Delhi Public School, Howrah

PREBOARD EXAMINATION (2024-2025)

Class-X

Care must be taken not to write anything on the question paper. All the questions must be attempted in the correct sequence.

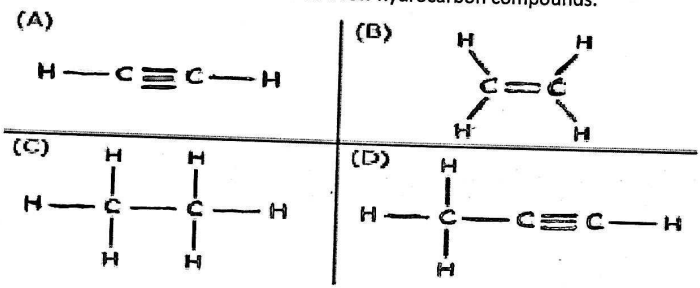
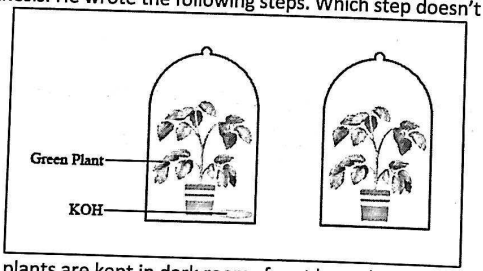
Subject:- Science (Code No. 086)

Time: -3 Hours **F.M.-80**

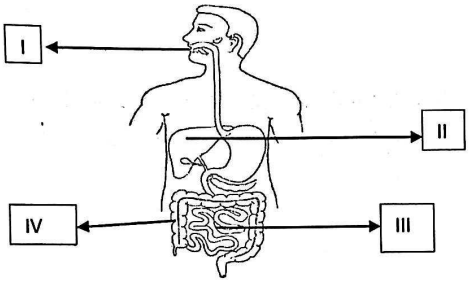
General Instructions:

1. All questions are compulsory. However, an internal choice of approximately 33% is provided. 50% marks is allotted to competency-based questions.
2. Section A have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B have 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C have 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D have 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

	SECTION A **Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.**	
Q. No.	**Questions**	**Marks**
1.	A student adds lead and silver to two different test tubes containing an equal amount of Copper Sulphate solution. The student observes that the colour of the solution in the test tube with lead changes. Which of the following explains the change in the colour of the solution? (a) A displacement reaction takes place as lead replaces copper from the solution. (b) A combination reaction takes place as lead combines with sulphate in the solution. (c) Decomposition reaction takes place as copper dissociates from sulphate in the solution. (d) A double displacement reaction takes place as copper dissociates from sulphate and lead combines with sulphate in the solution.	1
2.	We store silver chloride in dark colored bottles because it is (a) A white solid (b) Undergoes redox reaction (c) To avoid action by sunlight (d) (b) & (c) both	1
3.	When you clean a metal vessel with tamarind the reaction taking place is: Metal oxide + X → Salt+ Water. What is X here? (a)Acid (b)Base (c)Hydrogen (d)Carbon dioxide	1

4.	Brine is an (a) aqueous solution of sodium hydroxide (b) aqueous solution of sodium carbonate (c) aqueous solution of sodium chloride (d) aqueous solution of sodium bicarbonate	1
5.	$Al_2O_3 + 2NaOH \rightarrow$ 'X' + H_2O. Select the correct option from the following that correctly represents x. (a) $Al(OH)_3$ (b) Na_2O (c) $NaAlO_2$ (d) Na_2AlO_2	1
6.	Which of the following are not ionic compounds? (i) KCl (ii) HCl (iii) CCl_4 (iv) NaCl (a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iii)	1
7.	The image represents the structure of a few hydrocarbon compounds.  Which of these compounds can be classified as alkynes? (a) Only (A) (b) Only (B) (c) Both (A) and (D) (d) Both (B) and (C)	1
8.	A student was asked to write a stepwise procedure to demonstrate that carbon dioxide is necessary for photosynthesis. He wrote the following steps. Which step doesn't belong to this experiment?  a. Both potted plants are kept in dark rooms for at least three days. b. Bottom of the bell jars is sealed to make them air tight. c. Both potted plants are kept in sunlight after the starch test. d. A leaf from both the plants is taken to test the presence of starch.	1

