Indian School Al Wadi Al Kabir

Midterm Examination

Class: X | Sub: Science (086) | Max. Marks: 80
Date: 17/09/2024 | Set - II | Time: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This question paper comprises 39 questions. All questions are compulsory.
(ii) This question paper is divided into five sections A, B, C, D and E.
(iii) Section A - Question No. 1 to 20 are multiple choice questions. Each question carries 1mark.
(iv) Section B - Question No. 21 to 26 are very short answer type questions. Each question carries 2 marks. Answer to these questions should be in the range of 30 to 50 words.
(v) Section C - Question No. 27 to 33 are short answer type questions. Each question carries 3 marks. Answer to these questions should in the range of 50 to 80 words.
(vi) Section D - Question No. 34 to 36 are long answer type questions. Each question carries 5 marks. Answer to these questions should be in the range of 80 to 120 words.
(vii) Section E - Question No. 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. Only one of the alternatives has to be attempted in such questions.

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SECTION A

Select and write the most appropriate option out of the four options given for each of the question no. **1** to **20**. 20×1=20

1. It is important to balance the chemical equations to satisfy the law of conservation of mass. Which of the following statements of the law is incorrect?

(a) The total mass of the elements present in the reactants is equal to the total mass of the elements present in the products.
(b) The number of atoms of each element remains the same, before and after a chemical reaction.
(c) The chemical composition of the reactants is the same before and after the reaction.
(d) Mass can neither be created nor can it be destroyed in a chemical reaction.

2. Rekha dropped a metal piece A in the solution of another metal B. After some time, a new colourless compound C is formed. A, B, C respectively can be

(a) Cu, $ZnSO_4$, $CuSO_4$
(b) Mg, NaCl, $MgCl_2$
(c) Mg, $CuSO_4$, $MgSO_4$
(d) Fe, $ZnSO_4$, $FeSO_4$

3. Which of the following statements about the reaction given below are correct?

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

(i) HCl is oxidized to Cl_2.
(ii) MnO_2 is reduced to $MnCl_2$.
(iii) $MnCl_2$ acts as an oxidizing agent.
(iv) HCl acts as an oxidizing agent.

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

4. Salt 'A' commonly used in food products, is a reactant to produce salt ' *B* ', used in the kitchen for making tasty, crispy pakoras. Salt ' *B* ' on heating converts into another salt ' *C* ', which is used in the manufacturing of glass. Salts ' *A* ', ' *B* ' and ' *C* ' respectively are:

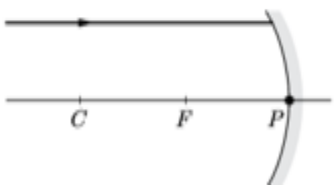
(a) $NaHCO_3$, NaCl, Na_2CO_3
(b) Na_2CO_3, $NaHCO_3$, NaCl
(c) Na_2CO_3, NaCl, $NaHCO_3$
(d) NaCl, $NaHCO_3$, Na_2CO_3

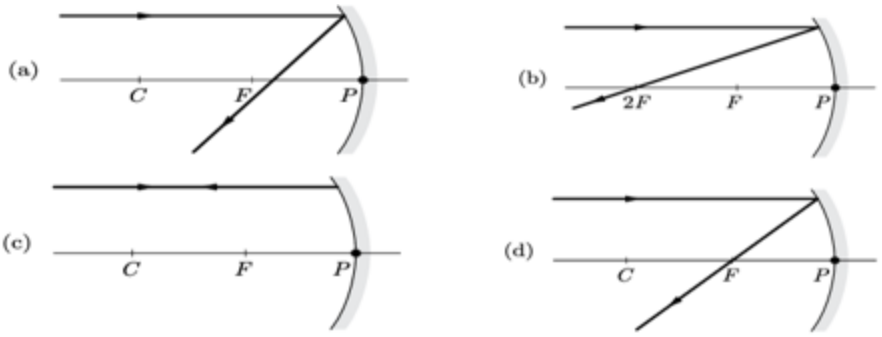
5. An aqueous solution of a salt shows an orange red colour when a drop of universal indicator is added to it. This salt is made up of:
(a) a strong acid and a strong base.
(b) a weak acid and a weak base.
(c) a strong acid and a weak base.
(d) a weak acid and a strong base.

