humans.
(c) Why is it dangerous if urea accumulates in the blood?

OR

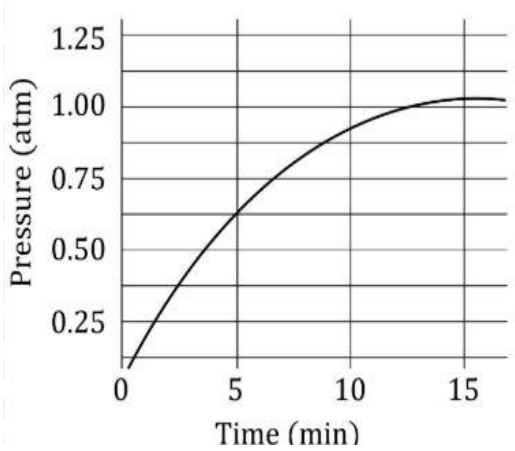
B. (a) Draw the diagram of the neuromuscular junction and label the following parts:
(i) Synaptic Knob (ii) Synaptic vesicles (iii) Axon terminal (iv) Neurotransmitters
(b) Why does the flow of signals in a synapse from the axonal end of one neuron to the dendritic end of another neuron take place but not in the reverse direction? Explain.

SECTION B

17. Juice of Tamarind turns blue litmus to red. It is because of the presence of an acid called _____. (1)
(A) ethanoic acid (B) acetic acid (C) tartaric acid (D) oxalic acid

18. The oxide which can react with HCl but not with KOH to give corresponding salt and water is _____. (1)
(A) Aluminium oxide (B) ZnO (C) Al_2O_3 (D) BaO

19. A student added 10 g of calcium carbonate in a rigid container, secured it tightly, and started to heat it. After some time, an increase in pressure was observed. The pressure reading was then noted at intervals of 5 minutes and plotted against time, in a graph as shown below. During which time interval did maximum decomposition take place? (1)



(A) 15 - 20 min
(B) 10 - 15 min
(C) 5 - 10 min
(D) 0 - 5 min

20. Which one of the following can be used as an acid–base indicator by a visually impaired student? (1)
(A) Litmus (B) Turmeric (C) Vanilla essence (D) Petunia leaves

21. Identify the correct representation of reaction occurring during the chloralkali process. (1)
(A) $2NaCl(l) + 2H_2O(l) \rightarrow 2NaOH(l) + Cl_2(g) + H_2(g)$
(B) $2NaCl(aq) + 2H_2O(aq) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$
(C) $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(aq) + H_2(aq)$
(D) $2NaCl(aq) + 2H_2O(l) \rightarrow 2NaOH(aq) + Cl_2(g) + H_2(g)$

22. In the double displacement reaction between aqueous sodium sulphate and aqueous Barium chloride, a white precipitate of Barium sulphate is formed. While performing the activity if barium chloride is not available, which of the following can be used in place of Barium chloride? (1)
(A) Barium sulphate (B) Lead chloride (C) Sodium chloride (D) Barium nitrate

23. Marble statues are corroded or stained in rain water. Identify the main reason. (1)

(A) Decomposition of calcium carbonate to calcium oxide.
(B) Polluted water is basic in nature and hence it reacts with calcium carbonate
(C) Polluted water is acidic in nature and hence it reacts with calcium carbonate
(D) Calcium carbonate dissolves in water to give basic calcium hydroxide

24. A: Weak acids cannot be concentrated acids. (1)
R: Weak acids already have the lower concentrations of hydrogen ions.
(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.

25. (a) Hydrated ferric oxide is commonly known as rust. Write its chemical formula. (2)
(b) Write a balanced chemical equation of any one electrolytic decomposition reaction.

26. Attempt either option A or B. (3)

A. Mention with the reason the colour changes observed when:

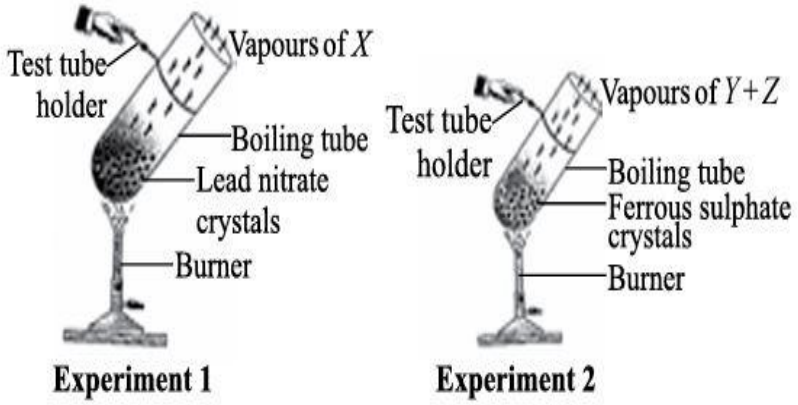
(a) Silver chloride is exposed to sunlight

(b) Copper powder is strongly heated in the presence of oxygen

(c) A piece of Zinc granule is dropped in copper sulphate solution

OR

B. Mayuri and Rohit conducted two experiments to study the types of chemical reactions as shown in the given figures.



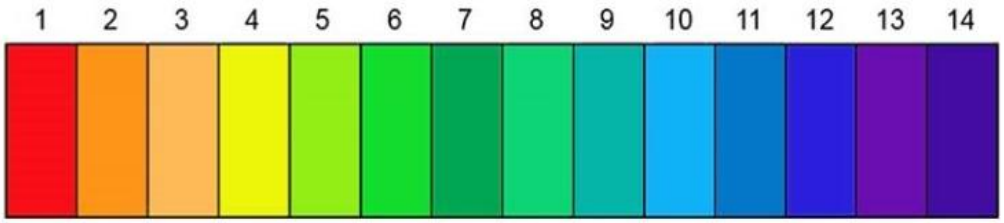
(a) The type of chemical reaction is same in both the experiments. Identify the type.

