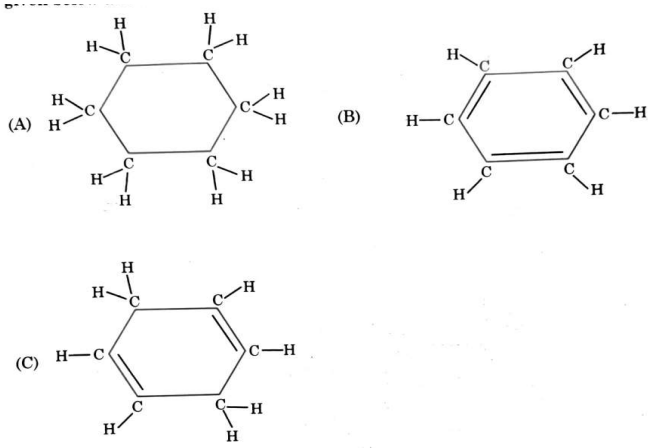
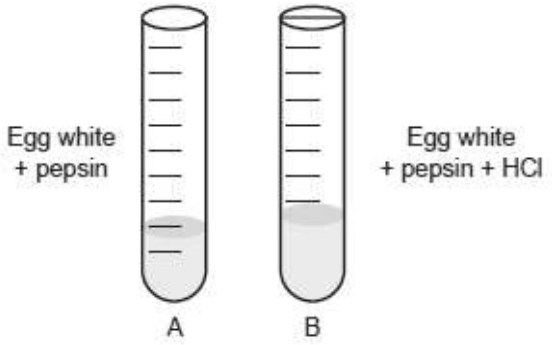
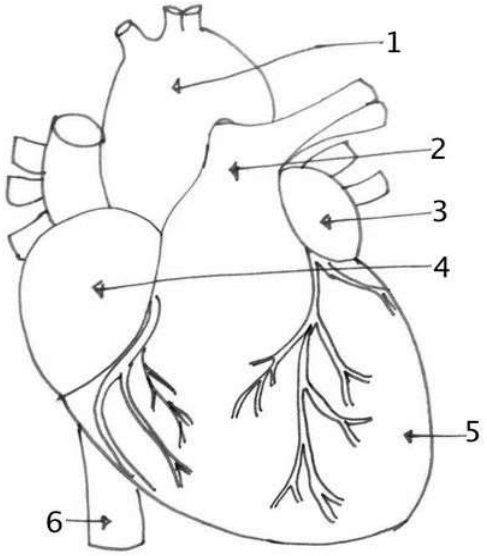
Delhi Public School R.K. Puram
Sample Paper I (Preboard), 2023-2024
Class- X
Subject - Science

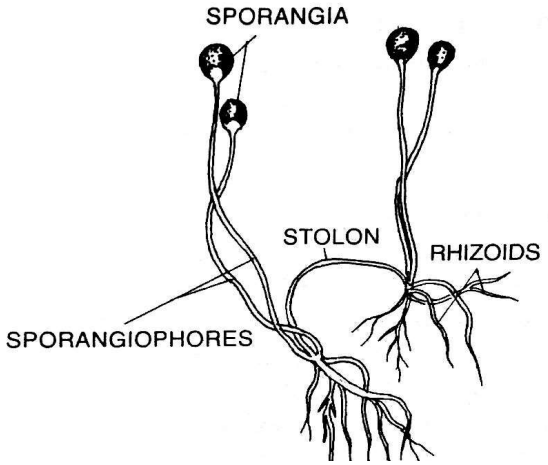
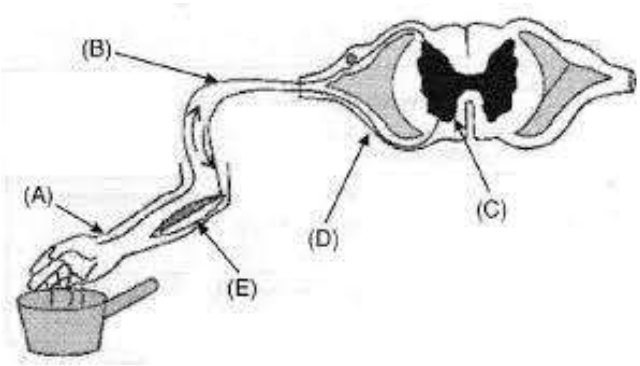
Time Duration: 3 hours **M.M. 80**