6. Which of the following are present in a dilute aqueous solution of hydrochloric acid?
(a) H_3O^+ and Cl^-
(b) H_3O^+ and OH^-
(c) Cl^- and OH^-
(d) Unionised HCl

7. Solid Calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by the liberation of heat. From the information given above it may be concluded that this reaction
(a) is endothermic and pH of the solution formed is more than 7.
(b) is exothermic and pH of the solution formed is 7.
(c) is endothermic and pH of the solution formed is 7.
(d) is exothermic and pH of the solution formed is more than 7.

8. Which of the following ray diagrams is correct for the ray of light incident on a concave mirror as shown in the figure?





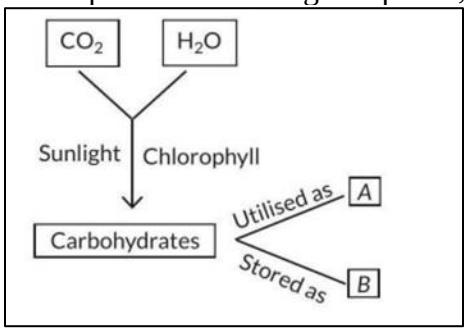
(a) Fig. (a)
(b) Fig. (b)
(c) Fig. (c)
(d) Fig. (d)

9. The focal length of the eye lens decreases when eye muscles
(a) are relaxed and lens becomes thinner.
(b) contract and lens become thicker.
(c) are relaxed and lens becomes thicker.
(d) contract and lens become thinner.

10. Mr. Ayub is suffering from malfunctioning of the pancreas.
Which of the following will be adversely affected in Mr. Ayub's body?
(a) Digestion of starch
(b) Digestion of vitamins
(c) Digestion of fats
(d) Digestion of proteins

11. The main function of lymph is to
(a) transport digested fat.
(b) returns extracellular fluid back to blood.
(c) destroys bacteria and foreign particles.
(d) all of these.

12. In the following flow chart showing autotrophic nutrition in green plants, *A* and *B* respectively are



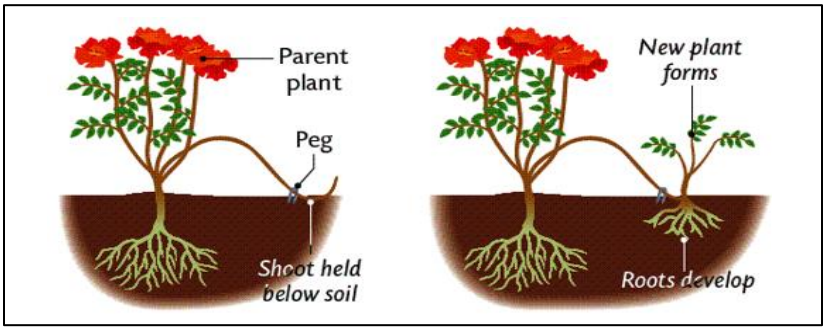
(a) oxygen and energy
(b) starch and oxygen
(c) energy and starch
(d) oxygen and water.

13. In 1987, an agreement was formulated by the United Nations Environment Programme (UNEP) to freeze the production of 'X' to prevent the depletion of 'Y'. 'X' and 'Y' respectively referred to here are:
(a) Ozone; CFCs
(b) CFCs; rays UV
(c) CFCs; Ozone
(d) UV rays; Diatomic oxygen

14. If a grasshopper is eaten by frog, then the energy transfer will be from:
(a) producer to decomposer.
(b) producer to primary consumer.
(c) primary consumer to secondary consumer.
(d) secondary consumer to primary consumer.

15. Which one of the following reproduces by multiple fission?
(a) Kala azar parasite
(b) Malaria parasite
(c) Yeast
(d) Bacteria

16. The image shows the process of vegetative propagation in a plant.
The shoot of the parent plant is pushed below the soil that results in growth of a new plant. What is the advantage of this process?



(a) This process results in plant of different flowers.
(b) This process helps grow plants without adding extra manure.
(c) This process eliminates the need of producing plant using seeds.
(d) This process allows growth of plants with new genetic composition.

For Question number **17** to **20**, two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

17. Assertion(A): The acid must always be added to water with constant stirring.
Reason(R): Mixing of an acid with water decreases the concentration of H^+ ions per unit volume.

18. Assertion(A): Refractive indices of all transparent mediums are less than 1 (except air).
Reason(R): Air is the rarest medium.

