

KENDRIYA VIDYALAYA SANGATHAN, BHUBANESWAR REGION
PRE BOARD-II EXAMINATION (2025-26)
CLASS : X
SUBJECT : SCIENCE (086)

Maximum Marks -80

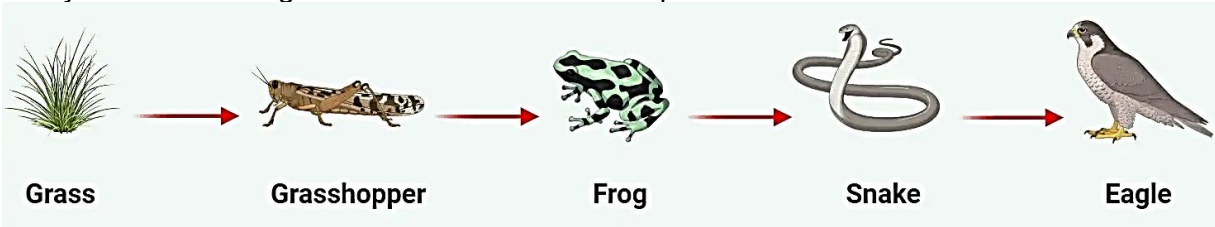
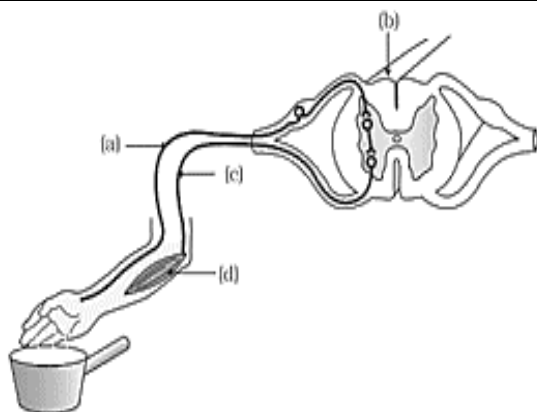
Maximum time allowed-3 Hours

General Instructions :

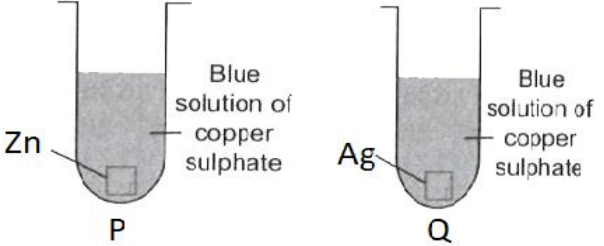
1. This question paper consists of 39 questions in 3 sections. Section A is Biology, Section B is Chemistry and Section C is Physics.

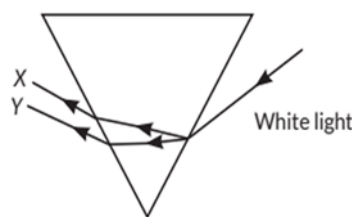
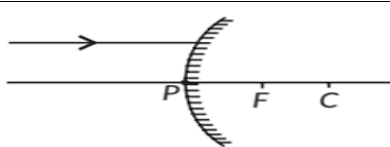
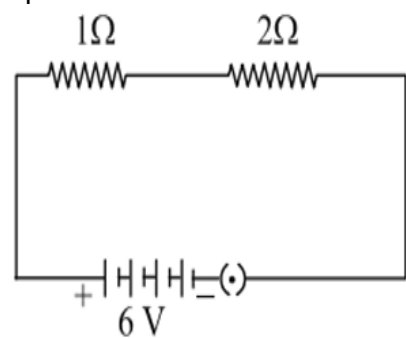
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.