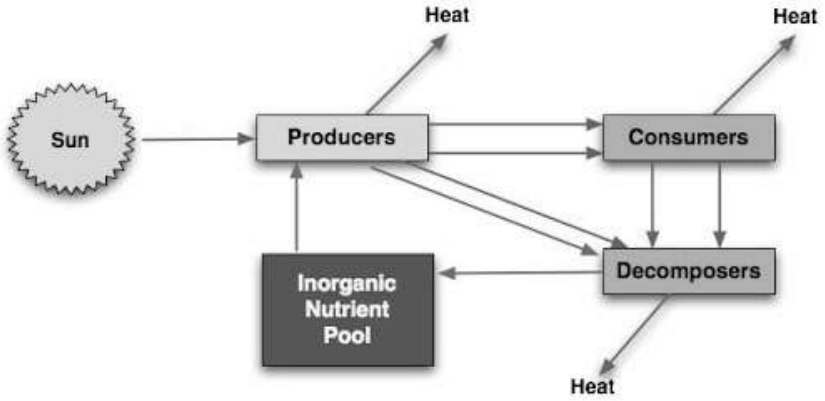
1. **This question paper consists of 39 questions in 5 sections.**
2. **All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.**
3. **Section A consists of 20 objective type questions carrying 1 mark each.**
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. Answers 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.**

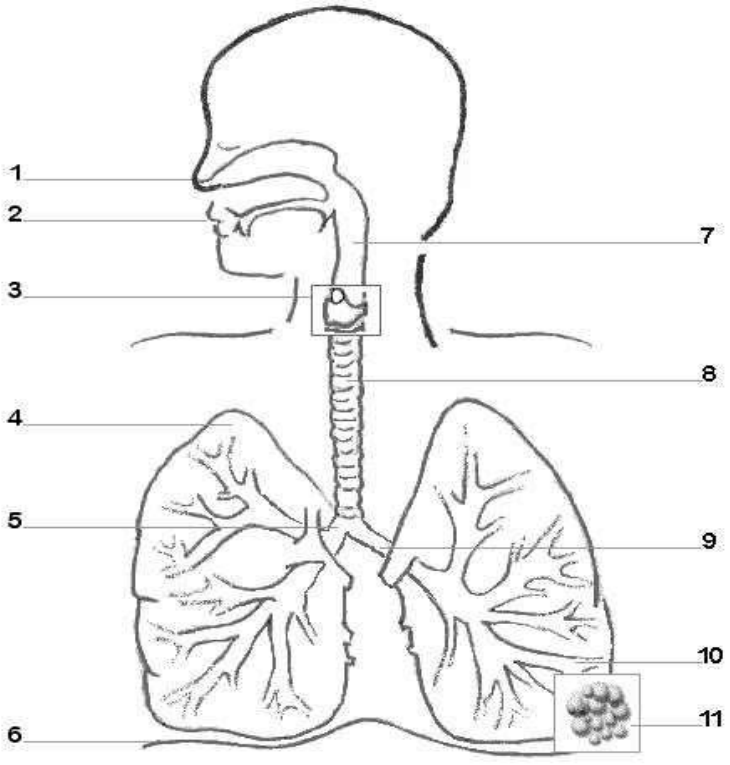
Section A **1 X 20 = 20**		
1	During purification of a metal by electrolysis, what happens at the negative electrode? (a) Metal ions lose electrons to become neutral atoms. (b) Neutral metal atoms gain electrons to become ions. (c) Neutral metal atoms lose electrons to become ions. (d) Metal ions gain electrons to become neutral metal atoms	1
2	You want to test for hardness of water but hard water is not available in the laboratory. Which of the following compounds may be dissolved in pure water to make it hard ? (i) Hydrogen Carbonate of Sodium (ii) Sulphate of Magnesium (iii) Chloride of Calcium (iv) Carbonate of Sodium (a) (i) and (ii) (b) (ii) and (iii) (c) (iii) and (iv) (d) (i) and (iv)	1

