B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

PRE-BOARD-3 2025-26
SCIENCE (086)
SET-II

Class: X | Time: 3 hours
Date: 15.01.26 | Max Marks: 80
Admission no: | Roll no:

General Instructions:

(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.
(ii) 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 (Biology) **Marks**

1 The readymade food is absorbed by a few organisms. In which of the following organisms is it done? 1
A. Amoeba B. Rhizopus C. Paramoecium D. Cuscuta

2 Identify the option with its correct function. 1
A. Valves- ensure backflow of the blood to the atrium.
B. Septum- separates right and left chambers of the heart.
C. Ventricle- upper chamber of the heart with thin muscular walls.
D. Capillary- a thick blood vessel that takes from the heart to the body parts.

3 Upon receiving a signal, the dendrite tip of a nerve cell sets off a chemical reaction that 1
A. creates a chemical impulse in the dendrite, cell body and axon.
B. creates an electric impulse in the next neuron.
C. releases some chemicals in the nerve ending of the neuron.
D. creates a stimulus

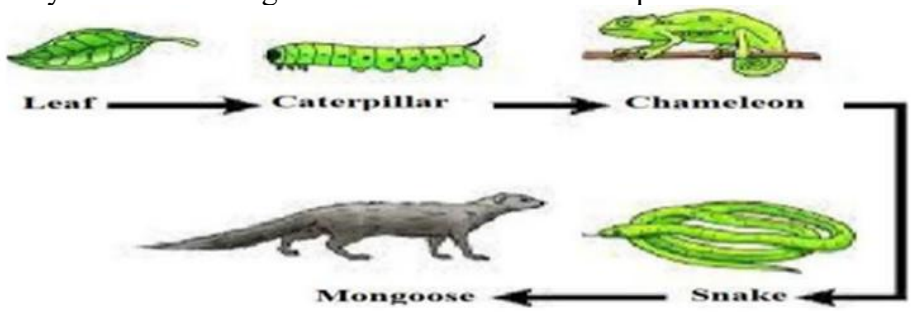
4 Which of the following statements are true about the brain? 1
(i) The main thinking part of the brain is cerebrum.
(ii) Centres of hearing, smell, memory, sight, etc, are located in the mid-brain.
(iii) Voluntary actions like salivation, vomiting, and blood pressure are controlled by
the medulla in the hind brain.
(iv) The cerebellum controls the posture and balance of the body.
A. (i) and (ii)
B. (i), (ii) and (iii)
C. (ii) and (iii)
D. (i) and (iv)

5 If pea plants with tall and green seeds (TTyy) are crossed with pea plants having short and yellow seeds (ttYY), the seeds developed by the plants of F1 generation will be: 1
A. 100% tall and yellow B. 75% short and green
C. 75% short and yellow D. 50% tall and green

6 The manufacturing of chlorofluorocarbons free refrigerators is mandatory throughout the world. 1
How does this help prevent ozone depletion?
A. This will help convert oxygen molecules into ozone.

B. This will help convert the CFCs into ozone molecules.
C. This will reduce the production of CFCs from oxygen molecules.
D. This will reduce the release of CFCs that react with ozone molecules.

7 Study the food chain given below and answer the questions that follow: 1



If the amount of energy available at the fourth trophic level is 10 joules, then how much energy will be available at the first trophic level?

A. 10 joules B. 2000 joules C. 10000 joules D. 100000 joules

The following question consists 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.

8 Assertion(A): In a food chain, the flow of energy is unidirectional. 1
Reason(R): At each trophic level, part of the energy is lost as heat.

9 Assertion (A): Biomagnification results in the maximum accumulation of harmful chemicals at the top trophic level. 1
Reason(R): Biomagnification is due to the presence of biodegradable substances at each level.