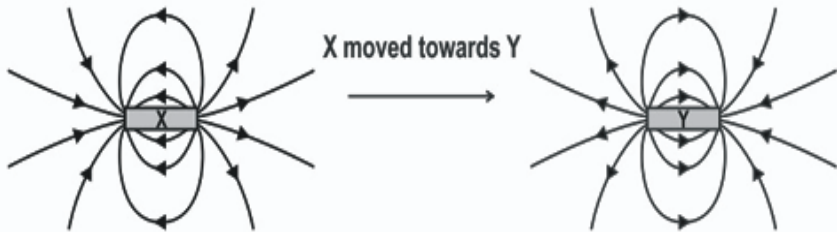
SECTION A		Marks
1	Which of the statements are true for respiration? i. Ribs move inwards and diaphragm is raised during inhalation ii. Gaseous exchange occurs at alveoli of lungs iii. Hemoglobin has greater affinity for carbon dioxide than oxygen iv. Alveoli increases surface area for exchange of gases (a) i. and iv. (b) ii. and iii. (c) i. and iii. (d) ii. and iv.	1
2	Plants use completely different process for excretion as compared to animals. Which one of the following processes is NOT followed by plants for excretion? (a) They can get rid of excess water by transpiration. (b) They selectively filter toxic substances through their leaves. (c) Waste products are stored as resins and gums in old xylem. (d) They excrete waste substances into the soil around them.	1
3	In a synapse, chemical signal is transmitted from (a) dendritic end of one neuron to axonal end of another neuron (b) axon to cell body of the same neuron (c) cell body to axonal end of the same neuron (d) axonal end of one neuron to dendritic end of another neuron	1
4	Neha suffers from a condition due to which her average blood sugar level is 174mg/dL. The average blood sugar level in a healthy adult is < 140mg/dL. Which of the following could be the cause of Neha's condition. (a) Insufficient production of thyroxine in her body (b) insufficient production of insulin in her body (c) excess production of thyroxine in her body (d) excess production of insulin in her body	1
5	A monohybrid cross is conducted between one variety of pea plants having violet flowers (VV) and another having white flowers (vv). What is the percentage of heterozygous offsprings in F1 generation? (a) 100% (b) 25% (c) 75% (d) 0	1
6	Consider the following ecosystems: I. Ponds II. Forests III. Aquariums IV. Crop fields Out of these, the natural ecosystems are (a) I, II and III (b) I and II only (c) II, III and IV (d) I, II and IV	1
7	Accumulation of non-biodegradable pesticides in the food chain in increasing amount at each higher trophic level is known as (a) deforestation (b) pollution (c) biomagnification (d) accumulation	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.		

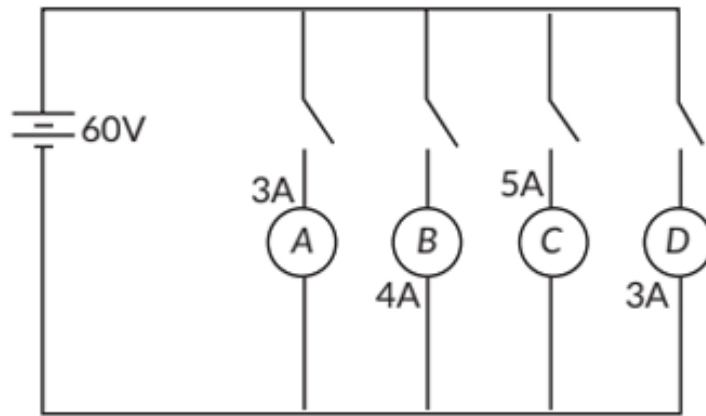
(c). A is true but R is false. (d). A is false but R is true.			
8	Assertion (A): Traits like seed shape and seed colour are inherited independently in pea plants. Reason (R) : Mendel's dihybrid cross showed that alleles of different traits segregate independently during gamete formation independently	1	
9	Assertion (A): Accumulation of harmful chemicals is maximum in the organisms at the highest trophic level of a food chain. Reason (R): Harmful chemicals are sprayed on the crops to protect them from diseases and pests.	1	
10	Name the substances other than water, that are reabsorbed during urine formation. What are the two parameters that decide the amount of water that is reabsorbed in the kidney?	2	
11	Attempt either option A or B A. How do guard cells regulate the opening and closing of stomatal pore? OR B. The rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms. Give reason.	2	
12	Study the food chain given below and answer the questions that follow:  Grass → Grasshopper → Frog → Snake → Eagle (i).If the amount of energy available at the third trophic level is 100 joules, then how much energy will be available at the producer level? Justify your answer. (ii). Is it possible to have 2 more trophic levels in this food chain just after the fourth trophic level? Justify your answer.	2	
13	(i)Label the parts (a), (b), (c) and (d) and show the direction of flow of electrical signals. (ii) How is mode of action in beating of the heart different from reflex action?		2+1
14	(i)"It is a matter of chance whether a couple will have a male or a female child." Justify with the help of a flow chart. (ii)Give two examples of the organisms in which the sex is not genetically determined.	2+1	
15	Read the given passage and answer the questions – Human digestive system is a tube running from mouth to anus. Its main function is to breakdown complex molecules present in the food which cannot be absorbed as such ,into smaller molecules. These molecules are absorbed across the walls of the tube and the absorbed food reaches each and every cell of the body where it is utilised for obtaining energy. A. Name the glands present in the buccal cavity and mention the component of food on which it acts. B. Two organs are having a sphincter muscle at their exit. Name them. Attempt either subpart C or D	1+1+2	

