KENDRIYA VIDYALAYA SANGATHAN CHENNAI REGION
SECOND PRE-BOARD EXAMINATION 2025-26
SCIENCE (086)
CLASS – X

Max. Marks: 80 Time : 3 hours

General Instructions:

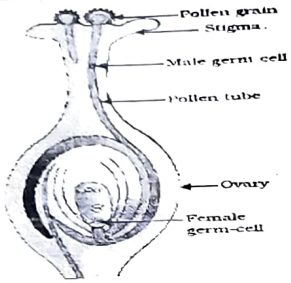
(i) This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.

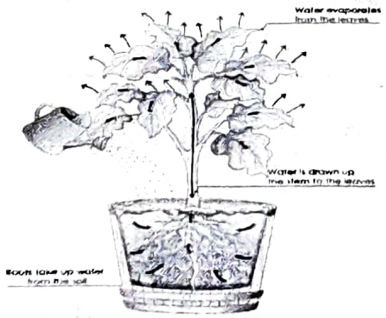
(ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

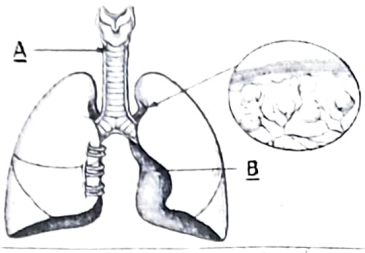
(iii) Student will divide the answer book in three sections A,B and C

(iv) Reply of questions are to be written only within the space identified for concern section only .

(v) In case replies are mixed these will not be evaluated and no marks will be awarded.

Q.no	SECTION A	MM
1.	 **Figure 7.8** *Germination of pollen on stigma* If the process shown in the diagram is successful, the Ovary will typically develop into the _____ and the ovule (containing the female germ-cell) will develop into the _____. A. Seed ,fruit B. Stigma, pollen grain C. Seed , fruit D. Fruit , seed	1
2.	During a biology lesson, a teacher explains that the human body continuously produces metabolic waste products that need to be efficiently removed from the blood to maintain good health. She describes a specific microscopic structural and functional unit within the kidneys that is solely responsible for filtering blood, removing waste substances like urea and excess salts, and reabsorbing essential nutrients. Which of the following best identifies this crucial filtration unit? A. Nephron B. Urinary bladder C. Urethra D. Ureter	1
3.	Which of the following statements is true about guard cells? A. They control stomatal movement by changing their shape through water loss or gain. B. They actively pump out oxygen to open the stomata. C. They close stomata by absorbing carbon dioxide. D. They transport food from leaves to other plant parts.	1
4	In pea plants, The dominant allele (T) for tallness ensures the tall phenotype primarily by: A. Inhibiting the function of the recessive allele (t) directly. B. Creating more ribosomes for faster general protein synthesis C. Coding for a highly efficient enzyme to maximize the production of plant growth hormone. D. Directly causing a greater uptake of water and minerals by the roots.	1

5.	 Which of the following correctly identifies the sequence of components involved in the transmission of the nerve impulse shown in the diagram? A. Receptors→Motor neuron → Spinal cord→ Sensory neuron→ Effector B. Effector → Sensory neuron → Spinal cord → Relay neuron → Receptors C. Receptors→ Sensory neuron → Relay neuron → Motor neuron → Effector D. Sensory neuron → Spinal cord → Motor neuron → Effector → Receptors	1
6.	A society decides to implement a two-bin system for waste disposal: Green Bin for biodegradable waste and Blue Bin for non-biodegradable waste. Which of the following items would be correctly placed in the Green Bin? A. Aluminum can, discarded clothing (cotton), and old newspapers. B. Plastic bottle, fruit peels, and broken glass. C. Waste tea leaves, paper napkins, and egg shells. D. Expired medicine, old batteries, and vegetable scraps.	1
	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.	
7.	**Assertion (A):** The flow of energy in an ecosystem is always unidirectional. **Reason (R):** The energy captured by the autotrophs (producers) does not revert to the solar input, and the energy that passes to herbivores does not come back to producers.	1
8.	**Assertion (A):** The father is solely responsible for determining the sex of the child. **Reason (R):** The mother contributes only the X chromosome to the offspring, whereas the father can contribute either an X or a Y chromosome.	1
9.	 A. Identify the two different processes that drive the upward movement of water in plants. B. Identify the vascular tissue responsible for translocation in plants and state whether its transport of food is unidirectional or bidirectional.	2
10.	***Attempt either option A or B.***	2



