

Kendriya Vidyalaya Sangathan, Jaipur Region
First-Pre Board Exam-2023-24

Class- X

Subject: Science (086)

Max. Marks: 80

Time: 3 Hours

General Instructions:

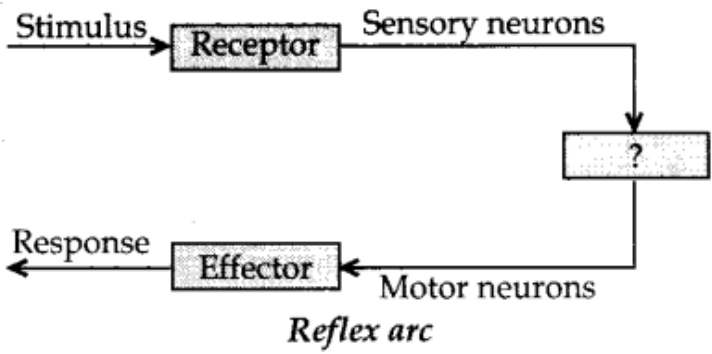
1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 Objective Type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

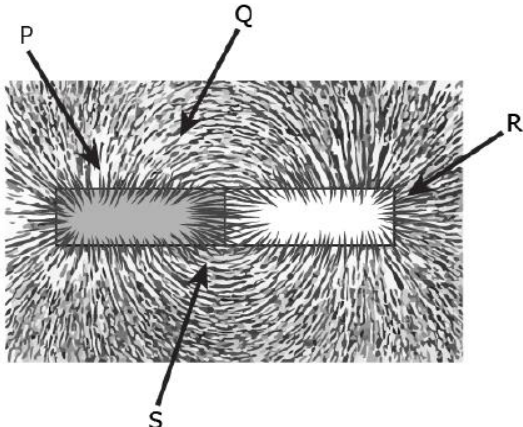
Section A

Select and write the most appropriate option of the four options given for each of the questions 1-20. There is no negative mark for incorrect response.

Q.No.	Questions	Marks
1	A student performs an experiment to form aluminium chloride from aluminium and chlorine. Which of the following option gives the chemical equation of the reaction? (a) $\text{Al} + \text{Cl}_2 \rightarrow \text{AlCl}_2$ (b) $2\text{Al} + 3\text{Cl}_2 \rightarrow 2\text{AlCl}_3$ (c) $2\text{Al} + \text{Cl}_2 \rightarrow 2\text{AlCl}$ (d) $3\text{Al} + 3\text{Cl}_2 \rightarrow 3\text{AlCl}_3$	1
2	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. What 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) A 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

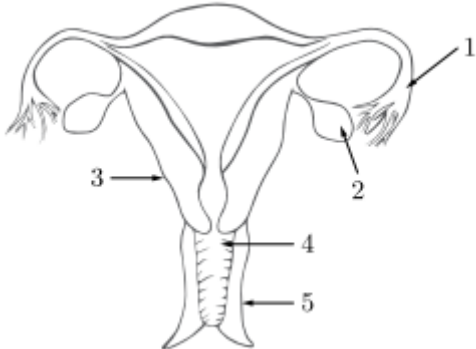
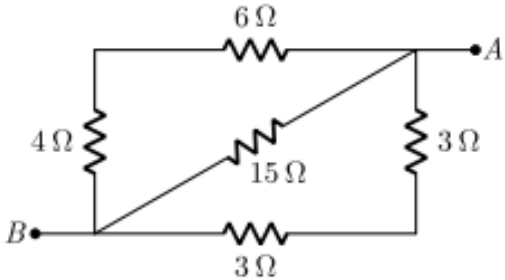
3	Which of the following reactions is used in black-and-white photography? (a) Combination Reaction (b) Decomposition Reaction (c) Displacement reaction (d) Oxidation reaction	1
4	If a few drops of a concentrated acid accidentally spills over the hand of a student, what should be done? (a) Wash the hand with saline solution. (b) Wash the hand immediately with plenty of water and apply a paste of sodium hydrogen carbonate. (c) After washing with plenty of water apply solution of sodium hydroxide on the hand. (d) Neutralize the acid with a strong alkali.	1
5	The colour of Methyl orange in basic medium is- (a) Pink (b) Orange (c) Purple (d) Yellow	1
6	Bleaching powder's chemical name is _____ (a) Calcium hypo-Oxychloride (b) Calcium Oxychloride (c) Calcium Chloride (d) Calcium Chloro-Oxide	1
7	The image represents the structure of a few hydrocarbon compounds. (A) $\text{H} - \text{C} \equiv \text{C} - \text{H}$ (B) $\begin{array}{c} \text{H} \quad \text{H} \\ \diagdown \quad \diagup \\ \text{C} = \text{C} \\ \diagup \quad \diagdown \\ \text{H} \quad \text{H} \end{array}$ (C) $\begin{array}{c} \text{H} \quad \text{H} \\ \quad \\ \text{H} - \text{C} - \text{C} - \text{H} \\ \quad \\ \text{H} \quad \text{H} \end{array}$ (D) $\begin{array}{c} \text{H} \\ \\ \text{H} - \text{C} - \text{C} \equiv \text{C} - \text{H} \\ \\ \text{H} \end{array}$ 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	The correct sequence of anaerobic reactions in yeast is (a) Glucose $\xrightarrow{\text{Cytoplasm}}$ Pyruvate $\xrightarrow{\text{Mitochondria}}$ Ethanol + Carbon dioxide (b) Glucose $\xrightarrow{\text{Cytoplasm}}$ Pyruvate $\xrightarrow{\text{Cytoplasm}}$ Lactic acid (c) Glucose $\xrightarrow{\text{Cytoplasm}}$ Pyruvate $\xrightarrow{\text{Mitochondria}}$ Lactic acid (d) Glucose $\xrightarrow{\text{Cytoplasm}}$ Pyruvate $\xrightarrow{\text{Cytoplasm}}$ Ethanol + Carbon dioxide	1

