HALF YEARLY EXAMINATION, 2024-25

SCIENCE

Time – 3:00 Hrs. **Class – X** **M.M. : 80**

Date – 10.09.2024 (Tuesday)

Name of the student _____Section _____

General Instructions:

i. This question paper consists of 39 questions in 5 sections.
ii. All questions are compulsory. However, internal choices are provided in some questions. A student is expected to attempt only one of choice.
iii. **Section A** consists of 20 objective type questions carrying 1 mark each.
iv. **Section B** consists of 6 Very Short questions carrying 02 marks each.
v. **Section C** consists of 7 Short Answer type questions carrying 03 marks each.
vi. **Section D** consists of 3 Long Answer type questions carrying 05 marks each.
vii. **Section E** consists of 3 source-based/case-based questions of 04 marks each with sub-parts.

SECTION -A

Select the most appropriate answer out of the four options given for each of the questions 1 – 20.

Q1. Ria wants an erect and magnified image of an object using a converging mirror of a focal length of 20 cm. What is the range of distance where the object can be placed in front of the mirror?

a) greater than 40 cm b) between 20 cm to 30 cm 1

c) between zero to 20 cm d) between zero to 40 cm

Q2. An object of 4cm in height is placed at the centre of curvature of the concave mirror, the image of the object is 1

a) real and half the size of the object

b) real, inverted, and double the size of the object

c)real, inverted, and of the same size as the object

d) virtual erect and half the size of the object

Q3. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because, among all other colours, the red light 1

a) is scattered the most by smoke or fog b) is scattered the least by smoke or fog

c) is absorbed the most by smoke or fog d) moves fastest in the air

Q4. When white light enters a glass prism from the air, the angle of deviation is least for 1

a) blue light b) yellow light c) violet light d) red light

Q5. A person gets out in the sunlight from a dark room. How does his pupil regulate and control the light entering the eye? 1

a) The size of the pupil will decrease, and less light will enter the eye

b) The size of the pupil will decrease, and more light will enter the eye

c) The size of the pupil will remain the same, but more light will enter the eye

d) The size of the pupil will remain the same, but less light will enter the eye

Q6. Match the following: - 1

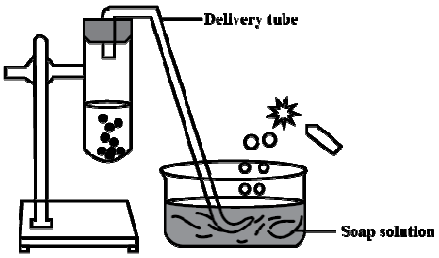
Column A	**Column B**
Types of chemical reaction	Chemical equation
A) Combination reaction	(i) $Na_2CO_3.10H_2O \xrightarrow{\Delta} Na_2CO_3 + 10\ H_2O$
B) Decomposition reaction	(ii) $BaCl_2\ (aq) + Na_2SO_4\ (aq) \rightarrow BaSO_4 + NaCl$
C) Displacement reaction	(iii) $2Mg + O_2 \rightarrow 2MgO$
D) Double displacement reaction	(iv) $Fe + CuSO_4\ (aq.) \rightarrow FeSO_4\ (aq) + Cu$

The correct option is-

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

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

Q7. Study the diagram given below and identify the gas formed in the reaction. 1



a) Carbon dioxide which extinguishes the burning candle.

b) Oxygen due to which the candle burns more brightly.

c) Sulphur dioxide which produces a suffocating smell.

d) Hydrogen which while burning produces a popping sound.

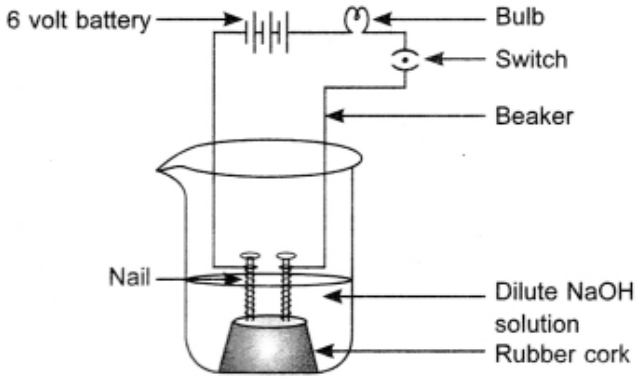
Q8. Which of the following salts do not have the water of crystallisation? 1

a) Bleaching powder b) Washing soda c) Plaster of Paris. d) Hydrated Zinc sulphate.