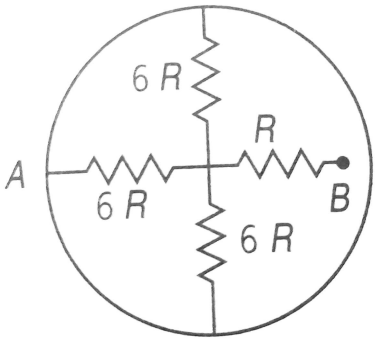
3	Consider the structure of three cyclic carbon compounds A, B and C given below and select the correct option from the following  a) A and C are saturated cyclic hydrocarbons and B is unsaturated cyclic hydrocarbons. b) A is saturated cyclic hydrocarbons and B and C are unsaturated cyclic hydrocarbons. c) A, B and C are isomers. d) A is cyclohexane and B and C are isomers of benzene .	
4	2 g of yellow sulphur powder is burnt in a china dish and the fumes are collected in a test tube. Water is added in the test tube and the solution is tested separately with blue and red litmus paper. The correct option is : (a) Blue litmus remains blue and red litmus turns blue. (b) Blue litmus turns red and red litmus remains red. (c) Blue litmus turns red and red litmus turns blue. (d) Blue litmus remains blue and red litmus remains red.	1
5	A metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X, Y and the type of reaction is : (a) X = Ca ; Y = CaO ; Type of reaction = Decomposition (b) X = Mg ; Y = MgO ; Type of reaction = Combination (c) X = Al ; Y = $Al2O_3$; Type of reaction = Thermal decomposition (d) X = Zn ; Y = ZnO ; Type of reaction = Endothermic	1
6	Study the following chemical reaction : 2 Na (s) + 2 H_2O (l) -------> 2 NaOH (aq) + H_2 (g) The reducing agent in this reaction is : (a) Na (b) H_2O (c) NaOH (d) H_2	1
7	Sodium hydroxide is termed an alkali while Ferric hydroxide is not because :	1

	(a) Sodium hydroxide is a strong base, while Ferric hydroxide is a weak base. (b) Sodium hydroxide is a base which is soluble in water while Ferric hydroxide is also a base but it is not soluble in water. (c) Sodium hydroxide is a strong base while Ferric hydroxide is a strong acid. (d) Sodium hydroxide and Ferric hydroxide both are strong base but the solubility of Sodium hydroxide in water is comparatively higher than that of Ferric hydroxide	
8	A student sets up an experiment to study the role of enzymes in digestion of food.  In which test tube, the digestion of protein will occur? a. Test tubes A as pepsin will breakdown protein into simple molecules. b. Test tube B as HCl will breakdown protein into simple molecules. c. Test tube A as pepsin will breakdown into simple molecules. d. Test tube B as HCl will activate pepsin for breakdown of protein into simple molecules.	
9	Refer to the picture below, the part labelled 5 has:  a. Muscular walls as compared to 4 b. Thinner walls as compared to 3 c. Thicker walls as compared to 6 d. Thicker muscular walls as compared to 3 and 4	1
10	The function of the sporangium is to:	1

	 a. Bear spores b. Reproduce c. Disperse the bread mould d. Protect the mould from unfavourable conditions	
11	The period in the life cycle of man when the reproductive tissues begin to mature is called: a. Ovulation b. Puberty c. Spermatogenesis d. Sexual maturity	1
12	 The part labelled E : a. Passes the impulse to the spinal cord b. Is the sensory nerve c. Responds to the instructions sent from nervous system d. Carries out reflex action	1
13	Out of Blue and Green which colour has a greater refractive index? a. Blue b. Green c. Both have same wavelength d. None of these	1