9. Observe the given diagram of human digestive system. 1



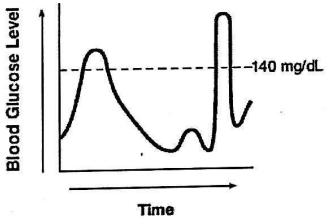
Match the labelling referred in column I and correlate with the description in column II.

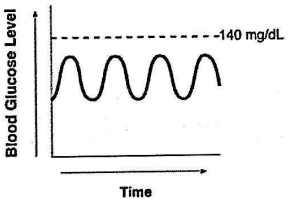
Column I	Column II
(I)	A. The length of this depends on the food the organism consumes.
(II)	B. Initial phase of starch digestion.
(III)	C. Removes toxic substances from the blood.
(IV)	D. This is the site of complete absorption of water.

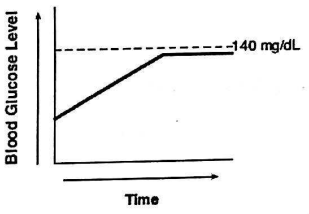
a.(I)-(A), (II)-(B), (III)-(C),(IV)-(D)
b.(I)-(B), (II)-(C), (III)-(A), (IV)-(D)
c.(I)-(C), (II)-(B), (III)-(A), (IV)-(D)
d.(I)-(A), (II)-(B), (III)-(D), (IV)-(C)

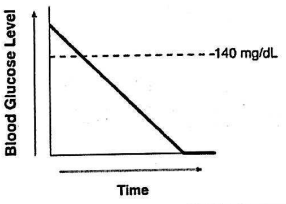
10. Respiratory structures vary for different animals. Fishes use gills for respiration and we respire using minute structures called alveoli. Select one characteristic that hold true for both of them.
a. Both are placed externally in the body of animal.
b. Both are poorly supplied with blood vessels to conserve energy.
c. In both blood returns to the heart after being oxygenated.
d. Both have thin and moist surface for gaseous exchange.

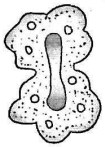
11. The blood glucose range for a healthy adult is 65-104 mg/dL. Which of the following graph best illustrates normal blood glucose levels in a healthy adult over the course of a day? 1

a.


b.


c.


d.


12.	Slides A and B were examined and interpreted by four students as a,b,c and d. Identify the correct option.  SLIDE A  SLIDE B	1

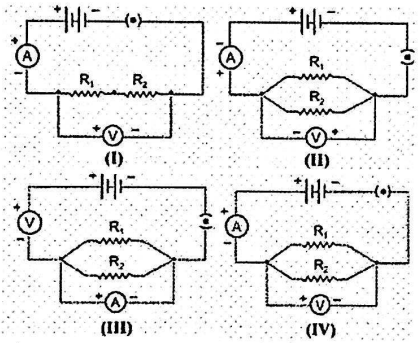
SLIDE A	SLIDE B
a. Binary fission in *Amoeba*	Daughter cell of *Amoeba*
b. Budding in yeast	Buds of yeast
c.Binary fission in *Amoeba*	Daughter cells of *Hydra*
d.Multiple fission in *Plasmodium*	Daughter cells of *Plasmodium*

13. An experiment to trace the path of a ray of light through a glass slab was performed by four students I, II, III and IV. They reported the following measurements of angle of incidence i, angle of refraction r and angle of emergence e. Which one of the students has performed the experiment correctly? **1**

Student	Angle i	Angle r	Angle e
I	60°	35°	59°
II	45°	40°	40°
III	35°	30°	40°
IV	50°	55°	50°