	<p>C. What will happen if-</p> <p>(a) Mucus is not secreted by the gastric glands.</p> <p>(b) Villi are absent in the small intestine.</p> <p style="text-align: center;">OR</p> <p>D. "Bile juice does not contain any enzyme. Yet, it has important roles in digestion." Justify the statement.</p>	
16	<p>(a) List any two methods of contraception.</p> <p>(b) Why has Government of India prohibited prenatal sex determination by law?</p> <p>(c) Unsafe sexual act can lead to various infections. Name two bacterial and two viral infections caused due to unsafe sex.</p> <p style="text-align: center;">OR</p> <p>The modes by which various organisms reproduce depend on the body design of the organisms. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals.</p> <p>(a) List any two advantages of producing plants through vegetative propagation.</p> <p>(b) State the name of the organism in which binary fission takes place in a definite orientation. Also name the disease caused by this organism.</p> <p>(c) Explain the process of budding in Hydra.</p>	2+1+2
	SECTION B	
17	<p>The balanced chemical equation showing reaction between quick lime and water is</p> <p>(a) $2\text{CaO} + \text{H}_2\text{O} \rightarrow 2\text{CaOH} + \text{H}_2 + \text{Heat}$</p> <p>(b) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2 + \text{Heat}$</p> <p>(c) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$</p> <p>(d) $2\text{CaO} + 3\text{H}_2\text{O} \rightarrow 2\text{Ca}(\text{OH})_3 + \text{O}_2 + \text{Heat}$</p>	1
18	<p>Three test tubes A, B and C contain distilled water, an acidic solution and a basic solution respectively. When red litmus solution is used for testing these solutions, the observed colour changes respectively will be</p> <p>(a) A no change; B - becomes dark red ; C- becomes blue</p> <p>(b) A becomes light red; B - becomes blue; C - becomes red</p> <p>(c) A- becomes red; B - no change; C - becomes blue</p> <p>(d) A becomes light red; B - becomes dark red; - C - becomes blue</p>	1
19	<p>Copper utensils slowly lose their shiny brown surface and gain a green coat on prolonged exposure to atmospheric air. This is due to the formation of a coating of</p> <p>(a) copper sulphate (b) copper carbonate</p> <p>(c) cupric oxide (d) cuprous oxide.</p>	1
20	<p>Adding which of the following to a colourless solution would give an indication that the solution could possibly be hydrochloric acid?</p> <p>(a) copper metal strips (b) silver metal strips</p> <p>(c) Calcium carbonate (d) sodium chloride</p>	1
21.	<p>Given below is a reaction showing Chlor-alkali process</p> $2\text{NaCl}_{(aq)} + 2\text{H}_2\text{O}_{(l)} \rightarrow 2\text{NaOH}_{(aq)} + \text{Cl}_{2(g)} + \text{H}_{2(g)}$ <p style="text-align: center;">(A) (B) (C)</p> <p>The products A, B and C are produced respectively</p> <p>(a) at the anode, at the cathode, near the cathode</p> <p>(b) near the cathode, at the anode, at the cathode</p> <p>(c) at the cathode, near the cathode, at the anode</p> <p>(d) at the anode, near the cathode, at the cathode.</p>	1