14	Magnetic field at the center for a current carrying loop depends on a. Number of turns b. Current flowing c. Both a and b d. All of these	1
15	***Crop, mongoose, rat, snake, decomposer.*** A food chain comprises the members of an ecosystem, mentioned above. The secondary consumer and occupying the third trophic level in such a food chain , is: a. Rat and mongoose respectively b. Mongoose c. Rat and snake respectively d. Snake	1
16	The amount of energy utilized by producers and consumers respectively is:  a. 10000Kcal and 1000 Kcal respectively b. Solar and chemical energy respectively c. 1% of solar and 10% of producer respectively d. 10% of previous trophic level and 90% lost as heat respectively	1
	The following questions from Question 4 to Question 6 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 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** **(e) Both A and R are false**	
17	**Assertion (A)** : In the following reaction ZnO + C -------> Zn + CO ZnO undergoes reduction. **Reason (R)** : Carbon is a reducing agent that reduces ZnO to Zn.	1

18	**Assertion:** Androecium is the male part of the flower. It produces the ovules. **Reason**: Carpel is the female part of the flower. It produces female gametes.	1
19	**Assertion:** Fuses can prevent short circuit **Reason**: more is the potential difference greater will be the current flowing	1
20	**Assertion:** Food chains do not extend beyond three-four trophic levels. **Reason**: Herbivores are most affected by pesticides sprayed on crops.	1
	Section B **2 X 6 = 12**	
21	A metal nitrate 'A' on heating gives a metal oxide along with evolution of a brown coloured gas 'B' and a colourless gas, which helps in burning. Aqueous solution of 'A' when reacted with potassium iodide forms a yellow precipitate. (a) Identify 'A' and 'B' (b) Name the types of both the reactions involved in the above statement.	2
22	What is the function of: (i) Urethra (ii) Prostate gland in the male reproductive system ?	2
23	What are the characteristics of a respiratory organ? **OR** What is the function of the part labelled 6 and 11 ?  	2
24	In the network shown in the figure, the ring has zero resistance. Find the resistance between A and B.	2



25 Analyze the following observation table showing the variation of image position (v) with object position (u) in case of convex lens and answer the questions that follow without using lens formula

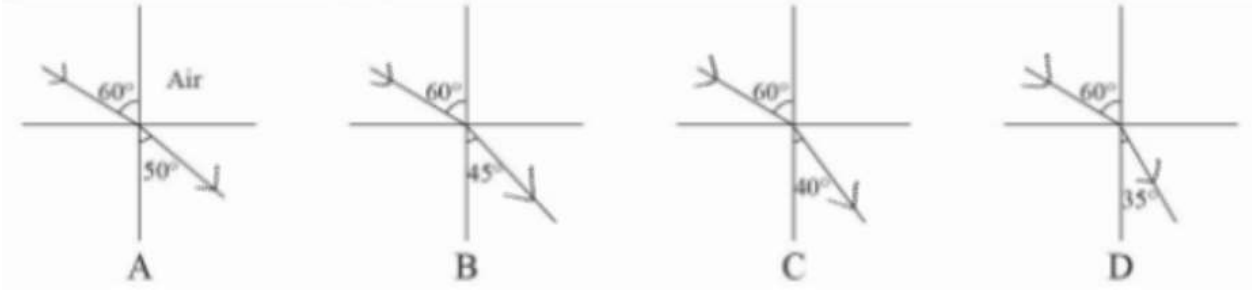
2

S No	Object distance (u) cm	Position of the screen (v) cm
1	100	25
2	60	30
3	40	40
4	30	60
5	25	100
6	15	120