Q9. An aqueous solution turns the red litmus solution blue. Excess addition of which of the following solutions would reverse the change? 1

a) Baking powder b) Lime c) Ammonium hydroxide solution d) Hydrochloric acid

Q10. The apparatus given in the adjoining figure was set up to demonstrate electrical conductivity.



Which of the following statement(s) is (are) correct?

(i) Bulb will not glow because electrolyte is not acidic.

(ii) Bulb will glow because NaOH is a strong base and furnishes ions for conduction.

(iii) Bulb will glow because circuit is complete.

(iv) Bulb will not glow because it depends upon the type of electrolytic solution.

a) (i) and (iii) b) (ii) and (iv) c) (ii) and (iii) only d) (iv) only

Q11. How does the bread mould obtain nutrition? 1

a) By eating the bread on which it is growing

b) By using nutrients from the bread to prepare their own food

c) By breaking down the nutrients of bread and then absorbing them

d) By allowing other organisms to grow on the bread and then consuming them

Q12. Digestion of food starts from which organ of the human digestive system? 1

a) Mouth due to the presence of saliva

b) Oesophagus that moves the food in the gut

c) Pancreas that releases juices for fat breakdown

d) Stomach that helps in mixing food with digestive juices

Q13. What are the end products of anaerobic respiration in plants? 1

a) Lactic acid + energy b) Carbon dioxide + water + energy

c) Ethanol + carbon dioxide + energy d) Pyruvate

Q14 How is food transported from the phloem to the tissues according to plants' needs? 1

a) Food is transported along with the water in the plant's body

b) Food is transported in only one direction, like water in the plant body through the xylem

c) Food is transported from a region with a low concentration to a higher concentration

d) Food is transported from the region where it is produced to other parts of the plants

Q15 How will information travel within a neuron? 1

a) Dendrite -> cell body -> axon -> nerve ending

b) Dendrite -> axon -> cell body -> nerve ending

c) Axon -> dendrite -> cell body -> nerve ending

d) Axon -> cell body -> dendrite -> nerve ending

Q16. The ___ produces most of the excretory compounds in humans and are eliminated through _____.

a) Liver, Urine b) Kidney, Urine c) Liver, Bile juice d) Kidney, Bile juice 1

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, but R does not explain A correctly.

c) A is true but R is false.

d) A is false but R is true

Q17. **Assertion (A) :** Printed letters on a page of a book appear to be raised, once seen through a glass slab placed over the page 1

Reason (R) : The ray of light bends away from the normal when it travels from a denser medium to a rarer medium

Q18 **Assertion (A)** : Carbohydrate digestion mainly takes place in small intestine.
Reason (R) : Pancreatic juice contains the enzyme lactase.

Q19. **Assertion (A) :** The process of dissolving an acid in water is highly exothermic. 1

Reason (R) : A large amount of heat is absorbed in endothermic reaction.

Q20 **Assertion (A) :** During vigorous exercise, the heart rate increases 1

Reason (R) : Increased oxygen demand by muscles causes the heart to pump more blood to meet this demand.

SECTION -B

Q21. The refractive index of ice with respect to air is 1.31 and rock salt with respect to air is 1.54. Calculate the refractive index of rock salt with respect to ice. 2

OR

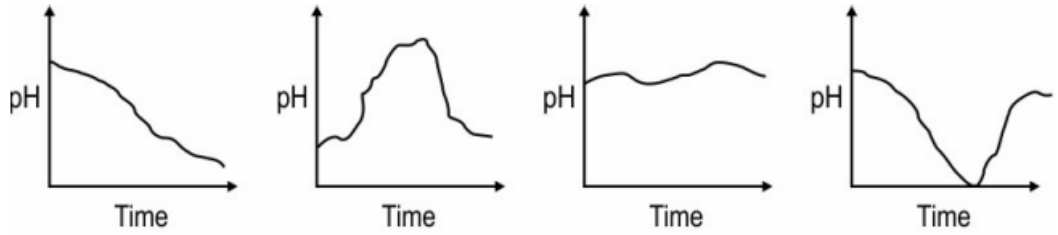
What should be the position of the object, when a concave mirror is used -

a) As a shaving mirror

b) In torches as reflecting mirrors?