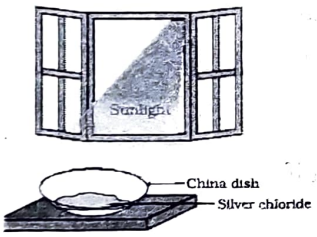
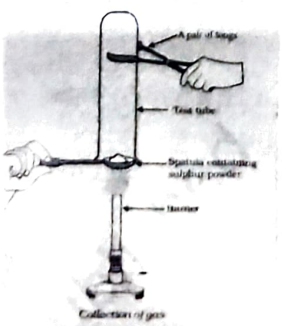
A. (a) In the human respiratory system, what is the structure that ensures that structure A does not collapse when air is not being inhaled or exhaled?
(b)What crucial process happens at structure B (Alveoli), and why is its wall structure necessary for this process?

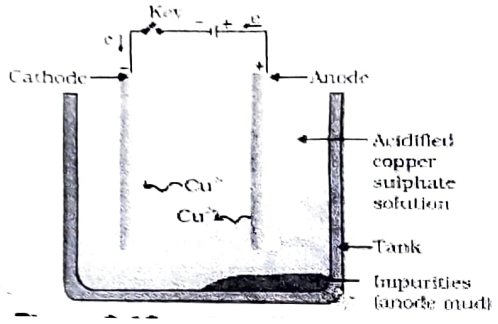
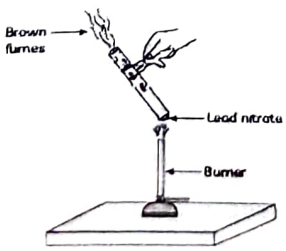
OR

B. During intense exercise, when oxygen is insufficient, glucose is broken down in the cytoplasm of muscle cells.
(a) Name the product formed and explains the effect of its accumulation in muscles.
(b)Compare fermentation in yeast and aerobic respiration in terms of the end products formed.

11.	An ecosystem in a small pond has the following organisms: Algae (Producers), Zooplankton (Primary Consumers), Small Fish (Secondary Consumers), and Kingfishers (Tertiary Consumers). A fisherman introduced a highly stable, non-biodegradable chemical pesticide, DDT, into the pond water to control mosquito larvae. Food Chain: Algae →Zooplankton →Small Fish →Kingfishers A. In which organism in this food chain will the concentration of DDT be highest? Name the phenomenon responsible for this concentration increase and explain the risk it poses to this organism. B. Why is it practically impossible to have a food chain with five or six successive trophic levels in any natural ecosystem?	3
12.	A science student, studying genetics in pea plants, performed a dihybrid cross. The student started with pure-breeding parental plants: one with round and green seeds (Genotype: RRyy) and another with wrinkled and yellow seeds (Genotype: rrYY). A. What is the genotype of the F_1 generation offspring? B. If the F_1 plants are self-pollinated to produce the F_2 generation, how many different phenotypes are possible in the F_2 generation, and in what ratio? (Explain your answer using Mendel's laws). C. If the F_1 plant (RrYy) is test-crossed with a plant having wrinkled and green seeds (rryy), what will be the phenotypic ratio of the resulting offspring?	3
13.	A. Identify the part of the female reproductive system where fertilization usually takes place. B. Mention the changes which the uterus undergoes, when (i) it has to receive a zygote. C. Name any two sexually transmitted diseases.	3
14.	Krishna and her friend were discussing the process of digestion after a science class. Krishna believed that digestion begins in the stomach because food remains there for a longer period. Her friend disagreed and explained that digestion actually begins in the mouth even before food enters the stomach. To prove her point, she planned a simple	4

