No. of Printed Pages/Questions: 7 / 39

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HALF YEARLY EXAMINATION - (2025 – 2026)

CLASS : X **Max. Marks: 80**
Subject: SCIENCE **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

Q1. Accumulation of non-biodegradable substances in the food chain in increasing amount at each higher trophic level is known as
(a) eutrophication (b) transpiration
(c) guttation (d) biological magnification

Q2. The breakdown of pyruvate using oxygen takes place in
(a) cytoplasm (b) mitochondria
(c) chloroplast (d) nucleus

Q3. Which enzyme present in saliva helps in digestion ?
(a) pepsin (b) amylase
(c) trypsin (d) lipase

Q4. Which hormone is responsible for the development of female characteristics ?
(a) adrenaline (b) estrogen
(c) thyroxine (d) testosterone

Q5. Which of the following hormone is responsible for ripening of fruits ?
(a) auxin (b) gibberellins
(c) cytokinins (d) Ethylene

Q6. Which is the structural and functional unit of kidney ?
(a)nephron (b) glomerulus
(c)neuron (d) alveoli

The following two questions consist of two statements – **Assertion** (A) and **Reason** (R). Answer these 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.

Q7. Assertion(A): Ozone layer is getting depleted at upper atmosphere which is a cause of concern.
Reason (R) : CFC reacts with ozone and breaks it.

Q8. Assertion: Cytokinins promote cell division in plants.
Reason : Cytokinins are also called anti-aging hormones in plants.

Q9. In a food chain 50,000 Joules of energy is available to the producer. How much energy will be available to the secondary consumer to transfer it to the tertiary consumer?

OR

What is meant by food web ? "The number of trophic levels in a food chain is limited." Give reason to justify this statement.

Q10. (i)Name the hormone secreted by pancreas. What is its function ?
(ii)Which gland is called the " master gland". Why ?

Q11. (i)What is peristalsis? Where does it occur?
(ii) Why is the small intestine in herbivores longer than in carnivores?
(iii)Why do veins have thin walls as compared to arteries?

Q12. (i)What is reflex action?
(ii) Draw a labelled diagram of reflex arc and explain its pathway.
(iii)Mention the function of adrenaline hormone.

OR

What are tropic movements in plants? Explain phototropism and geotropism with examples.

Q13. The purpose of making urine is to filter out waste products from the blood. Just as CO2 is removed from the blood in the lungs, nitrogenous waste such as urea or uric acid are removed from blood in the kidneys. It is then no surprise that the basic filtration unit in the kidneys, like in the lungs, is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney is associated with the cup-shaped end of a tube that collects the filtered urine. Each kidney has large numbers of these filtration units called nephrons packed close together. Some substances in the initial filtrate, such as glucose, amino acids, salts and a major amount of water, are selectively re-absorbed as the urine flows along the tube. The amount of water reabsorbed depends on how much excess water there is in the body, and on how much of dissolved waste there is to be excreted.
(i)Name the blood vessel which brings blood into kidney for filtration.
(ii)What is excretion?
(iii) What is haemodialysis?
(iv)Write two functions of human kidney.

Q14. (i)Explain the structure of a neuron with a neat labelled diagram. How does information travel in the nervous system?
(ii)State the function of :
(a) cerebellum
(b) auxin

OR

(i)What are the steps involved in nutrition in Amoeba? Explain with a diagram.
(ii)What are the functions of villi in the small intestine?
(iii)How are fats digested in the human body?

SECTION B

Q15. The products obtained when lead nitrate is heated in a boiling tube.

(a) PbO, NO_2 and O_2 (b) NO, PbO and O_2
(c) $Pb(NO_3)_2$ and O_2 (d) NO_2, PbO and O_2

Q16. An element X reacts with O_2 gives a compound of high melting point. This compound is also sparingly soluble in water. The element X is likely to be :

(a)Iron (b)Calcium
(c)Carbon (d)Silicon

Q17. A solution turns red litmus blue; its pH is likely to be:

(a) 1 (b) 4
(c) 5 (d)10

Q18. An aqueous solution A turns phenolphthalein solution pink. On addition, an aqueous solution B to A, the pink colour disappears. Which of the following statements is/are correct?

(a) A is strongly basic and B is weak acid
(b) A is strongly acidic and B is 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

Q19. The yellow colour of turmeric changes to red on adding soap solution. When turmeric is added to dilute acid solution, there is no change in colour. Which of the following is appropriate to the substance?