(b) Write the chemical formulae of Y and Z.

27. (a) On adding dilute HCl to copper oxide powder, the solution formed is blue-green. Predict the new compound formed that imparts a blue-green colour to the solution. (3)

(b) "Table salt and washing soda both belong to the same family of salts". Justify this statement.

28. A pH paper changes its colour depending upon the pH value of the substance it is dipped in. The picture shows the different colours of a pH paper.



Leena tested the pH value of four different liquids using a pH paper. The table shows the shade of the pH after it is dipped separately in the four liquids.

	Liquid 1	Liquid 2	Liquid 3	Liquid 4
Shade of the pH paper	Colour 9	Colour 12	Colour 5	Colour 3

(i) Which of these liquids has the lowest concentration of hydrogen ions? (1)

(ii) What should be the colour no. of the pH paper after it is dipped in distilled water? (1)

(iii) (A) When pH paper is dipped in the solution of detergent, the expected colour no. ranges from 8 to 12. Justify this statement. (2)

OR

(iii) (B) If a sample of water containing detergent is provided to you, suggest a specific method to bring its pH value to 7. Name the phenomenon that is taking place here.

29. Attempt either option A or B. (5)

A. (a) Identify the type of a chemical reaction and write a balanced chemical equation for the following reaction.

Chlorine gas is passed into an aqueous potassium iodide solution to form potassium chloride solution and solid iodine.

(b) Identify the reducing agent in the following reaction.

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

(c) On heating blue coloured powder of copper nitrate in a boiling tube, copper oxide (black), oxygen gas and a brown gas "X" is formed. Write the balanced chemical equation for this reaction. Also, name the brown colour gas "X ".

OR

B. (a) Give a balanced chemical equation for each of the following observations.
(i) change in colour (ii) change in temperature (iii) evolution of a gas.
(b) Why do we clean Magnesium ribbon before burning in air?
(c) Define: Rancidity.

SECTION C

30. A point object is placed at a distance of 15 cm from a convex mirror of focal length 15 cm. The image will form ____. (1)
(A) at infinity (B) at F (C) at C (D) between pole & F

31. For the same angle of incidence, the angles of refraction in media P, Q, R and S are 50^0, 40^0, 30^0 and 20^0 respectively. In which medium speed of light is minimum? (1)
(A) P (B) Q (C) R (D) S

32. A: A ray of light does not deviate when it travels from one medium into another having same refractive indices. (1)
R: Refractive index of medium is independent of the speed of light in the medium.

(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

33. You have three lenses L_1, L_2 and L_3 of powers +2D, +5D and +10D respectively. Find the focal lengths of the given lenses. Which lens would be most suitable to use as a magnifier? (2)

34. Attempt either option A or B. (2)
A. What is the cause of dispersion of white light through a glass prism? Draw a ray diagram to show the path of light when two identical glass prisms are arranged together in inverted position with respect to each other and a narrow beam of white light is allowed to fall obliquely on one of the faces of the prisms.

OR

B. Describe the formation of rainbow in the sky with the help of a diagram.

35. Draw a ray diagram to show the path of the refracted ray in each of the following cases. A ray of light incident on a concave lens is: (3)
(a) passing through its optical centre.
(b) parallel to its principal axis.
(c) directed towards its principal focus.

36. Give reasons for the following: (3)
(a) Danger signals installed at airports and at the top of tall buildings are of red colour.
(b) The sky appears dark to the passengers flying at very high altitudes.
(c) Stars twinkle but planets do not.

37. Due to gradual weakening of ciliary muscles and diminishing flexibility of the eye lens a certain defect of vision arises. Write the name of this defect. Name the type of lens required by such persons to improve the vision. Explain the structure and function of such a lens. (3)

38. Read the given passage and answer the questions based on passage and related studied concepts.

Aditya, who liked to sit in the last row in the class, started complaining of frequent headaches. His parents took him to the nearest clinic and the doctor referred him to the eye specialist. The eye specialist tested his vision and asked Aditya whether he was able to read whatever the teacher wrote on the black board clearly or not. He replied that he could not see clearly. The doctor told his parents about the defect of vision that Aditya was suffering from and advised corrective glasses. After wearing the glasses, Aditya could read the black board clearly and also got rid of his headache.

(i) What type of defect was Aditya suffering from? (1)

(ii) What are the causes of this defect? (1)

(iii) (A) Draw the (a) defective eye of Aditya (b) correction for this defect. (2)

OR

(iii) (B) What type of lens is used to correct Aditya's defect? How does the combination of lens system work?

39. Attempt either option A or B. (5)

A. The focal length of a given concave mirror is 12 cm.

(a) What is the radius of curvature of the mirror?

(b) Find the positions of the image formed by the given mirror when the object is kept in two different positions such as (i) 20 cm and (ii) 10 cm from the mirror. List any two properties of the image formed in each case.

OR

B. (a) Define the term principal focus of a convex lens.

(b) The image of an object formed by a lens is real, inverted and its magnification is -1.

(i) If the image is at the distance of 30 cm from the lens, where is the object placed?

(ii) Find the position of the image if the object is now moved 20 cm towards the lens. What is the nature of the image obtained? Justify your answer with the help of a ray diagram.