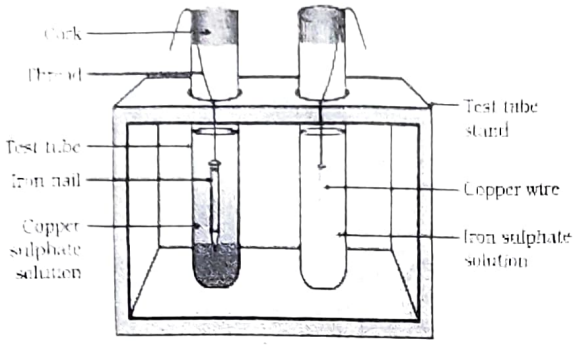
	experiment. She took two test tubes—A and B. She poured starch solution into both and added saliva to test tube B only. After keeping the test tubes undisturbed for 10 minutes, she added a few drops of iodine solution to both test tubes. A. In the starch and saliva experiment, what is the expected result (colour) when iodine solution is added to Test Tube B (Starch + Saliva) and Test Tube A (Starch only)? B. Why is bile required even though it contains no digestive enzyme? Explain using scientific reasoning. C. How does the structure of the small intestine ensure maximum efficiency in the absorption of digested food? ***Attempt either subpart D or E*** D. How would digestion be affected if bile and pancreatic juice were mixed and delivered into the stomach instead of the small intestine? **OR** E. The length of the small intestine in various animals depends on the food they eat." Justify the statement.	
15.	Dhruv suffered a minor head injury in a playground accident. After the initial shock, his friends noticed a few unusual symptoms. He seemed to have difficulty maintaining his balance and walking a straight line. Additionally, he was experiencing trouble recalling recent conversations and solving simple puzzles, suggesting issues with memory and logic. Fortunately, he was breathing and his heart rate was normal, showing that his involuntary life-sustaining functions were unaffected. His doctor explained that the brain is divided into three main parts—the forebrain (Cerebrum), midbrain, and hindbrain—each controlling different sets of functions. The doctor assured them that only the parts controlling balance and higher thought processes seemed temporarily affected. A. Name the part of Dhruv's brain which is likely affected if he is having trouble maintaining balance and walking in a straight line? B. Identify the part of the brain associated with memory and logical thinking, the functions that Dhruv is struggling with? C. The case mentions that Dhruv's breathing and heart rate were normal. Based on this information, Identify the part of the brain which can be safely concluded to be functioning properly and why is this part considered critical for survival? D. The brain is one of the most vital organs. Name the tough, protective, bony structure that houses and shields the brain from external injury. E. How does the feedback mechanism involving insulin helps regulate blood glucose levels, and why is accurate hormonal control essential for maintaining life processes?	5
	SECTION B	
16.	The property of Carbon atoms to link with other Carbon atoms to form long chains, branched chains, or rings is called: A. Tetravalency B. Homology C. Catenation D. Isomerism	1

17.	The values of a, b, c and d in the following balanced chemical equation are respectively $MnO_2 + aHCl \rightarrow bMnCl_2 + cH_2O + dCl_2$ A. 2, 2, 1, 4 B. 1, 1, 1, 2 C. 4, 1, 2, 1 D. 2, 2, 4, 1	1
18.	A magnesium ribbon is reacted separately with dilute hydrochloric acid (HCl) in Test Tube A and dilute acetic acid (**CH_3COOH**) of the same concentration in Test Tube B. In which test tube is the reaction more vigorous, and why? A. The molecular weight of HCl is smaller than **CH_3COOH**, so it reacts faster. B. More magnesium was used in Test Tube A than in Test Tube B. C. HCl is a strong acid and provides a higher concentration of H^+ ions, increasing the reaction rate. D. Magnesium reacts only with inorganic acids like HCl, not with organic acids like **CH_3COOH.**	1
19.	When zinc metal Zn reacts with dilute sulphuric acid, a colourless, odourless gas is produced. Which option correctly identifies this gas and its characteristic confirmatory test? Options: A. Gas: Oxygen O_2; Test: Relights a glowing splint. B. Gas: Hydrogen H_2; Test: Burns with a pop sound when a burning splint is brought nearby. C. Gas: Carbon Dioxide CO_2; Test: Turns lime water milky. D. Gas: Hydrogen Sulphide H_2S; Test: Turns lead acetate paper black.	1
20.	 A student takes 2 g of Silver Chloride (AgCl) powder (white) in a China dish and places it in bright sunlight for some time. Which of the following statements correctly identifies the observation, the type of reaction, and the balanced chemical equation? A. The white powder turns black; Thermal Decomposition; $2AgCl \xrightarrow{Heat} 2Ag + Cl_2$ B. The white powder turns yellow; Double Displacement Reaction; $AgCl + Sunlight \rightarrow AgS + HCl$ C. The white powder turns greyish-white; Photochemical Decomposition; $2AgCl(s)\ Sunlight\ 2Ag(s) + Cl_2\ (g)$ D. The powder remains white; Displacement Reaction; $Ag + Cl_2 \rightarrow 2AgCl$	1
21.	 Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it, as shown in figure below.	1