10 In a well-balanced forest ecosystem, a simple food chain is observed. The chain begins with grass, which is eaten by grasshoppers, which are then consumed by frogs, and finally, snakes prey on the frogs. What would happen to the ecosystem if the population of snakes decreased significantly? 2

11 Students to attempt either option A or B. 2
A.i. Name two excretory products other than O2 and CO2 in plants.
ii. What is the first step in the breakdown of glucose in anaerobic respiration? Name the organism that respires anaerobically.
OR
B. Lymph has a similar composition as that of blood. How does it differ in its function? Mention any one function of it.

12 Finger-like projections are playing an important role in the process of digestion. Explain its role in the small intestine and large intestine? 2

13 Name the hormone responsible for the bending of the shoot and explain how it works. Name the hormone which is a growth inhibitor. 3

14 A. "A trait may be inherited, but may not be expressed". Justify this statement with the help of a suitable example. 3
B. In a dihybrid cross, if 800 plants were obtained in F_2 progeny, write the number of plants having traits:
i) Round seeds with white flowers
ii) Wrinkled seeds with white flowers

15 From the given diagram, identify the parts that perform the following functions: 4
Attempt either subpart A or B.
A. Part where digestion is completed. Explain how it is done.

OR

B. Explain how pepsin and trypsin are different in their action?

C. How can the presence of starch be detected in the food item?

D. Name the secretion and the part which releases the juice that helps in the emulsification of fats.

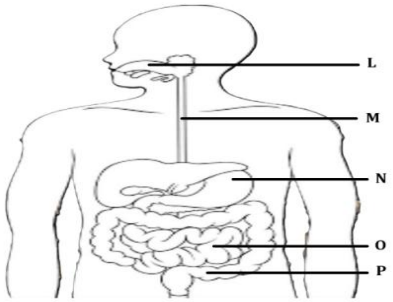


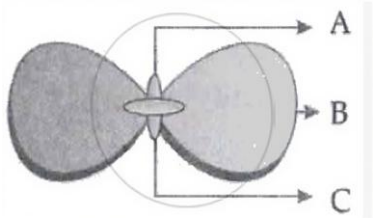
Figure: Human Alimentary canal

16 Attempt either option A or B. 5

A. i) Differentiate between unisexual and bisexual flower with an example.

ii) Identify 'B' and mention it's function?

iii) Label 'A' and 'C'and write it's function.



OR

B. A student is comparing regeneration, fragmentation, and budding in different organisms. The student wants to know how each method works in different environments and how it benefits the species.

(i) Compare the processes of fragmentation and regeneration.

(ii) How is the process of regeneration is different from sexual reproduction?

(iii) Complex organisms cannot give rise to new individuals through regeneration. Give reasons.

(iv) How can these asexual methods be advantageous to these organisms?

Section-B (Chemistry)

17 Which of the following is a neutralisation reaction? 1

(a) $NaOH + HCl \rightarrow NaCl + H_2O$

(b) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

(c) $AgNO_3 + HCl \rightarrow AgCl + HNO_3$

(d) $CaCO_3 \rightarrow CaO + CO_2$

18 Which acid is present in curd? 1

(a) Acetic acid (b) Lactic acid (c) Citric acid (d) Oxalic acid

19 Which of the following is the functional group in ethanoic acid? 1

(a) –COOH (b) –CHO (c) –OH (d) –CO–

20 Which metal reacts with cold water? 1

(a) Sodium (b) Iron (c) Copper (d) Aluminium

21 Which of the following metals is the poorest conductor of heat? 1

(a) Iron (b) Silver (c) Lead (d) Mercury

22 Which gas is released when a metal carbonates reacts with an acid? 1

(a) Oxygen (b) Nitrogen (c) Hydrogen (d) Carbon dioxide

23 How many single bonds present in Ethane (C2H6)? 1

(a)4 (b) 5 (c) 6 (d) 7

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24 **Assertion (A):** Carbon forms a large number of compounds because it shows catenation 1

Reason (R): Carbon has tendency to join with other elements easily.