19. Assertion(A): Flow of energy in a food chain is unidirectional.
Reason(R): Energy captured by autotrophs does not revert to the solar input and it passes to herbivores.

20. Assertion(A): The rate of breathing in aquatic organisms is much slower than that seen in terrestrial organisms.
Reason(R): The amount of oxygen dissolved in water is very low as compared to the amount of oxygen in air.

SECTION B

Question no. **21** to **26** are very short answer type questions.

21. Write one example for each of decomposition reaction carried out with help of
(i) Electricity (ii) Light . (2)

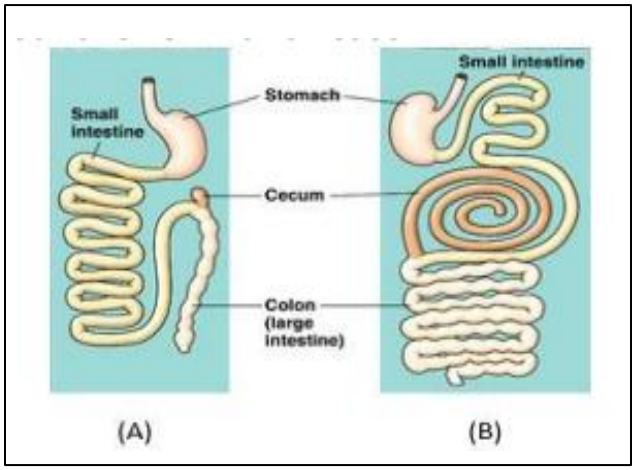
22. Explain the term 'absolute refractive index of a medium' and write an expression to relate it with the speed of light in vacuum. How does a light ray bend when it travels from
(i) a denser to a rarer medium, and (ii) a rarer to a denser medium? (2)

OR

Define the radius of curvature of spherical mirrors. Find the nature and focal length of a spherical mirror whose radius of curvature is +30cm. (2)

23. What would the sky look like if the earth had no atmosphere? Why? (2)

24. The length of the small intestine differs in various animals depending on the food they eat. Identify which of the two belongs to a carnivore and herbivore respectively. Justify your answer with a reason. (2)

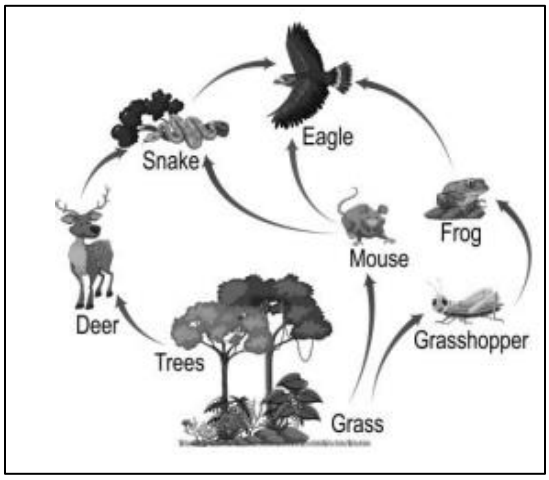


25. (a) How is a nephron involved in the filtration of blood and formation of urine?
(b) List two factors on which reabsorption of water from urine depends. (2)

26. In a food chain, producers have 10,000 Joules of energy. How much energy will be available to the primary and secondary consumers? Also, give reason in support of your answer. (2)

OR

Study the food web shown below.



(a) Identify and write the food chain from the food web shown, in which the eagle will receive the highest percentage of the energy from the producers.
(b) Which organism will be the most affected when a non-biodegradable pesticide is introduced into the soil? What is the phenomenon responsible for this called? (2)

SECTION C

Question no. **27** to **33** are short answer type questions.

27. What is observed when carbon dioxide gas is passed through lime water
(i) for a short duration?
(ii) for a long duration? Also write the chemical equations for the reactions involved. (3)

OR

A compound X which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water:
(i) Identify the compound X.
(ii) Write the chemical equation for its preparation.
(iii) For what purpose is it used in hospitals? (3)

28. What are amphoteric oxides? Give two examples. Write balanced chemical equations to justify your answer. (3)

29. (a) What is meant by magnification in the context of image formation by mirror and lenses?
(b) An object is 2 m away from a lens, which forms an erect image one-fourth the size of the object. Determine the focal length of the lens. What type of lens is this? (3)

30. (a) Why does a lemon kept in water in a glass tumbler appear to be bigger than its actual size?
(b) Study the table given below and state the medium in which light ray will travel fastest. Why?