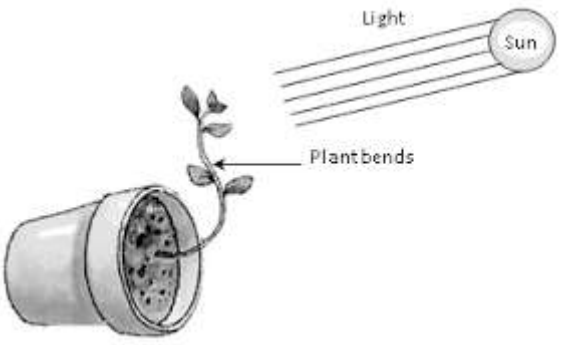
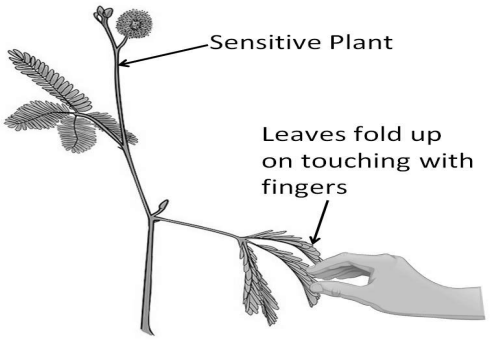
a) What is the focal length of the convex lens?
b) Identify the incorrect observation. Justify your answer.

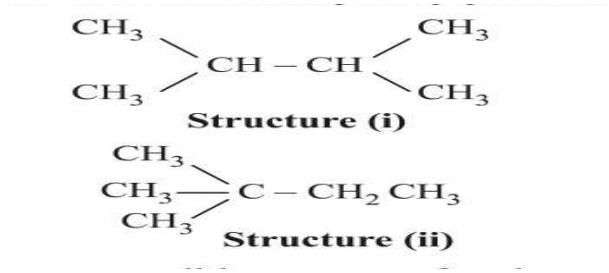
OR

Ram is performing an experiment with four different optical media. He traced the path of light in media A, B, C and D and draws the following diagrams:

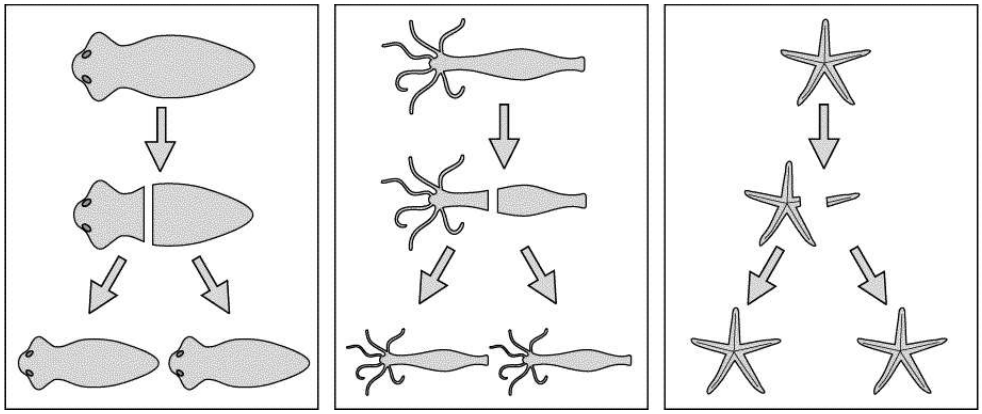


i) Which of the following has minimum optical density?

