

DESIGN OF QUESTION PAPER

SAMPLE QUESTION PAPER

X - SCIENCE (THEORY)

Time : 2½ Hours

Max. Marks : 60

The weightage to marks over different dimensions of the question paper shall be as under:

A. Weightage to Content/Subject units

S.No	Content Unit	Marks
1.	Chemical Substances	18
2.	World of living	16
3.	Effects of current	10
4.	Light	8
5.	Natural Resources	8
Total		60

B. Weightage to forms of Questions

S.No.	Form of Questions	Marks for each question	No. of questions	Total Marks
1.	Very short answer type (VSA)	01	09	09
2.	Short answer type (SA I)	02	09	18
3.	Short answer type (SA II)	03	06	18
4.	Long answer type (LA)	05	03	15
Total			27	60

C. Number of Sections

The question paper will have two sections A & B

D. Scheme of Options

There will be no overall choice. However, there is an internal choice in every question of five marks category.

E. Weightage to difficulty level of questions

S.No.	Estimated difficulty level of questions	Percentage
1.	Easy	15
2.	Average	70
3.	Difficult	15

F. Typology of Questions

In order to assess different abilities related to the subject, the question paper includes open-ended questions, drawing/illustrations based questions, communication-skill based questions and activity-based questions.

About 20% weightage has been assigned to questions testing higher order thinking skills of learners.

BLUE PRINT I
X SCIENCE (THEORY)

Form of Questions Unit	VSA (1 Mark)	SA - I (2 Marks)	SA - II (3 Marks)	LA (5 Marks)	Total
Chemical Substances	3(3)	4(2)	6(2)	5(1)	18(8)
World of Living	2(2)	6(3)	3(1)	5(1)	16(7)
Effects of current	1(1)	4(2)	-	5(1)	10(4)
Light	2(2)	-	6(2)	-	8(4)
Natural Resources	1(1)	4(2)	3(1)	-	8(4)
Total	9(9)	18(9)	18(6)	15(3)	60(27)

SAMPLE PAPER I
X - SCIENCE (THEORY)

Time : 2½ Hours

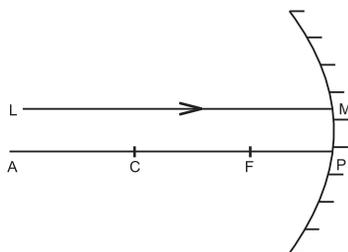
Max. Marks : 60

General Instructions

1. The question paper comprises of two sections A and B. You are to attempt both the sections.
2. All questions are compulsory.
3. There is no overall choice However, internal choice has been provided in all the three questions of five marks category. Only one option in such questions is to be attempted.
4. All questions of section A and all questions of section B are are to be attempted separately.
5. Questions 1 to 6 in section A and 17 to 19 in section B are short question. These carry one mark each.
6. Questions 7 to 10 in section A and 20 to 24 in section B are short answer type questions and carry two marks each.
7. Questions 11 to 14 in section A and 25 to 26 in section B are also short answer type questions and carry three marks each.
8. Questions 15 and 16 in section A and question 27 in section B are long answer type questions and carry five marks each.

SECTION A

1. A ray of light LM is incident on a mirror as shown in the figure. The angle of incidence for this ray is the angle between it and the line joining two other points in the figure. Name these two points.



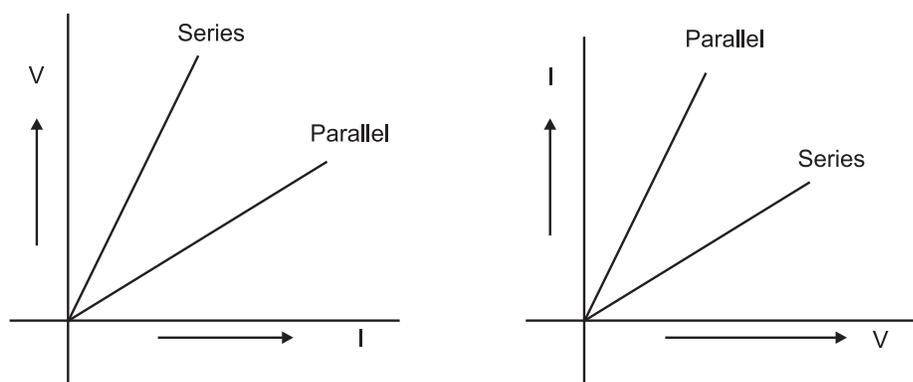
2. Metals generally occur in solid state. Name and write symbol of a metal that exists in liquid state at room temperature.
3. During summer season, a milkman usually adds a very small amount of baking soda to fresh milk. Give one reason.