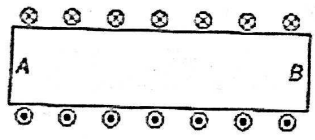
(a) Student III
(b) Student II
(c) Student I
(d) Student IV

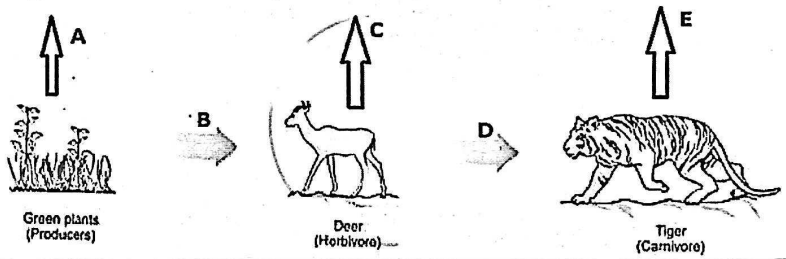
14. Following circuits were drawn by four students, to determine the equivalent resistance of two resistors when connected in parallel. **1**

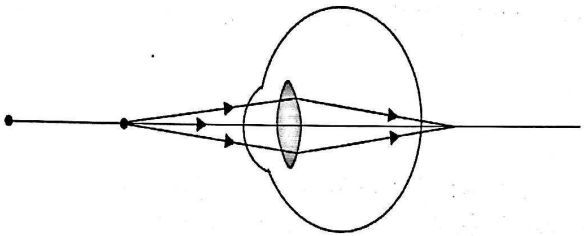
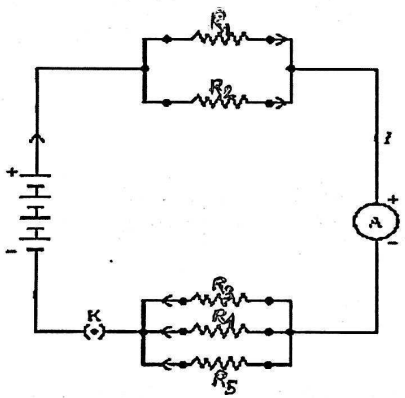


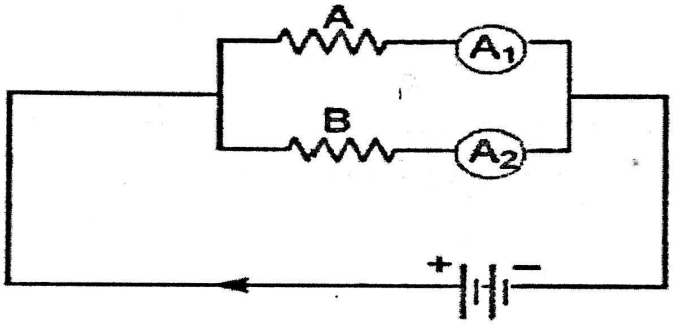
The correct circuit is drawn by -
(a) student III
(b) student IV
(c) student I
(d) student II

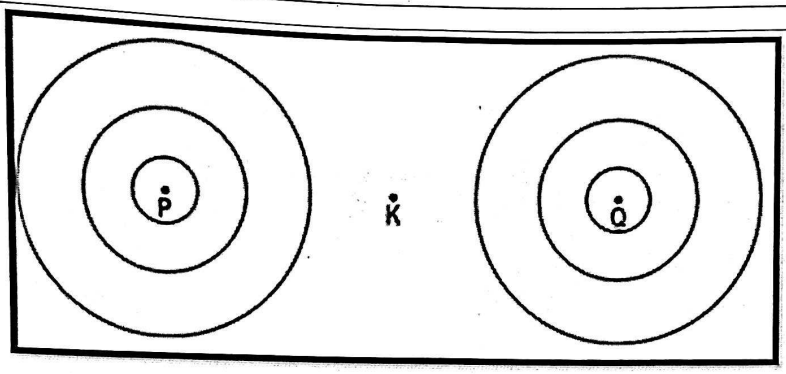
15. The manufacturing of chlorofluorocarbons free refrigerators is mandatory throughout the world. How does this help prevent ozone depletion? **1**
a. This will help convert oxygen molecules into ozone.