	ii) Through which media will the speed of light be maximum?	
26	How does the accumulation of Non biodegradable waste affect the environment?	2
	Section C **3 X 7 = 21**	
27	A metal 'M' reacts with dilute acid and liberates a gas 'G'. The same metal also liberates gas 'G' when it reacts with a base. Metal A is placed towards the top of the activity series and formula of its oxide is M_2O_3 (i) Write the name of metal M and gas 'G'. (ii) How will you test the presence of this gas? (iii) Write chemical equations for the reactions of the metal with (1) an acid and (2) a base.	3
28	Compound X and aluminium are used to join railway tracks. a)Identify the reaction. b) Name the compound 'X' c) Express the reaction between compound X and aluminium by a balanced chemical equation. d) How is this reaction useful in joining the railway tracks? **OR** Give Reasons for the following: a) Carbon cannot reduce the oxides of Na or Mg. b) The galvanised article is protected against rusting even if the zinc coating is broken. c) Calcium metal floats in water.	3
29	Identify the type of plant movements shown in the figures A and B below. State two differences between the two types of movements.  **A**  **B**	3
30	How will you prove that the genotype of the cross between purple coloured flowers and white flowers of pea plants, is 1:2:1 in the F2?	3
31	An electric iron is used on a 240 V supply and draws a current of 4 Ampere. (A) What is its power?	3

	(B) What is the cost of using the iron for the month of January 10 hours a day if 1KWH costs Rs 3.40?	
32	A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the board gently and observes that the iron filings arrange themselves in a particular pattern. (A) Why do the iron flings arrange in the given pattern? (B) What do the lines along which the iron filings align represent? (C) What does the crowding of iron filings at the end of the magnet indicate?	3
33	Two identical resistors, each of resistance 10Ω, are connected in (a) series and then (b) in parallel, in line to a battery of 6 volts. Calculate the ratio of power consumed in the combination of resistors in the two cases.	3
	Section D **5 X 3 = 15**	
34	(i) Draw the structure of the following compounds : (a) Butanoic acid (b) Chloropentane (ii) How are structure (i) and structure (ii) given below related to one another ? Give reason to justify your answer.  Structure (i) Structure (ii) Draw one more possible structure for the above case. (iii) Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula. OR (B) (a) A saturated organic compound 'A' (C_2H_6O) belongs to the homologous series of alcohols. On heating A with concentrated sulphuric acid at 443 K, it forms an unsaturated compound 'B' with molecular mass 28 u. The compound 'B' on addition of one mole of hydrogen in the presence of Nickel, changes to a saturated hydrocarbon 'C'. i) Identify A, B and C. ii) Write the chemical equations showing the conversion of A into B. iii) What happens when compound C undergoes combustion? iv) State one industrial application of hydrogenation reaction. v) Name the products formed when compound A reacts with sodium.	5
35	a. List two differences between the two types of fission. (2) b. What happens in case the ovum is not fertilized? (2)	5

c. Define the method of reproduction depicted below (1)

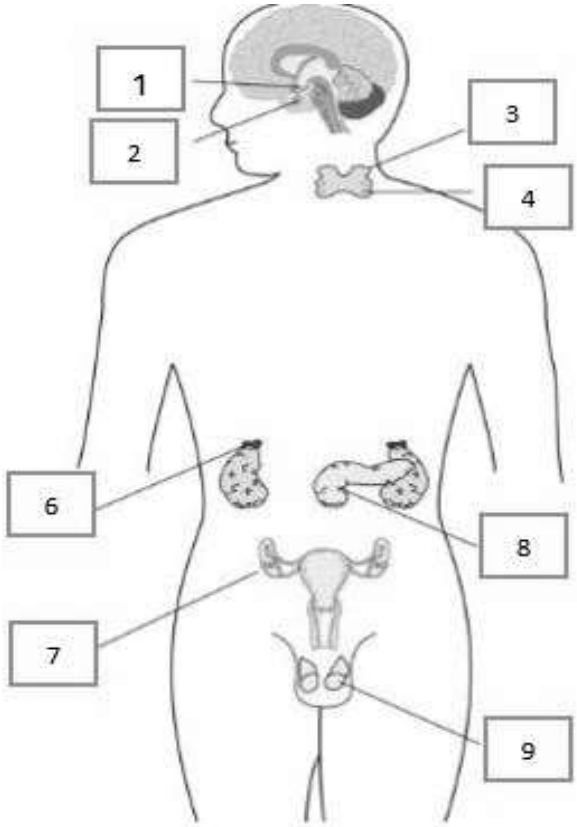


OR

a. Compare nervous and chemical coordination in animals. (2)