25 With the help of an example explain what happens when a base reacts with a non-metallic oxide. What do you infer about the nature of non-metal oxide? 2

26 Lead nitrate solution is added to a test tube containing potassium iodide solution. 3

(a) Write the name and colour of the compound precipitated.

(b) Write the balanced chemical equation for the reaction involved.

(c) Name the type of this reaction justifying your answer

27 State what would happen if: 3

(i) some zinc pieces are placed in blue copper sulphate solution.

(ii) some'copper pieces are placed in green ferrous sulphate solution.

(iii) an iron nail is dipped in a solution of copper sulphate for some time.

OR

(i) By the transfer of electrons, illustrate the formation of bond in magnesium chloride and identify the ions present in this compound.

(ii) Ionic compounds are solids. Give reasons.

(iii) With the help of a labelled diagram show the experimental set up of action of steam on a metal.

28 Case Base Question 4

There are so many important compounds known, which have some characteristic properties like Bleaching powder used as an disinfectant, POP used for joining fractured bones, Baking powder used for making dhoklas and baking cake, Sodium chloride as a table salt etc. These properties make these compounds very useful in our daily routine.

1.Bleaching powders chemical name is

(a) calcium fluoride (b) calcium oxychloride

(c) calcium chloride (d) calcium chloro oxide

2. The ratio of the water molecule in plaster of paris and gypsum is

(a) 3:1 (b) 1:3 (c) 1:4 (d) 4:3

3. Baking powder is

(a) sodium carbonate + sodium tartaric (b) sodium bicarbonate + tartaric acid

(c) sodium carbonate + tartaric acid (d) sodium carbonate + sodium benzoate

4. In the chlor alkali process H_2 gas liberated at:

(a) Cathode(b) Anode (c) in the solution (d) None

OR

4. The compound formed when POP combines with water: (a) Quicklime (b) Soda lime (c) Gypsum (d) Bleaching powder

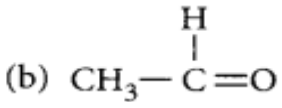
29 Attempt either option A or B. 5

A. (I)Write the next homologue of each of the following:

(i) C_2H_4 (ii) C_4H_6

(II)Name the following compounds :

(a) $CH_3 - CH_2 - OH$

(b) 

(III) Select saturated hydrocarbons from the following:
C3H6; C5H10; C4H10; C6H14; C2H4

B.(I) Write the name and structure of an alcohol with three carbon atoms in its molecule.
(II)Write the name and structure of ketone with four carbon atoms in its molecule.
(III) Draw the structures of possible isomers of butane, C4H10.

Section-C (Physics)

30 One end of a wire carrying current in the downward direction is placed in a trough containing mercury (so that the direction of force experienced by it is clearly visible). Two pole pieces N and S are placed on each side as shown in the diagram (so as to provide a uniform magnetic field). 1

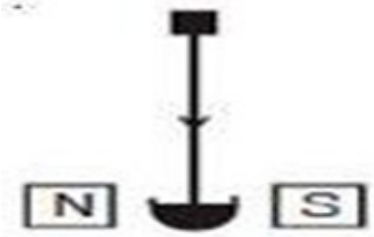
What is the direction of force experienced by the wire?

a) Away from the observer

b) Constant position

c) Upward from the observer

d) Towards the observer



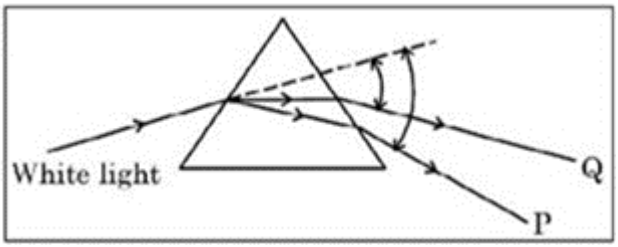
31 In the following diagram showing dispersion of white light by a glass prism, the colours P and Q respectively are - 1

a) Violet and red

b) Orange and Green

c) Red and blue

d) Red and Violet



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32 **Assertion** (A): Two bar magnets attract when they are brought near to each other with the same pole. 1
Reason (R): Unlike poles will attract each other.