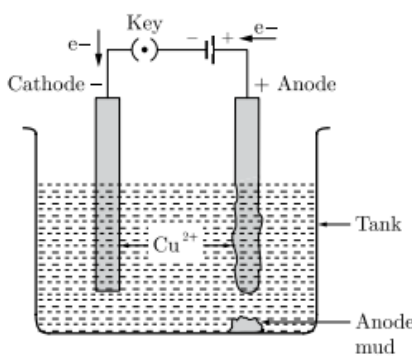
9	Give the missing term.  (a) Spinal cord (b) Brain (c) Cranial nerves (d) Relay nerves	1
10	Which of the following options correctly shows the path that the sperms take when they are released from the male reproductive system? (a) testis → ureter → urethra → penis (b) testis → vas deferens → ureter → penis (c) testis → ureter → vas deferens → penis (d) testis → vas deferens → urethra → penis	1
11	The number of pairs of sex chromosomes in the zygote of a human being is (a) 1 (b) 3 (c) 2 (d) 4	1
12	In peas, a pure tall (TT) is crossed with a pure short plant(tt). The ratio of pure tall plants to pure short plants in the F₂ generation is: (a) 1:3 (b) 3:1 (c) 2:1 (d) 1:1	1
13	In pea plants, yellow seeds are dominant to green seeds. If a heterozygous yellow-seeded plant is crossed with a green-seeded plant, what ratio of yellow and green-seeded plants would you expect in the F₁ generation? (a) 9:1 (b) 3:1 (c) 1:3 (d) 50:50	1
14	If two resistors of 35 Ω and 15 Ω are joined together in series and then placed in parallel with a 40 Ω resistor, the effective resistance of the combination is: (a) 0.1 Ω (b) 10 Ω (c) 20 Ω (d) 40 Ω	1
15	Which of the following statements is incorrect regarding magnetic field lines? (a) The direction of the magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points. (b) Magnetic field lines are closed curves. (c) If magnetic field lines are parallel and equidistant, they represent zero field strength. (d) Relative strength of the magnetic field is shown by the degree of closeness of the field lines.	1

16	A student places some iron filings around a magnet. The iron filings arrange themselves as shown in the image.  The student labelled four different regions around the magnet. Where would the magnetic field be the strongest? (a) P (b) Q (c) R (d) S	1
	Following questions consist of two statements – Assertion (A) and Reason (R). Answer these questions 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 but 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) : Longer wires have greater resistance and the smaller wires have lesser resistance. Reason (R): Resistance is inversely proportional to the length of the wire.	1
18	Assertion: The reaction of calcium with water is less violent in comparison to that of sodium. Reason: The heat evolved is not sufficient for the hydrogen to catch fire.	1
19	Assertion (A): The purpose of making urine is to filter out undigested food from intestine Reason (R): Kidneys filter the waste and produce urine,	1
20	Assertion (A) : The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the current flowing through the coil. Reason (R) : Magnetic field strength is inversely proportional to the current flowing in the coil.	1
Section – B Question No. 21 to 26 are very short answer questions		