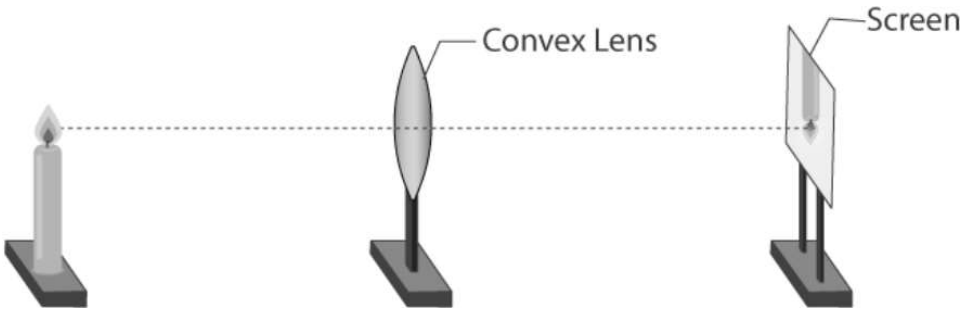
b. A person suffered a head injury due to which he faced problems with breathing. No problem was detected in his respiratory system. What could be the possible reason for this respiratory condition? (1)

c. What is the role of the glands labelled 3 and 6? (2)



36	Aditya and his friend Manoj placed a candle flame in front of a convex lens at various distances from it and obtained the image of the candle flame on a white screen.	5

They noted down the position of the candle, screen and the lens as under:
Position of candle = 20 cm
Position of convex lens = 50 cm
Position of screen = 80 cm



i) What is the image distance? (1)
ii) What is the focal length of the lens? (1)
iii) Where will the image be formed, if the candle is shifted towards the lens at a position of 35 cm? (1)
iv) If the object is shifted at 5 cm find the nature, size and position of the image formed (2)

OR

Draw ray diagrams showing the image formation by a convex mirror when an object is placed:
(A) at infinity
(B) at finite distance from the mirror

Section E
4 X 3 = 12

37 **Read the passage and answer the questions that follow:** 4

The melting points and boiling points of some ionic compounds are given below

COMPOUND	**MELTING POINT [K]**	**BOILING POINT [K]**
NaCl	1074	1686
LiCl	887	1600
$CaCl_2$	1045	1900
CaO	2850	3120
$MgCl_2$	981	1685

These compounds are termed ionic because they are formed by the transfer of electrons from a metal to a non-metal. The electron transfer in such compounds is controlled by the electronic configuration of the elements involved. Every element tends to attain a completely filled valence shell of its nearest noble gas or a stable octet.
(i) Show the electron transfer in the formation of magnesium chloride.

(ii) List two properties of ionic compounds other than their high melting and boiling points.

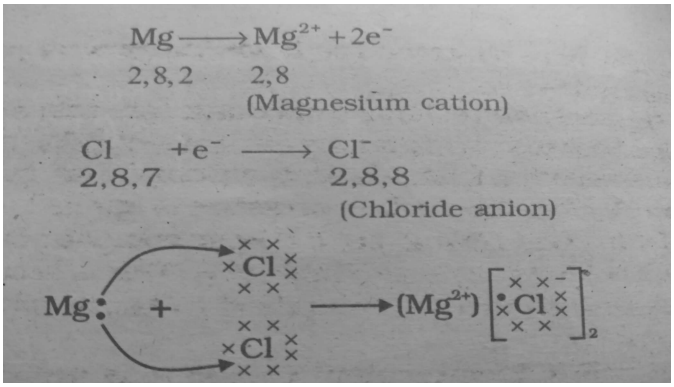
(iii) (A) While forming an ionic compound, say sodium chloride, how does the sodium atom attain its stable configuration ?