33 An object 5 cm in length is placed 25 cm away from a convex lens of focal length 10 cm. A. Use the lens formula to calculate the image distance. 2

(a) Find the size of the image using magnification.
(b) State the nature of the image

34 <u>Attempt either option A or B.</u> 2

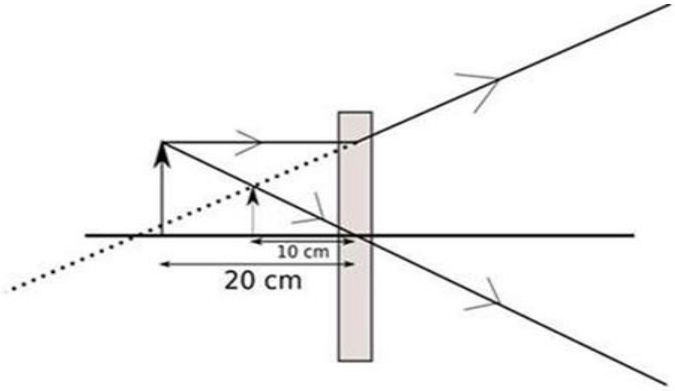
(A) A potential difference of 220 V is applied across a resistance of 440 Ω in an electric appliance.

(i) Find the current.
(ii) Heat energy produced is 30s.

OR

Several electric bulbs designed to be used on a 220V electric supply line are rated 10W. How many lamps can be connected in parallel with each other across the two wires of 220V line if the maximum allowable current is 5A?

35 3



The above image shows the formation of an image with an optical instrument.

A. Identify the optical instrument (shown schematically as a rectangle) in the image.

B. What type of image is formed in this case?

Based on the measurements given in the image, calculate the focal length of the instrument.

36 Two identical resistors are first connected in series and then in parallel, find the ratio of equivalent resistance in two cases. 3

37 (i). A current through a horizontal power line flows in the east to west direction. What is the direction of the magnetic field at a point directly below it and at a point directly above it? 3
(ii) List two methods of producing magnetic fields.

38 The spherical mirror is a special type of mirror which forms different types of images when the object is placed at different locations, when the image is formed on screen, it is real and when the image is not formed on the screen it is virtual. When two reflected rays meet actual, the image is real and when the y appear to meet the image is virtual. 4

A convex mirror always forms a virtual and erect image for all positions of the object. A concave mirror forms a real and inverted image for different positions of the object but when the object is placed between focus and pole, it forms a virtual and erect image. A concave mirror is used as a doctor's head mirror to focus light on the body parts, like eyes, ears, nose etc; to be examined because it can form an erect and magnified image of the object. The convex mirror is used as a rare view mirror in automobiles because it can form a small and erect image of the background.

(i) What is the difference between real and virtual images?

(ii) Why does a convex mirror have a wider field of view?

(iii) Why is a concave mirror used by doctors during examinations of body parts like eyes, ears and nose?

OR

Explain why convex mirrors are used as rare view mirrors in automobiles?

39 Attempt either option A or B. 5

A household uses the following electric appliances of rating 18 W each for 6 hours daily.

(i) refrigerator of rating 400 W for 10 hours each day.

(ii) two electric fans of rating 80 W each for 6 hours daily.

(iii) six electric tubes of rating 18 W each for 6 hours daily

Calculate the electricity bill for the household for the month of June, if the cost of electrical energy is Rs.3 per unit.

OR

B. i) The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given below:

I (ampere) 0.5 1.0 2.0 3.0 4.0

V (volt) 1.6 3.4 6.7 10.2 13.2

Plot a graph between V and I and calculate the resistance of the resistor.

ii) State the law related to the above situation.

**********ALL THE BEST**********