21	What happens when a metal reacts with dilute acid? Explain with the help of an example. OR A metal A, which is used in thermit process, when heated with oxygen gives an oxide B, which is amphoteric in nature. Identify A and B. Write down the reactions of oxide B with HCl and NaOH.	2
22	What do you mean by double circulation of blood?	2
23	Explain why bile juice does not contain any digestive enzymes, yet it is essential for digestion.	2
24	An old man is advised by his doctor to take less sugar in his diet. Name the disease from which the man is suffering. Mention the hormone due to imbalance of which he is suffering from this disease. Which endocrine gland secretes this hormone?	2
25	Draw ray diagrams showing (i) a hypermetropic eye and (ii) its correction using suitable optical device. OR Define the term dispersion of white light. Name the colour of light which bends (i) the most, (ii) the least while passing through a glass prism.	2
26	Consider the following food chains- (i) Plants → Mice → Snakes → Hawks (ii) Plants → Mice → Hawks If energy available at the producer level in both the food chains is 100J. In which case will hawks get more energy and how much?	2
	Section- C Question No. 27 to 33 are short answer questions	
27	What is redox reaction? Identify the substance oxidised and the substance reduced in the following reactions. (i) $2\text{PbO} + \text{C} \longrightarrow 2\text{Pb} + \text{CO}_2$ (ii) $\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$	3
28	(a) Show the formation of Na_2O by the transfer of electrons between the combining atoms. (b) Why are ionic compounds usually hard? (c) How is it that ionic compounds in the solid state do not conduct electricity and they do so when in molten state?	3
29	Give reasons: (a) Ventricles have thicker muscular walls than atria.	3

	(b) During the daytime, water and minerals travel faster through xylem as compared to the night. (c) Veins have valves whereas arteries do not. OR (a) Draw a diagram of human alimentary canal and label the following parts: (i) largest gland. (ii) Gland that secretes digestive enzymes and hormone. (iii) Part where HCl is produced. (iv) Part where digested food is absorbed.									
30	It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm. (i) What should be the range of the object distance in the above case? (ii) Will the image be smaller or larger than the object? Draw a ray diagram to show the formation of image in this case. (iii) Where will the image of this object be, if it is placed 24 cm in front of the mirror?	3								
31	(a) What is a solenoid? Draw the pattern of magnetic field lines around a current carrying solenoid. (b) What is the pattern of field lines inside a solenoid?	3								
32	a) Define 1 dioptre of power. Find the focal length of a lens of power -2 D. (b) Why does a lemon kept in water in a glass tumbler appear to be bigger than its actual size? (c) Study the table given below and state the medium in which light ray will travel fastest. Why? <table border="1"><tr><td>Medium</td><td>A</td><td>B</td><td>C</td></tr><tr><td>Refractive index</td><td>1.33</td><td>1.5</td><td>2.4</td></tr></table>	Medium	A	B	C	Refractive index	1.33	1.5	2.4	3
Medium	A	B	C							
Refractive index	1.33	1.5	2.4							
33	(You have been selected to talk on “ozone layer and its protection in the school assembly” on “Environment Day” (i) Why should ozone layer be protected to save the environment? (ii) List any two ways that you would stress in your talk to bring in awareness amongst your fellow friends that would also help in protection of ozone layer as well as the environment.	3								
	Section – D Question No. 34 to 36 are long answer questions									
34	Identify the given diagram. Name the parts 1 to 5.	5								

	 (ii) What is contraception? List three advantages of adopting contraceptive measures. OR (i) Write one main difference between asexual and sexual mode of reproduction. Which species is likely to have comparatively better chances of survival—the one reproducing asexually or the one reproducing sexually? Give reason to justify your answer. (ii) What is carpel? Write the function of its various parts.	
35	(a) Compare soaps and detergents on the basis of their composition and cleansing action in hard water. (b) What happens when ethanol is treated with sodium metal? State the behaviour of ethanol in this reaction. (c) Draw the structures of two isomers of butane, C_4H_{10}. (d) Name the following compound. $ \begin{array}{c} & & H & & \\ & & & & \\ H & - & C & - & C & - & H \\ & & & & \\ & O & & H & \end{array} $	5
36	(a) List two disadvantages of using a series circuit in homes. (b) Calculate the effective resistance between A and B in the circuit given below: 	5