22	<p>Given figure shows a student adds an equal amount of CuSO_4 (aq) in two test tubes. He added zinc in test tube P and silver in test tube Q. The student observes that the colour of solution in test tube P changes while no change is observed in test tube Q. Which option is correct for reactivity?</p> <p>(a) $\text{Ag} < \text{Zn} < \text{Cu}$ (b) $\text{Zn} < \text{Cu} < \text{Ag}$ (c) $\text{Ag} < \text{Cu} < \text{Zn}$ (d) $\text{Cu} < \text{Ag} < \text{Zn}$</p>		1
23	<p>Reema took 5 mL of lead nitrate solution in a beaker and added approximately 4 mL of potassium iodide solution to it. What would she observe?</p> <p>(a) The solution turned red. (b) Yellow precipitate was formed. (c) White precipitate was formed. (d) The reaction mixture became hot.</p>		1
<p>The following question consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:</p> <p>(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.</p>			
24	<p>Assertion (A): Carbon has a strong tendency to either lose or gain electrons to attain noble gas configuration. Reason (R): Carbon has four electrons in its outermost shell and has the tendency to share electrons with carbon or other elements.</p>		1
25	<p>(a) Give two general properties of the compound formed by combination of magnesium and oxygen.</p> <p>(b) Show the formation of this compound by the transfer of electrons.</p>		2
26	<p>Attempt either option A or B</p> <p>A. A teacher asks her students to identify a metal, M. She gives them the following clues to help them. (P) Its oxide reacts with both HCl and NaOH. (Q) It does not react with hot or cold water but reacts with steam. (R) It can be extracted by electrolytic reduction of its oxide.</p> <p>(a) Identify the metal. (b) Write the balanced chemical equations for the reaction of metal with HCl and NaOH. (c) What would happen if the metal powder is reacted with iron(III) oxide.</p> <p style="text-align: center;">OR</p> <p>B. It is observed that calcium on reaction with water floats on its surface. Explain why it happens. Also write a balanced chemical equation for the reaction that occurs. What happens when aqueous solution of the product of this reaction reacts with carbon dioxide gas? Write a balanced chemical equation.</p>		3
27	<p>Tina finds a paper covered with a white substance in a chemistry lab. She keeps the paper near the window of the lab and comes back to pick it up after five hours to take it home. She noticed that the white substance had turned grey.</p> <p>(a) What could be the most likely substance on the paper that Tina found? Write name and formula. (b) The substance changed from white to grey. Write the chemical equation for this reaction. (c) State one application of this property of the substance seen in daily life.</p>		3
28	<p>(a) You are provided with concentrated sulphuric acid. Describe the process of preparing a dilute solution of sulphuric acid. (b) What is the effect of dilution on $(\text{H}_3\text{O}^+/\text{OH}^-)$ ratio? (c) If the H_3O^+ ion concentration is increased in a solution, will the pH increase or decrease? What are the probable colours of pH paper if pH ranges from 0.5 to 2.0?</p>		4