	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 reacts with ozone molecules.	
16.	What will happen if deer is missing from the following food chain? Grass → Deer → Tiger a. The population of tiger will increase. b. Tiger will start eating grass. c. The population of grass decrease. d. Population of tiger decrease and grass increases.	1
	Question No. 17 to 20 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**	
17.	**Assertion (A):** If the first member of a homologous series is methanal, its third member will be propanal. **Reason (R):** All the members of a homologous series follow same nomenclature rule.	1
18.	**Assertion(A):** The offspring produced by sexual reproduction is likely to adjust better in environmental fluctuation. **Reason (R):** During the fusion of gametes there is mixing of genetic material from two parents.	1
19.	**Assertion (A):** The magnetic field intensity at the centre of a circular coil carrying current changes, if the current through the coil is doubled. **Reason (R):** The magnetic field intensity is dependent on current in conductor.	1
20.	**Assertion (A):** Food chain is responsible for the entry of harmful chemicals in our bodies. **Reason(R):** The length and complexity of food chains vary greatly.	1
	SECTION B **Question No. 21 to 26 are very short answer questions**	
21.	Lead nitrate solution is added to a test tube containing potassium iodide solution. (a) Write the name and colour of the compound precipitated. (b) Write the balanced chemical equation for the reaction involved.	2
22.	Plants use completely different process for excretion as compared to animals. Justify this statement mentioning the different processes used by plants and animals.	2
23.	**Attempt either option a or b.** a. Mammals have four chambered heart but amphibians have three chambered heart. Justify the statement based on the difference in the number of chambers in the heart. **OR** b. A patient was suffering from kidney infection and both his kidneys are damaged. What could be the possible solution to this situation? Explain.	2
24.	The diagram given below shows the lengthwise cross-section of a current carrying solenoid.  ⊗ Indicates current entering into the page. ⊙ Indicates current emerging out the page.	2

	(a) Identify which end of the solenoid A or B, will behave as the North pole. Give reason for your answer. (b) Also, draw field lines inside the solenoid.	
25.	An electric lamp of resistance 100 ohms, a toaster of resistance 50 ohms and a water filter of resistance 500 ohms are connected in parallel to a 220V source. An electric iron if connected to the same source will take as much current as is taken by all the three appliances together. What is the resistance of the electric iron and what is the current through it? **OR** Current I flowing through a resistor result in dissipation of power P. By what percentage will the power dissipated in the resistor increase, if the current through the resistor is increased by 50 percent?	2
26.	In the following food chain, vertical arrows indicate the energy lost to the environment and horizontal arrows indicate energy transferred to the next trophic level. Which one of the three vertical arrows (A, C and E) and which one of the two horizontal arrows (B and D) will represent more energy transfer? Give reason for your answer.  	2
	SECTION C **Q.no. 27 to 33 are short answer questions.**	
27.	(a) Write the balanced chemical equation for the reaction that occurs when zinc reacts with NaOH. (b) Write a test to confirm the presence of the gas evolved during this reaction.	3
28.	**Attempt either option (a) or (b).** (a) Give reason for the following: i) Hydrogen gas is not evolved when most of the metals react with nitric acid. ii) Sodium oxide is not considered as an amphoteric oxide. iii) Metals conduct electricity. **OR** (b) Answer the following: (i) Write two properties of gold which make it the most suitable metal for ornaments. (ii) Name a metal which melts when you keep them on your palm. (iii) Explain the formation of ionic compound CaO with electron-dot structure. Atomic numbers of calcium and oxygen are 20 and 8 respectively.	3
29.	a. Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of flowchart. b. In the process of respiration, state the function of alveoli.	3
30.	A green stemmed rose plant denoted by GG and a brown stemmed rose plant denoted by gg are allowed to undergo a cross with each other. a. List your observations after performing the cross regarding : (i) Colour of stem in their F_1 progeny (ii) Percentage of brown stemmed plants in F_2 progeny if plants are self pollinated. (iii) Ratio of GG and Gg in the F_2 progeny. b. Based on the findings of this cross, what conclusion can be drawn?	3