Q22. How will you use two identical prisms so that a narrow beam of white light incident on one prism emerges out of the second prism as white light? Draw the diagram. 2

Q23. Which of these graphs shows how the pH of milk changes as it forms curd? Give reason to support your answer. 2



(i) (ii) (iii) (iv)

Q24. (a) State the law which is followed by balancing chemical equations. 2

(b) In the reaction $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$. Name the substance oxidised and reduced.

Q25. a) What is cellular respiration? 1+1

b) A cell undergone aerobic respiration and produced 646 ATPs on complete breakdown of glucose molecules. How many glucose molecules were utilised in this process?

OR

State the role of the following in the process of breathing-

a) Minute hairs in nasal passage b) Diaphragm.

Q26. Name any two excretory products in plants excreted through stomata .Also mention the process involved in these removal. 2

SECTION - C

Q27. Draw ray diagrams to describe the nature, position, and relative size of the image formed by a concave lens for the object. 3

(i) When the object is placed at Infinity

(ii) when the object is placed in between the Infinity and the optical centre of the lens

Q28 a) What is meant by the scattering of light? 3

b) Why is the colour of the clear sky blue? Explain.

Q29. Write the action of the following enzymes in the process of digestion of food – 3

a) Salivary amylase b) Pepsin c) Lipase

Q30 a) Write any two features of alveoli which support maximum exchange of gases during respiration. (1+2)

b) How is normal respiration different from fermentation? Write any two points.

Q31. Draw a complete diagram of human excretory system. Identify and name the following parts in this diagram. 3

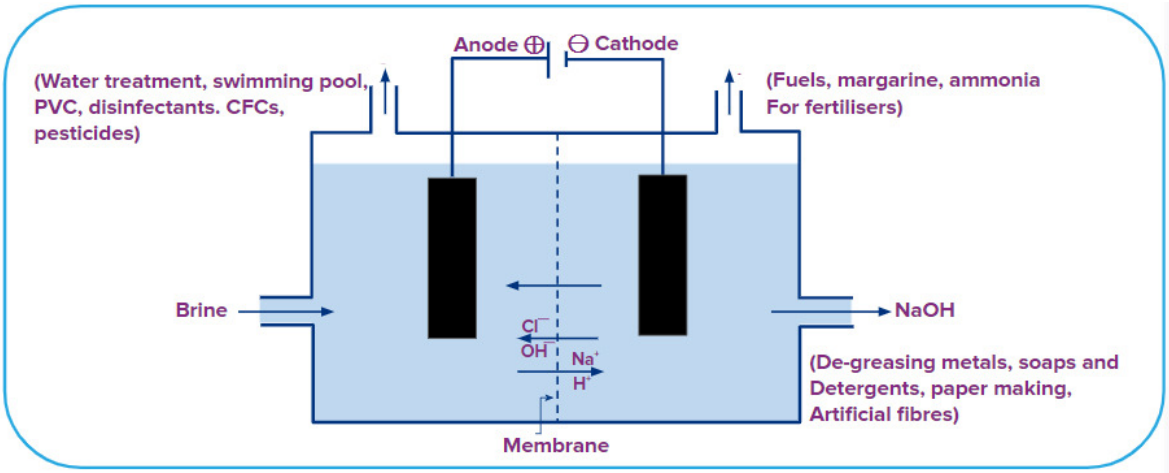
i) Left kidney

ii) The blood vessel that carries the nitrogenous waste into the kidney.

iii) The ducts that take out the urine from the kidney.

iv) The place where the urine is stored temporarily.

Q32 Answer the following questions based on the diagram given below 3



(a) Identify the gases evolved at the anode and cathode in the above experimental set up.