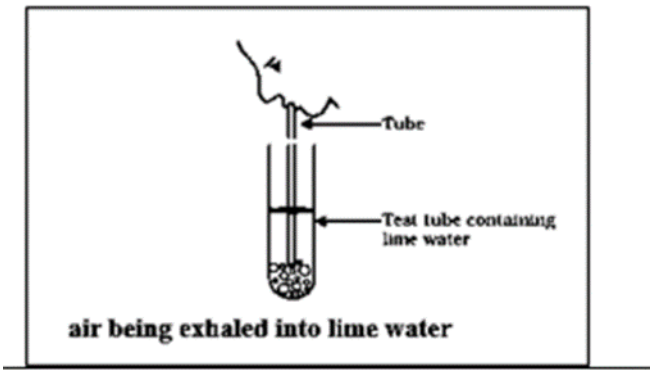
MEDIUM	A	B	C
REFRATIVE INDEX	1.33	1.5	2.0

(c) Refractive index of water with respect to air is 1.33. What is the refractive index of air with respect to water? (3)

31. A student sitting at the back seat of a class is not able to see what is written on the blackboard. He however, sees it clearly when sitting at the front seat at an approximate distance of 1.5 m from the blackboard.
(a) State the defect of vision the student is suffering from. Mention a cause of this defect.
(b) Draw ray diagrams to illustrate the image formation of the blackboard writing by his eye-lens when he is seated at the
(i) back seat
(ii) front seat. (3)

32. (a) Write two components of water conducting tissues present in plants. How does water enter continuously into the root xylem?
(b) Why do plants have low energy needs as compared to animals?
(c) State ONE difference between transpiration and translocation. (3)

33. Explain the following. (3)
(a) Role of the diaphragm in inspiration.
(b) Role of cartilage rings in trachea.
(c) Observe the diagram and comment on your findings.



SECTION D

Question no. **34** to **36** are long answer type questions.

34. Write the balanced chemical equation for the following reaction and identify the type of reaction and define it.
(i) Zinc metal is added to copper sulphate solution.
(ii) 2g of lead nitrate powder is taken in a boiling tube. The boiling tube is heated over a flame. (5)

OR

(i) On heating blue coloured powder of copper (I) nitrate in a boiling tube, copper oxide(black), oxygen gas, and a brown gas X is formed.
(a) Write a balanced chemical equation of the reaction.
(b) Identity the brown gas X evolved.
(c) What could be the pH range of the aqueous solution of the gas X?
(ii) Ferrous sulphate decomposes with the evolution of a gas having a characteristic odour of burning Sulphur. Write the chemical reaction involved and identify the type of reaction. (5)

35. Ravi took three concave mirrors of different focal lengths and performed the experiment to see the image formation by placing an object at different distances with these mirrors as shown in the following table:

Case No.	Object-distance	Focal length
I.	45 cm	20 cm
II.	30 cm	15 cm
III.	20 cm	30 cm

Answer the following questions: (5)

(a) List two properties of the image formed in Case I.

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

(c) Name the type of mirror used by dentists. Why do they use such type of mirrors?

(d) Look at the table and identify the situation (object distance and focal length) which resembles the situation in which concave mirrors are used as shaving mirrors? Draw a ray diagram to show the image formation in this case.

OR

Neethu focused the image of a candle flame on a white screen by placing the flame at various distances from a convex lens. She noted her observation in the following table:

Distance of the flame from lens (cm)	Distance of the screen from lens (cm)
60	20
40	24
30	30
24	40
12	70

Analyse the above table and answer the following questions:

(a) What is the focal length of convex lens?

(b) Which set of observation is incorrect and why?

(c) Draw a ray diagram to show the image formation for any correct set of observation.

(d) Write any two uses of convex lens. (5)

36. (a) Although Amoeba and Leishmania both show same mode of reproduction, but the process of reproduction is carried out in different ways. Identify their mode of reproduction and mention the way it is carried out in the two species.

(b) Explain budding in Hydra with the help of labelled diagrams only.