(a) Turmeric is a degenerate form of acid (b) Soap is a base
(c) Turmeric is an acid (d) pH is not a scale

Q20. What is X in the chemical reaction given below?

$$2Al + 3H_2O \rightarrow Al_2O_3 + X$$

(a) Al (b) H_2
(c) O_2 (d) AlH_3

The following one questions consist of two statements – **Assertion** (A) and **Reason** (R). Answer these questions by selecting the appropriate option given below:

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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.

Q21. Assertion (A): When a lead vessel is kept in a solution of $ZnSO_4$, lead will remain unaffected.
Reason(R) : Lead is less reactive than zinc.

Q22. Assertion (A): Plaster of Paris should be stored in moisture-proof containers.
Reason(R) : It converts to gypsum in presence of moisture.

Q23. A metal salt MX when exposed to light, splits up to form metal M and a gas X_2. Metal M is used for making ornaments whereas the gas X_2 is used for making bleaching powder. The salt MX is itself used in black-and-white photography.

(i)Identify metal M and gas X_2.
(ii) Mention the type of chemical reaction involved when salt MX is exposed to light.

Q24. Attempt either option **A** or **B**

(A)

In the electrolysis of water:
(i) Name the gas liberated at anode and cathode.
(ii)Why is that the volume of a gas collected on one electrode is two times that on the other electrode?
(iii)What would happen if dil. H_2SO_4 is not added to water?

OR

(B):

What do you mean by precipitation reaction? Explain by giving two examples.

Q25. A metal A is used in thermite process, when heated with oxygen gives an oxide B which is amphoteric in nature. Identify A and B. Write down the reaction of B with HCl and NaOH

Q26. Sodium is a very important element. Many of its compounds are widely used by us even in our food as well as for washing clothes e.g. washing soda is widely used for washing clothes. When it is saturated with dioxide of carbon in moist environment it gives a product called baking soda. Baking soda is used in small amount in making bread and cake is kept to make these soft and spongy. An aqueous solution of baking soda turns red litmus blue. It is also used in soda-acid fire extinguishers.

(i)Why sodium hydrogen carbonate is used in soda-acid fire extinguishers?
(ii)What is the approximate pH value of baking soda solution?
(iii)How many water of crystallization are present in washing soda? What happens when we heat the crystals?

OR

(iii) By which gas baking powders help in making cake soft and spongy? Explain with chemical equation.

Q27. Attempt either option **A** or **B**

(A):

(i)Show formation of sodium oxide by the transfer of electrons in the two elements using electron-dot structures.
(ii) Give reason for the following:
(a)Ionic compounds have high melting and boiling points.
(b)Sodium is kept immersed in kerosene.
(c)Generally, no hydrogen gas is evolved when metals react with dilute nitric acid.

OR

(B):

(i)A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore and give the chemical reactions involved for the extraction of metal.

(ii)Give the reaction involved during extraction of Zinc from its ore by:

(a)Roasting of zinc ore.

(b)Calcination of zinc ore.

SECTION C

Q28. If an object is placed 21cm from a converging lens, the image formed is slightly smaller than the object. If the object is placed at 19cm from the lens, the image is slightly larger. What is the approximate focal length of the lens?

(a)20 cm (b)18 cm

(c)10 cm (d)5 cm

Q29. A person went for a medical check-up and found that the curvature of his eye lens was increasing. Which defect is he likely to suffer from?

(a) Myopia (b) Cataract

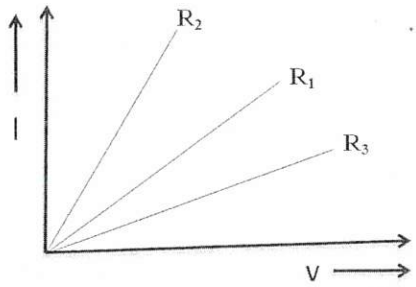
(c) Presbyopia (d) Hypermetropia

Q30. A wire with a resistance of 12 Ω is stretched to three times its original length. What is its new resistance?