(b) Name the process that occurs. Why is it called so?

(c) Illustrate the reaction of the process with the help of a balanced chemical equation.

OR

The metal salt 'A' is blue in colour. When salt 'A' is heated strongly over a burner, a substance 'B' is released as vapours and a white powder 'C' is left behind. When a few drops of a liquid 'B' is added to powder 'C', it becomes blue again.

a. Identify A & C.

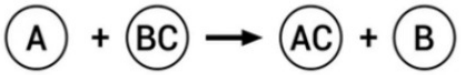
b. Write chemical equations involved in the process.

c. Name the type of reaction when A is heated to get C.

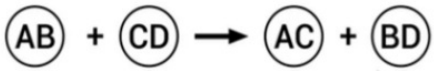
d. Write any one example which also shows the above property of A.

Q33. Identify the types of reaction mentioned below in (i) and (ii).

i)



ii)



Give one example for each type in the form of a balanced chemical equation. 3

SECTION D

Q34. A 10 cm long pencil is placed 5 cm in front of a concave mirror having a radius of curvature of 40 cm.

a) Determine the position of the image formed by this mirror. 2

b) What is the size of the image? 2

c) Draw a ray diagram to show the formation of the image. 1

OR

Define the power of a lens. What is its unit? One student uses a lens with a focal length of 50 cm and another of –50 cm. What is the nature of the lens and its power used by each of them?

Q35 a) Name the biggest artery and the biggest vein in the human body. (1+2+2)

b) Mention any two structural differences between Artery and Vein.

c) In which type of blood vessels does the gaseous exchange usually takes place? Give one reason.

OR

a) What is the role of the valves present between the atria and ventricles? (1+2+2)

b) Name an organism which follows Double circulation system of blood flow. Write one advantage of double circulation.

c) In plants the rate of transportation of water and minerals is faster during the day time than at night. Explain.

Q36. a) A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a solution gives a gas G that is obtained at anode during electrolysis of brine, is passed through dry Y, it gives a compound Z used for disinfecting drinking water. Identify X, Y, G and Z. Write the four chemical equations involved. 5

b) What will be the pH of solution of baking soda?

OR

a) Give an example of salt which is produced by strong acid and weak base. 5

b) Name the acid present in ant's sting.

c) What will the pH of common salt and what will be its nature?

d) What happens when gypsum is heated at 100^0 C?

e) Acids conduct electricity while glucose does not. Give reason.

SECTION -E

Q37. A student in a classroom was having trouble reading while sitting at the back of the class but had no issues when sitting in the front. The doctor prescribed a negative power lens, which moves the image back onto the retina, allowing the student to comfortably read the board while sitting in the back of the classroom.

a) Name the defect of vision in the student's eye. 1

b) If the doctor prescribes the lens of power -0.5 D. Find the focal length of the lens. 1

c) What are the two causes of this defect? 2

OR

c) Write the function of the retina in the human eye.

Q38 Read the following information and answer the following questions.

Reflex actions are sudden involuntary responses which does not involve thinking. For example, when we touch a hot object, we withdraw our hand immediately without thinking. The sensory nerves that detect the heat from the receptors in the skin are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is known as the reflex arc. Reflex arcs are formed in the spinal cord but the information is still sent to the brain.

a) Which type of receptor in our body is used to detect the temperature of an object? 1

b) How are the impulses/signals transferred between two neurons? 1

c) Draw a reflex arc for the situation mentioned in the above paragraph. 2

OR

c) Write any two advantages of reflex action in the body.

Q39 A student sets up an experiment to electrolyze water using a simple apparatus consisting of two electrodes (anode and cathode) connected to a battery and placed in water. The student adds a small amount of sulphuric acid. After the current is applied, gas bubbles form at both electrodes.

a) What gases are produced at the anode and the cathode during the electrolysis of water? 1

b) Write the balanced chemical equations for the reactions occurring at the anode and the cathode. 1

c) Why is sulphuric acid added to the water in this experiment? What type of reaction is this? 2

OR

c) Explain why the volume of gas collected at the cathode is twice that of the gas collected at the anode. What is the ratio of mass of the gases collected in cathode and anode?