	The gas evolved is A. **Hydrogen gas (H_2)** **B. Sulphur dioxide gas (SO_2)** **C. Carbon dioxide gas (CO_2)** **D. Sulphur dioxide gas (SO_2) and Hydrogen gas (H_2)**	
22.	 The following diagrams shows the electrolytic refining of copper: Which of the following statements is incorrect description of the process? A. The impure metal from the anode dissolves into the electrolyte B. The pure metal from the electrolyte is deposited on the cathode C. Insoluble impurities settle down at the bottom of the anode. D. On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte.	1
	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	
23.	Assertion (A): Esterification is a process in which a sweet smelling substance is produced. Reason (R): When esters react with sodium hydroxide an alcohol and sodium salt of carboxylic acid are obtained.	1
24.	A student is working in a laboratory with a metal which is stored under kerosene oil. Somehow a piece of this metal falls in a beaker containing water and starts burning. A. Name the metal. B. Write chemical equation for the reaction when metal reacts with water. State the nature of the product obtained. C. Name the process by which metal is obtained from its molten chloride.	2
25.	Observe the setup shown in the figure.  A student heats about 2 g of lead nitrate in a boiling tube using a pair of tongs, as shown in the diagram. A. State the observations the student is likely to make during heating. B. Identify the type of reaction taking place and write the balanced chemical	3

equation for the reaction.

C. You might have noted that when copper powder is heated in a China dish, the reddish-brown surface of copper powder becomes coated with a black substance. Write the chemical equation of the reaction that takes place.

26. 

A student sets up an experiment as shown in the figure. In Test Tube 1, an iron nail is dipped in copper sulphate ($CuSO_4$) solution, and in Test Tube 2, a copper wire is dipped in iron sulphate ($FeSO_4$) solution. After a few hours, the contents of both test tubes are observed. 3

A. Identify the type of chemical reaction taking place in Test Tube 1 and 2 and write the balanced chemical equation.

B. Predict the observable change that will take place in Test Tube 1 and 2 after some time.

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

A. Sodium hydrogen carbonate (baking soda) is a weak non-corrosive basic salt. It is produced from raw materials including NaCl and is an essential compound in the chemical industry and daily life. 4

a) "Sodium hydrogen carbonate is a basic salt". Justify this statement.

b) Write the balanced chemical equation for the formation of this salt using sodium chloride NaCl as one of the raw materials.

c) When fermented idli batter containing mild acid is mixed with baking soda ($NaHCO_3$), the batter rises and becomes spongy. Write the chemical equation for this chemical reaction and name the gas responsible for making the batter rise.

d) Sodium hydrogencarbonate is used in antacids. How does it help reduce acidity in the stomach?

OR

B. a) Write the chemical formula of washing soda. How is it obtained from baking soda? List two uses of washing soda.

b) State the advantage of using baking powder over baking soda for the preparation of bread or cakes.

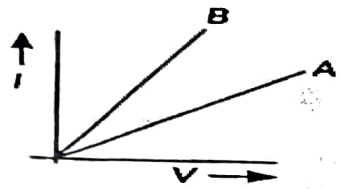
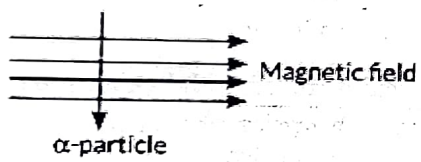
28. Ethanol is an important carbon compound widely used in industries, hospitals etc. Because it is a very good solvent, it is a used in medicines such as tincture iodine, cough syrups, and many tonics 5

A. What happens when ethanol is heated with excess concentrated sulphuric acid at 443 K? Write the chemical equation for the reaction stating the conditions for the reaction. Also, state the role played by concentrated sulphuric acid in the reaction.

B. Draw the electron dot structure of the hydrocarbon produced in the above reaction.

C. What would be observed on adding a 5% alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube? State the role of $KMnO_4$ in the reaction and write the chemical equation for the reaction involved.