4. The following table gives the values of refractive indices of a few media.

S.No.	1	2	3	4	5
Medium	Water	Crown Glass	Rock salt	Ruby	Diamond
Refractive Index	1.33	1.52	1.54	1.71	2.42

Use this table to give an example of (i) a medium pair so that light speeds up when it goes from one of these media to another. (ii) a medium pair so that light slows down when it goes from one of these media to another.

- Why potato chips manufacturers fill the packet of chips with nitrogen gas?
- Alloys are used in electrical heating devices rather than pure metals. Give one reason.
- Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets? What should we do to prevent it?
- A student has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings.
- Two students perform the experiments on series and parallel combinations of two given resistors R_1 and R_2 and plot the following V-I graphs.



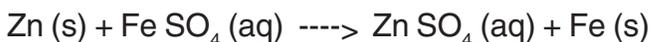
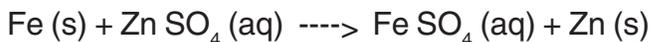
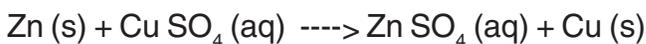
Which of the graphs is (are) correctly labelled in terms of the words 'series' and 'parallel'? Justify your answer.

- Draw the pattern of magnetic field lines of a current carrying solenoid. What does the pattern of field lines inside the solenoid indicate? Write one application of magnetic field of current carrying solenoid.
- A student finds the writing on the blackboard as blurred and unclear when sitting on the last desk in the classroom. He however, sees it clearly when sitting on the front desk at an approximate distance of 2m from the blackboard.

Draw ray diagrams to illustrate the formation of image of the blackboard writing by his eye-lens when he is seated at the (i) last desk (ii) front desk.

Name the kind of lens that would help him to see clearly even when he is seated at the last desk. Draw a ray diagram to illustrate how this lens helps him to see clearly.

12. State which of the following chemical reactions will take place or not, giving suitable reason for each.



13. (a) Two lenses have power of (i) + 2D (ii) - 4D. What is the nature and focal length of each lens?
 (b) An object is kept at a distance of 100cm from each of above lenses.
 Calculate the (i) image distance (ii) magnification in each of the two cases.

14. The following table shows the position of six elements A, B, C, D, E and F in the periodic table.

Groups	1	2	3 to 12	13	14	15	16	17	18
Periods									
2.	A					B			C
3.		D			E				F

Using the above table answer the following questions :

- (a) Which element will form only covalent compounds?
 (b) Which element is a metal with valency 2?
 (c) Which element is a non-metal with valency of 3?
 (d) Out of D and E, which one has a bigger atomic radius and why?
 (e) Write a common name for the family of elements C and F.
15. An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $\text{C}_2\text{H}_2\text{O}_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'.
- (i) Identify the compound 'A'
 (ii) Write the chemical equation for its reaction with ethanol to form compound 'B'.
 (iii) How can we get compound 'A' back from 'B'?
 (iv) Name the process and write corresponding chemical equation.
 (v) Which gas is produced when compound 'A' reacts with washing soda? write the chemical equation.

OR

- (a) Why does carbon form largest number of compounds?
 (b) Why are some of these called saturated and other unsaturated compounds?

(c) Which of these two is more reactive?

(d) Write the names of the compounds.