(c) Name the part of Rhizopus in which spores are formed. State the condition under which spores grow into a new individual. (5)

OR

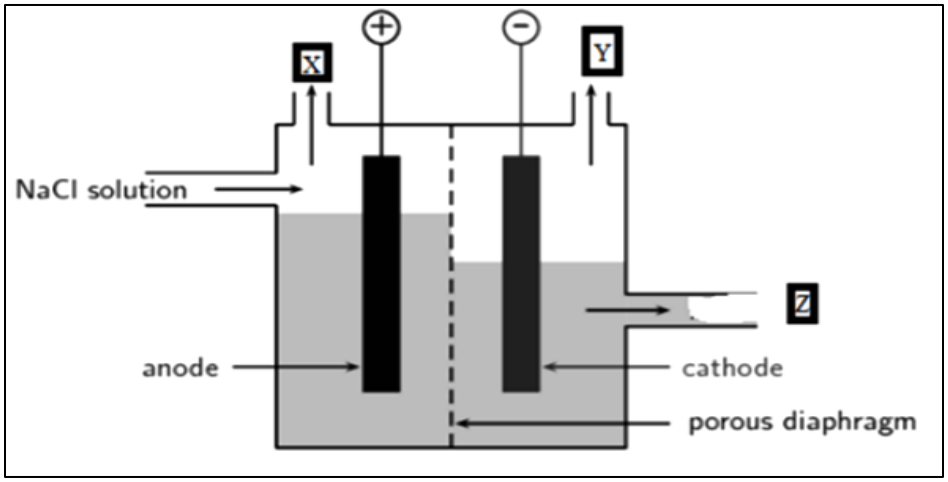
(a) On cutting the body of an organism into many pieces, it was observed that many of these pieces developed as new individuals. Name the process and list two organisms in which this process may be observed. Draw a schematic diagram to illustrate the changes that are likely to be observed during the development of new individuals in any one of the organisms named.

(b) What is vegetative propagation? List two advantages of using this technique.
(c) We can develop new plants from the leaves of Bryophyllum. Comment. (5)

SECTION E

Question no. **37** to **39** are **case-based/data-based questions** with 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. In the diagram given below when electricity is passed through an aqueous solution of a common salt, A substance 'Z' is produced along with the evolution of gases 'X' and 'Y'. When a burning matchstick is brought near the gas 'Y' it burns with a pop sound, whereas X is used for disinfecting drinking water. When gas 'X' is passed through a solution of slaked lime, an insoluble substance 'A' is produced.



(i) Name the gases 'X' and 'Y'. (1)
(ii) Write the balanced chemical equation for the formation of substance 'A'. (1)
(iii) Write your observations:
(a) if a drop of blue litmus solution is added to the aqueous solution of substance 'Z'
(b) if methyl orange is added to substance 'Z' (2)

OR

(iii) (a) What is brine?
(b) Write any two useful industrial products from common salt. (2)

38. White light is a mixture of seven colours i.e., violet, indigo, blue, green, yellow, orange and red. Every colour has its own characteristic wavelength. Different colours with their wavelengths are given below in the table.

S. No.	Colour	Wavelength
1.	Red	7900 Å
2.	Orange	6000 Å
3.	Yellow	5800 Å
4.	Green	5400 Å
5.	Blue	4800 Å
6.	Indigo	4500 Å
7.	Violet	4000 Å

(i) Name the phenomenon occurring in nature due to dispersion of light. (1)

(ii) Light of two colours 'A' and 'B' pass through a glass prism. 'A' deviate more than 'B' from its path of incidence. Which colour (A or B) has a higher speed in the prism? On which factor does the speed of light depend here? (1)

(iii) What is dispersion of white light? State its cause. (2)

OR

(iii) Draw a ray diagram to show the dispersion of white light by a glass prism. (2)

39. The heart is the main organ of your cardiovascular system, a network of blood vessels that pumps blood throughout your body. It also works with other body system to control your heart rate and blood pressure. Your family history, personal health history and lifestyle all affect how well your heart works. It is called a double circulatory system because blood passes through the heart twice per circuit. The right pump sends deoxygenated blood to the lungs where it becomes oxygenated and returns back to the heart. The left pump sends the newly oxygenated blood around the body.

(a) Name the following:

(i) The structure that prevents the backflow of blood in veins. (1)

(ii) The artery that carries impure deoxygenated blood

(b) Why do ventricles have thicker walls than atria? (1)

(c) Draw a schematic representation of transport and exchange of oxygen and carbon dioxide in human body. (2)

OR

(c) How many chambers are there in heart of Fish and reptiles? What is a key advantage of having a 4 chambered heart in human beings? (2)