31.	(i) Draw a ray diagram to show the formation of image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus. (ii) In the above ray diagram mark the object distance (u) and the image distance (v) with their proper signs (+ ve or - ve as per the sign convention) and state how these distances are related to the focal length (f) of the convex lens in this case. (iii) Find the power of convex lens which forms a real and inverted image of magnification -1 of an object placed at a distance of 20 cm from its optical centre.	3
32.	Study the diagram given below and answer the questions that follow it:  (a) Which defect of vision is represented in this case? Give reason for your answer. (b) What could be the two causes of this defect? (c) With the help of a diagram show how this defect can be corrected by the use of a suitable lens.	3
33.	If $R_1 = 10\ \Omega$, $R_2 = 40\ \Omega$, $R_3 = 30\ \Omega$, $R_4 = 20\ \Omega$, $R_5 = 60\ \Omega$ and a 12 V battery is connected as shown in the fig, calculate:  (a) the total resistance in the circuit. (b) the total current flowing in the circuit. (c) What should the resistance of the ammeter ideally be in this circuit? Justify your answer.	3
	SECTION-D **Q.no. 34 to 36 are long answer questions.**	
34.	(a) State two properties of carbon which lead to a very large number of carbon compounds. (b) An aldehyde as well as a ketone can be represented by the same molecular formula C_3H_6O. Write their structures and name them. State the relation between the two in the language of science. (c) Name the process by which unsaturated fats are changed to saturated fats. **OR**	5

	3 mL of ethanol is taken in a test tube and warmed gently in a water bath. A 5% solution of alkaline potassium permanganate is added first drop by drop to this solution, then in excess. (a) State the role of alkaline potassium permanganate in this reaction. (b) What happens on adding it in excess? (c) Write chemical equation of this reaction.	
35.	**Attempt either option a or b** a. i. Give reasons for the following: A. Placenta is extremely essential for foetal development. B. Uterine lining becomes thick and spongy after fertilization. ii. Draw diagrams to show the method of reproduction in *Hydra*, *Rhizopus* and *Planaria*. **OR** b. i. A. State one drawback of each of the following: Oral contraceptive pill and Copper T. B. Under which category of contraceptive methods, the use of condoms kept? In what way, use of condoms is better as compared to other methods of contraception? ii. Draw a well labelled diagram showing the germination of pollen on stigma.	5
36.	**Attempt either option A or B.** **A.** Rahima was investigating a circuit for her school project. She wanted to demonstrate the effect of length on the resistance of a conductor. The following is the given circuit with resistors A and B that are made up of the same metal and of the same thickness but 'A' is twice as long as 'B'. The total current in the circuit is 6 A and the Voltage of the battery is 12 V.  (i) What will be the resistance in the circuit? (ii) Determine the value of 'R_A' and 'R_B'. (iii) Determine the current in both the ammeters. Will the current in 'A_1' and 'A_2' be the same? Justify your answer. (iv) What are the factors affecting the resistivity of a conductor? **OR** **B.** P and Q represent two straight wires carrying equal current (I) in a direction perpendicular to the plane of the screen outwards. K is the midpoint of the line joining P and Q. The image shows the magnetic field lines around the wire. But the direction of the magnetic field is not marked.	**1+1+2 +1** **2+1+1 +1**



(i) Draw the above image and mark the direction of the magnetic field.
(ii) If the current in the wires is increased, how will the strength of the magnetic field around P and Q change? Draw the magnetic field lines around P and Q to represent this change.
(iii) If B is the magnetic field at point K due to the current in wire P, what will be the magnetic field due to P and Q at the midpoint K? Give a reason for your answer.
(iv) If B is the magnetic field at point K due to the current in wire P and the current in wire Q is reversed, what will be the magnetic field at midpoint K?