SECTION C

29.	A rainbow is formed due to: A. Only refraction B. Refraction and scattering C. Reflection and scattering D. Dispersion, internal reflection and refraction	1
30.	The graph shows the current (I) versus potential difference (V) for two combinations of the same set of resistors. Which statement correctly identifies the combinations represented by lines A and B?  A. A is parallel; B is Series B. A is Series ; B is parallel C. Both A and B represent parallel combination. D. Both A and B represent Series combination.	1
31.	An alpha particle enters a uniform magnetic field as shown. The direction of force experienced by the alpha particle is ____  A. Towards right B. towards left C. Into the page D. Out of the page	1
	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.	
32.	Assertion (A): The refractive index of a medium is independent of the wavelength (or colour) of light used. Reason (R): The refractive index of a medium is a constant value and is defined as the ratio of the speed of light in vacuum to the speed of light in that medium.	1
33.	Write the relation between resistance and electrical resistivity of the material of a conductor in the shape of a cylinder of length 'l' and area of cross-section 'A' Hence derive the SI unit of electrical resistivity.	2
34.	Study the diagram given below and answer the questions that follow:	2

A. Name the defect of vision represented in the diagram. Give reason for your answer.
B. With the help of a diagram show how this defect of vision is corrected.

35. A heating element is made from an alloy wire with a resistivity of $5.0\times 10^{-7}\Omega$m. Calculate the length of the wire required to achieve a total resistance of 20Ω, if the wire has a radius of 0.5 mm. — 2

36. ***Attempt either option A or B*** — 3

A. A driver is using the side-view mirror to check the distance of a bicycle behind their car. The radius of curvature of the mirror is R = 20.0 cm. The bicycle is located at a distance of u = 6.0 m from the mirror.

I. Calculate the position of the bicycle's image formed by the mirror.

II. Determine the magnification of the image. State the nature of the image.

OR

B. Draw ray diagrams to show the nature, position, and relative size of the image formed by a convex mirror when the object is placed (i) at infinity and (ii) between infinity and pole P of the mirror.

37. A. Why do two magnetic field lines not intersect each other? — 3

B. Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.

C. Draw magnetic field lines showing the direction of the magnetic field due to a current-carrying long straight solenoid.

38. Class 10 student is performing an experiment in the physics laboratory to explore the image-forming ability of lens. He uses a lens with a focal length of +12 cm and an object of height 4 cm. He places the object at two different positions to observe the nature, size, and location of the images formed. — 4

Observation Table

CASE	OBJECT POSITION	OBJECT HEIGHT
CASE 1	-36 CM	4 CM
CASE 2	-6 CM	4CM

A. Calculate the optical Power (P) of the lens.

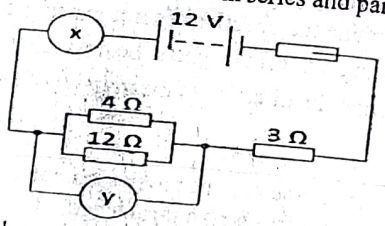
B. When the object is placed at -36 cm (Case 1), state the position and the nature (real or virtual) of the image formed.

C. If the student wants to use the lens to project an image onto a screen such that the image is real, inverted, and exactly the same size as the object, where precisely must the object be placed?

Attempt either option D or E

D. (i) Calculate the image distance for Case 2.

(ii) Calculate the height of the image and state its nature.

	OR E. In which of the two positions mentioned (-36 cm or -6 cm) would the student use this lens as a simple magnifying glass? Draw the ray diagram for that specific position, showing the formation of the magnified image.	
39.	***Attempt either option A or B*** A. A homeowner buys three electrical appliances for their 220V household supply: 1. A Heater rated at 1000 W. 2. A Television rated at 100W. 3. A Light Bulb rated at 60W. All three are connected in the domestic circuit. a) Explain why the three appliances must be connected in parallel rather than in series in a domestic circuit. b) Calculate the total current drawn from the 220 supply when all three appliances are switched on simultaneously. c) Calculate the current drawn by the heater alone when it operates on 220 V. d) Why are alloys used in electrical heating devices? **OR** B. The circuit in Figure has resistors in series and parallel.  a) Calculate the total equivalent resistance R of the entire circuit. b) Identify the type of meters X and Y. c) Calculate the total current flowing through the 3Ω resistor d) Determine which component, 3Ω series resistor or the entire parallel combination, dissipates more electrical power. Justify your answer.	5