(a)36Ω (b)48 Ω

(c)72 Ω (d)108 Ω

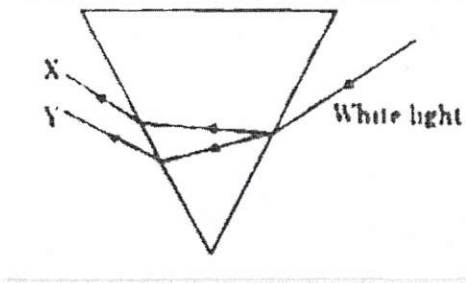
Q31. A student plots V-I graphs for three samples of nichrome wire with resistances R_1, R_2, and R_3.Choose the correct statement from the following options:



(a)$R_1 = R_2 = R_3$ (b) $R_1 > R_2 > R_3$

(c) $R_3 > R_1 > R_2$ (d) $R_2 > R_1 > R_3$

Q32. In the diagram given below, X and Y are the end colours of the spectrum of white light. The colour of 'Y' represents the:



(a) Red
(b) Violet
(c) Blue
(d) Yellow

Q33. Assertion (A) : A cell is a device which converts chemical energy into electrical energy.
Reason (R) : Cell maintains a constant potential difference between its terminals for a long-time.

Q34. (i)State the reason of dispersion.
(ii)Arrange the following colour of light in descending of refractive index and speed:
Blue, Yellow, Green and Red

Q35. The current passing through a resistor in a circuit is 0.01 A, when the voltage across the same resistor is 5 V. What current passes through this resistor when the voltage across it is 7.5 V ?

OR

Draw the symbols of commonly used components in electric circuit diagrams for
(i) open plug key
(ii) wires crossing without connection
(iii) variable resistor
(iv) battery

Q36. A current of 10 A flows through a conductor for two minutes.
(i)Calculate the amount of charge passed through any area of cross section of the conductor.
(ii)If the charge of an electron is 1.6×10^{-19} C, then calculate the total number of electrons flowing.

OR

(i)State Ohm's Law.
(ii)The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given below. Plot a graph between V and I and calculate the resistance of that resistor

I(Ampere)	0.5	1.0	1.5	2.0	2.5
V(Volt)	1.6	3.2	4.8	6.4	8.0

Q37. Attempt either option **(A)** or **(B)**

(A):

(i)The absolute refractive indices of glass and water are 3/2 and 4/3 respectively. If the speed of light in glass is 2×10^{8} m/s, calculate the speed of light in
(a) vacuum (b) water (c)glass

(ii)Define the following terms in context of a lens:
(a)Focus
(b)Optical centre

OR

(B):

(i)A convex lens of power 3 D is held in contact with a concave lens of power -1 D. A parallel beam of light is made to fall on the combination. At what distance from the combination will the beam get focused?

(ii) Name two factors on which the refractive index of a medium depends? State how it depends on the factors stated by you.

Q38. A student took three concave mirrors of different focal lengths and performed the experiment image formation by placing an object at different distances with these mirrors as shown in the table.

Sl. No.	Object Distance	Focal length
I	45 cm	20 cm
II	30 cm	15 cm
III	20 cm	30 cm

Now answer the following questions:

(i) Look at the table and identify the situation (object distance and focal length) which resemble this situation in which concave mirrors are used as shaving mirrors. Also draw a ray diagram to show the image formation in this case.

(ii)List two properties of the image formed in Sl. No. I

Attempt either (iii) or (iv)

(iii)In which one of the above given in the table, the mirror will form real image of same size and why?

OR

(iv)Name the type of mirror used by dentists. Give reason why do they use such type of mirror.

Q39. Attempt either option A or B

(A):

Tarun, a 15-year-old student, started having difficulty seeing the whiteboard clearly from the back benches. He complained of headaches and eye strain while watching distant objects like street signs. His parents took him to an eye specialist, who diagnosed him with myopia and prescribed suitable lenses.

(i) What is myopia and what causes it?

(ii) Why can Ravi see nearby objects clearly but not distant ones?

(iii) What kind of lens is prescribed to Ravi and why?

(iv) With the help of a labelled diagram, explain how myopia can be corrected.

(v) Suggest any two lifestyle tips that could help prevent or reduce the progression of myopia.

OR

(B):

While watching a sunset, Tushar observed that the Sun appeared oval in shape and stayed visible for some time even after it had gone below the horizon.

(i) What phenomenon is responsible for this?

(ii) Why does the Sun look oval?

(iii)How long does atmospheric refraction affect the visibility of the Sun?

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