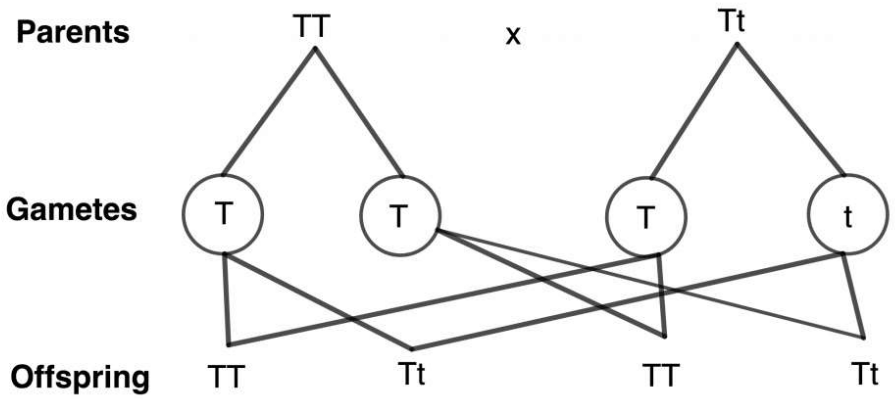
OR

(iii) (B) Give reasons :

(i) Why do ionic compounds in the solid state not conduct electricity ?

(ii) What happens at the cathode when electricity is passed through an aqueous solution of sodium chloride ?



38	**Read the passage and answer the questions that follow:** The terms dominant and recessive describe the inheritance patterns of certain traits. The traits which are expressed more often and observed more commonly in the population are called dominant traits. Recessive trait is a characteristic feature expressed by recessive genes. Recessive gene is a gene whose expression is suppressed by a dominant gene. Dominant traits are always expressed when the connected allele is dominant, even if only one copy of the dominant trait exists. Recessive traits are expressed only if both the connected alleles are recessive. An allele is the expression of a gene. For example in the figure shown below , both parents show the dominant trait.  a. What is a dominant trait? b. A trait is not expressed in the F1 of a population but seen in the F2. What does this tell us about the trait? c. What will be the phenotype of the offsprings in the above figure? d. The fused ear lobe condition is seen in some people. Is it a dominant or recessive trait? Give reasons for your answer. **OR** What is Mendel's First law of inheritance?	4
39	**Read the passage and answer the questions that follow:** The phenomenon in which a part of light incident on a particle is redirected in different directions is called scattering. Light having the least wavelength scatters the most. Reddish appearance of the sun at the time of sunrise and sunset and the blue appearance of the sky is due to scattering of light. The colour of scattered light depends on the size of particles. The smaller the size of particles, the smaller is the wavelength of scattered light. The path of sunlight entering a dark room through a fine hole is seen because of scattering of sunlight by dust particles present in the dark room. i) How does the sky appear to an astronaut? a. Blue b. Dark	4

	c. Violet d. White ii) At the time of sunrise and sunset: a. shorter wavelengths get scattered and longer wavelengths reach our eyes. b. shorter wavelengths get scattered and reach our eyes. c. green and blue colours get scattered and orange reaches our eyes. d. none of the above iii) Danger signals are red in colour because: a. Red colour can be seen from a large distance. b. Red colour is scattered the least. c. Both A and B d. none of the above **OR** iii) Sunlight which reaches the earth is yellowish rather than white because, due to scattering of light, sunlight reaching us is deficient in: a. blue colour b. red colour c. violet, indigo and blue colour d. green colour	