29	<u>Attempt either A or B</u> A .An organic compound 'X' is liquid at room temperature. It is also very good solvent and has the molecular formula C_2H_6O . Upon oxidation 'X' gives 'Y'. 'Y' releases a gas 'W' with brisk effervescence on reacting with $NaHCO_3$. X reacts with Y in the presence of Conc. H_2SO_4 to give another compound 'Z' which has a pleasant smell. (a) Give the chemical name and chemical formula of 'Y'. (b) How will you test for the gas 'W'? (c) Depict the formation 'Y' and 'Z' using chemical equations. (d) Name the reaction of formation of 'Z'. (e) Give any one use of 'Z'. OR B.(a)Define a homologous series of carbon compounds. (b)Why is the melting and boiling points of C_4H_8 higher than that of C_3H_6 or C_2H_4 ? (c) Why we do NOT see any gradation in chemical properties of a homologous series compounds? (d) Write the name and structures of (i) aldehyde and (ii) ketone with molecular form C_3H_6O .		5
SECTION C			
30	A lens has a power of +4.0 D. It is (a) a convex lens of focal length 4 m (b) a concave lens of focal length 4 m (c) a convex lens of focal length 0.25 m (d) a concave lens of focal length 0.25 m		1
31	In the diagram given below, X and Y are the end colours of the spectrum of white light. The colour of 'Y' represents the (a) Colour of sky as seen from earth during the day (b) Colour of the sky as seen from the moon (c) Colour used to paint the danger signals (d) Colour of sun at the time of noon.		1
The following question 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.			
32	Assertion: Concave mirrors are used as make-up mirrors. Reason : When the face is held within the focus of a concave mirror, then a diminished image of the face is seen in the concave mirror		1
33	A ray of light is incident on a convex mirror as shown. Redraw the diagram and complete the path of this ray after reflection from the mirror. Mark angle of incidence and angle of reflection on it.		2
34	<u>Attempt either A or B</u> A.In the given circuit calculate the power consumed in watts in the resistor of 2Ω : 		2

	<p style="text-align: center;">OR</p> <p>B. Show how you would connect three resistors each of resistance $6\ \Omega$, so that the combination has a resistance of $9\ \Omega$. Also justify your answer.</p>	
35	<p>A student uses spectacles of focal length - 2.5 m.</p> <p>(a) Name the defect of vision he is suffering from.</p> <p>(b) Which lens is used for the correction of this defect?</p> <p>(c) List two main causes of developing this defect.</p> <p>(d) Compute the power of this lens</p>	3
36	<p>(a) List the factors on which the resistance of a uniform cylindrical conductor of a given material depends.</p> <p>(b) The resistance of a wire of 0.01cm radius is $10\ \Omega$. If the resistivity of the wire is $50 \times 10^{-8}\ \Omega\text{m}$ find the length of this wire.</p>	3
37	<p>(a) The given figure shows the two magnets X and Y kept near each other. Their poles are not marked but the magnetic field lines are shown.</p> <div style="text-align: center;">  </div> <p>If magnet X is moved towards magnet Y as indicated by the arrow, will the two magnets attract or repel each other. Justify your answer by describing how you interpret the field lines.</p> <p>(b) Two magnetic field lines do not intersect each other. Why?</p>	3
38	<p>Ravi wanted to fix the rear-view mirror of his scooter. He knows that rear-view mirror is an essential safety device in the vehicle and allows him to see objects at the backside of his vehicle.</p> <div style="text-align: center;">  </div> <p>He bought two mirrors M_1 and M_2, out of which M_1 is curved inwards and M_2 is curved outwards.</p> <p>A. Based on the given situation, which mirror should Ravi need to fix as his rear-view mirror and why?</p> <p>B. Ravi did some preliminary experiment with mirror M_1 and found that magnification of the real image of an object placed at 10 cm in front of it is 3, at what distance is the image located?</p> <p><u>Attempt either subpart C or D</u></p> <p>C. An object is placed at the centre of curvature of M_1. Find the distance between its image and pole.</p> <p style="text-align: center;">OR</p> <p>D. An object is placed 60 cm in front of M_2. The image formed by the mirror is located 30 cm behind the mirror. What is the object's magnification?</p>	4
39	<p><u>Attempt either option A or B</u></p> <p>A. In the given circuit, A, B, C and D are four lamps connected with a battery of 60 V.</p>	5



Analyse the circuit to answer the following questions.

- What kind of combination are the lamps arranged in (series or parallel)?
- Explain with reference to your above answer, what are the advantages (any two) of this combination of lamps.
- Explain with proper calculations which lamp glows the brightest.
- Find out the total resistance of the circuit.

OR

B.(i)An air conditioner consumes energy at a rate of 2200W when it operates at 16°C and 1540 W when it operates at 25°C .If the source voltage is 220V, Calculate the current and resistance in each case.

(ii) An electric water heater is designed to operate on a mains voltage of 22V.It consumes 4.4 units of electrical energy in 10 hours. Calculate:

- the power rating of the water heater
- the resistance of the water heater