	Section –E Question No. 37 to 39 are case-based/data-based questions with 2 to 3 sub-parts. Internal choice is provided in one of these sub-parts									
37	Refining is the process of purification of metals. One of the important method of refining is electrolysis. In electrolysis, electrical energy is used to bring about a non-spontaneous redox reaction. This is done by passing an electric current through a liquid containing ions, known as an electrolyte. In contrast to metals, the current in electrolytes is carried by the movement of ions rather than the movement of electrons. The solid conductors inserted into the liquid are called electrodes, the one with a positive charge is called the anode (because it attracts anions) and the one with the negative charge is called the cathode. A diagrammatic representation of electrolysis of copper is shown below:  (i) Name the electrolyte used in refining of copper. (ii) (a) $\text{Cu} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$ (b) $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ Which of these two reactions occur at cathode and anode? (iii) What is anode mud? Name two metals which can be refined by electrolytic method. OR What happens to impure copper during electrolysis?	4								
38	Refer to the given table regarding results of F₂ generation of Mendelian cross. <table><tr><td>Plants with round and yellow coloured seeds (P)</td><td>315</td></tr><tr><td>Plants with round and green coloured seeds (Q)</td><td>108</td></tr><tr><td>Plants with wrinkled and yellow coloured seeds (R)</td><td>101</td></tr><tr><td>Plants with wrinkled and green coloured seeds (S)</td><td>32</td></tr></table> (i) What would be the phenotype of F₁ generation regarding given data of F₂ generation? (ii) What would be the genotype of parental generation regarding given result of F₂ generation?	Plants with round and yellow coloured seeds (P)	315	Plants with round and green coloured seeds (Q)	108	Plants with wrinkled and yellow coloured seeds (R)	101	Plants with wrinkled and green coloured seeds (S)	32	4
Plants with round and yellow coloured seeds (P)	315									
Plants with round and green coloured seeds (Q)	108									
Plants with wrinkled and yellow coloured seeds (R)	101									
Plants with wrinkled and green coloured seeds (S)	32									

(iii) If plant with wrinkled and green coloured seeds (S) is crossed with plant having wrinkled and yellow coloured seeds (R), what will be the probable phenotype of offspring's?

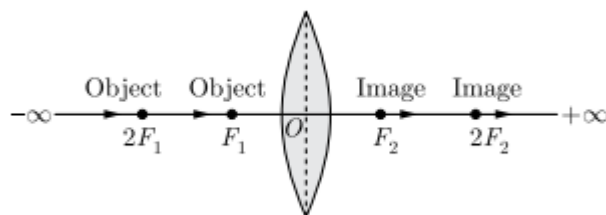
OR

If YYRR is round yellow, what do the following represent? yyrr, yyRR

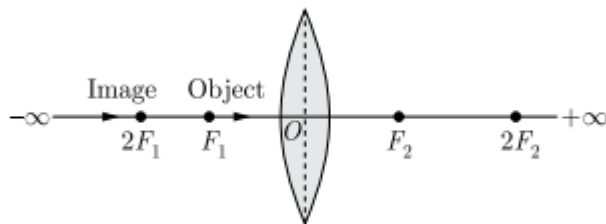
39

The image formed by a convex lens depends on the position of the object in front of the lens. When the object is placed anywhere between focus and infinity, the image formed by convex lens is real and inverted. The image is not obtained on the screen why the object is placed between the focus and the lens. The distance between the optical centre O of the convex lens and the focus point F₁ and F₂ is its focal length.

When the object shifts from $-\infty$ to F₁, the image moves from F₂ to $+\infty$



When the object shifts from F₁ to O, the image moves $-\infty$ to O.



A student did an experiment with a convex lens. He put an object at different distances from the lens. In each case, he measured the distance of the image from the lens. The results were recorded in the following table

Object distance (in cm)	Image distance (in cm)
25	100
30	24
40	60
60	30
120	40

Unfortunately, his results are written in the wrong order.

(i) Rewrite the image distances in the correct order.

(ii) What is the minimum distance between an object and its real image formed by a convex lens?

(iii) What is the focal length of this lens?

OR

(iv) How do you determine if a lens is concave or convex?

4