SECTION - E

Question No. 37 to 39 are case-based/data -based questions

37. Maya's mother is a chemistry teacher who loves explaining chemical reactions through everyday examples. One day, Maya observed various activities in her kitchen and garden, which her mother used as teaching opportunities to explain different types of chemical reactions. **4**

(a) During a cooking demonstration, Maya observed that when baking soda ($NaHCO_3$) was added to vinegar (CH_3COOH), bubbles were formed and the mixture fizzed.
i) Identify the type of reaction taking place.
ii) Write the balanced chemical equation for this reaction.

Attempt either subpart (b) or (c).

(b) Maya found an old silver spoon that had turned black. Her mother explained that this was due to the formation of silver sulfide (Ag_2S).
i) What type of chemical reaction caused the blackening?
ii) Write the balanced chemical equation for this reaction.

OR

(c) While cleaning her brass doorknobs, Maya noticed they had developed a greenish coating. Her mother explained this was basic copper carbonate [$CuCO_3 \cdot Cu(OH)_2$].
i) Explain the type of reaction occurring and why it happens.
ii) If Maya uses vinegar (CH_3COOH) to clean the doorknobs, what type of reaction occurs? Write the balanced equation.

38. Given below is the test report of an individual related to blood thyroxine levels. Study the table and answer the questions that follows: **4**

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www.drlogy.com

Yash M. Patel
Age : 21 Years
Sex : Male
PID : 555

Sample Collected At:
12A, Shivam Bungalow, S G Road,
Mumbai
Ref. By: Dr. Hiren Shah

Registered on: 02 31 PM 07 Dec, 2X
Collected on: 03 11 PM 02 Dec, 2X
Reported on: 04 35 PM 02 Dec, 2X

THYROID PROFILE, TOTAL

Investigation	Result		Reference Value	Unit
T3, TOTAL, SERUM CLIA	317.40	High	80.00 - 200.00	ng/dL
T4, TOTAL, SERUM CLIA	13.60	High	4.50 - 12.50	mcg/dL
TSH CLIA	10.10	High	0.40 - 4.00	mU/L

Note :
1. TSH levels are subject to circadian variation, reaching peak levels between 2 - 4.a.m. and at a minimum between 6-10 pm . The variation is of the order of 50% . hence time of the day has influence on the measured serum TSH concentrations
2. Alteration in concentration of Thyroid hormone binding protein can profoundly affect Total T3 and/or Total T4 levels especially in pregnancy and in patients on steroid therapy
3. Unbound fraction (Free,T4 /Free,T3) of thyroid hormone is biologically active form and correlate more closely with clinical status of the patient than total T4/T3 concentration
4. Values <0.04 mU/L need to be clinically correlated due to presence of a rare TSH variant in some individuals

Thanks for Reference
End of Report

Medical Lab Technician
(DMLT, BMLT)

Dr. Payal Shah
(MD, Pathologist)

Dr. Vimal Shah
(MD, Pathologist)

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Sample Collection 0123456789

Attempt either subpart a or b.

a. What conclusion regarding the health of the patient can be drawn from the test report?

OR

b. Doctors advised him more salty diet. Give reason for such diet suggestion made by the doctors.

c. Which gland is responsible for releasing the hormones mentioned in the report. Mention the location of the gland.

d. Explain feedback mechanism in relation to the mentioned hormone in the given report.

39. Study the data given below showing the focal length of three concave mirrors A,B and C and the respective distances of objects placed infront of the mirrors: **4**

Case	Mirror	Focal length(cm)	Object distance(cm)
1	A	20	45
2	B	15	30
3	C	30	20

(i) In which one of the above cases the mirror will form a diminished image of the object? Justify your answer.

(ii) List two properties of the image formed in case 2.

(iii) **Attempt either subpart a or b.**

a. What is the nature and size of the image formed by mirror C? Draw a ray diagram to justify your answer.

OR

b. An object is placed at a distance of 18 cm from the pole of a concave mirror of focal length 12 cm. Find the position of the image formed in this case.