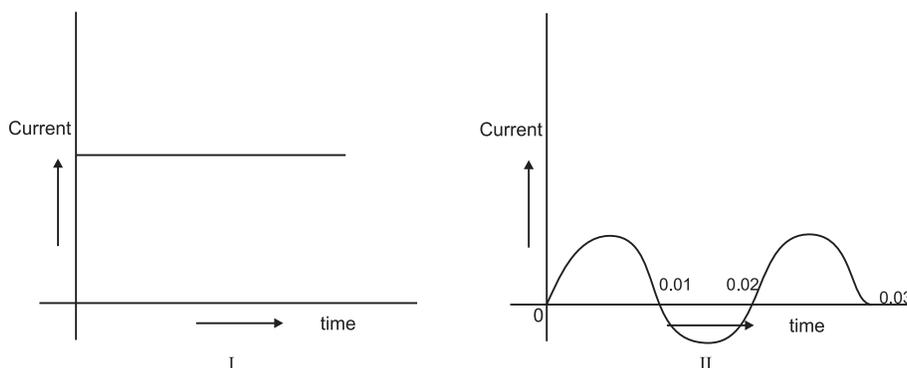


16. In a household electric circuit different appliances are connected in parallel to one another. Give two reasons.

An electrician puts a fuse of rating 5A in that part of domestic electrical circuit in which an electrical heater of rating 1.5kW, 220V is operating. What is likely to happen in this case and why? What change, if any, needs to be made?

OR

You are given following current-time graphs from two different sources:

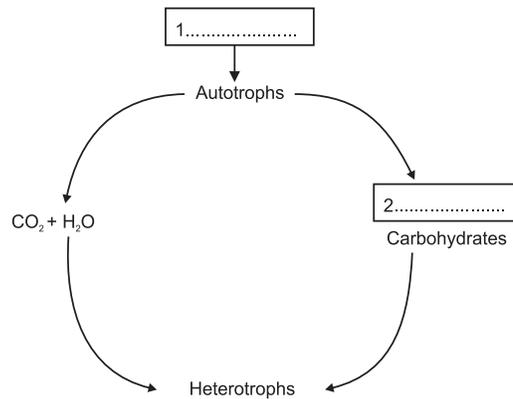


- (i) Name the type of current in two cases.
(ii) Identify any one source for each type of these currents.
(iii) What is the frequency of current in case II in India?
(iv) Use above graphs to write two difference between the current in two cases.

SECTION B

17. After a vigorous exercise, you may experience cramps in your leg muscles. Why does this happen? 1
18. Which organ secretes a hormone when the blood sugar rises. Name a digestive enzyme released by this organ. 1
19. Name two gases, other than carbon-di-oxide, that are given out during burning of fossil fuel and contribute towards acid rain formation. 1
20. Out of two solar cookers, one was covered by a plane glass slab and the other was left open. Which of the two solar cookers will be more efficient and why? 2

21. In the flow chart given below, fill in the blank spaces with the kind of energy available. 2



22. By comparing the similarity of nucleotide sequences in DNA of different kinds of organisms, evolutionary relationships can be established

- (i) Arrange the following according to their evolutionary closeness. (You may use your knowledge of classification also).
- (ii) Whose DNA among the following do you think is most similar to that of humans? 2
cockroach, mango tree, gorilla, fish

23. Study carefully the food chains given below:-

Food chain I : grass - grasshopper - frog

Food chain II : wheat - rat - snake - hawk

To which of the two consumers, snake or hawk will more energy (percent) be available and why?

2

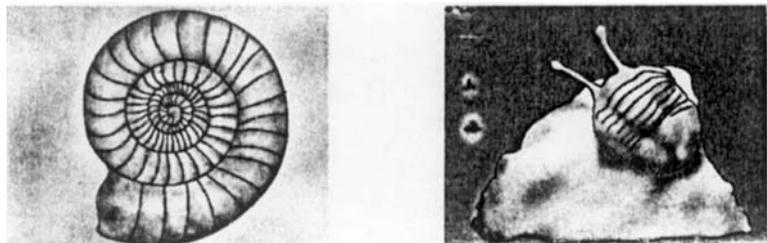
24. What do the following transport?

- (i) xylem (ii) phloem (iii) pulmonary vein (iv) Vena Cava

25. Give one term caption for the two pictures given here.

Define the term and give its significance in evolution

3



26. Why are environmentalists insisting upon 'sustainable natural resource management'? Give any three reasons

27. Study the given data and answer the questions following the data.

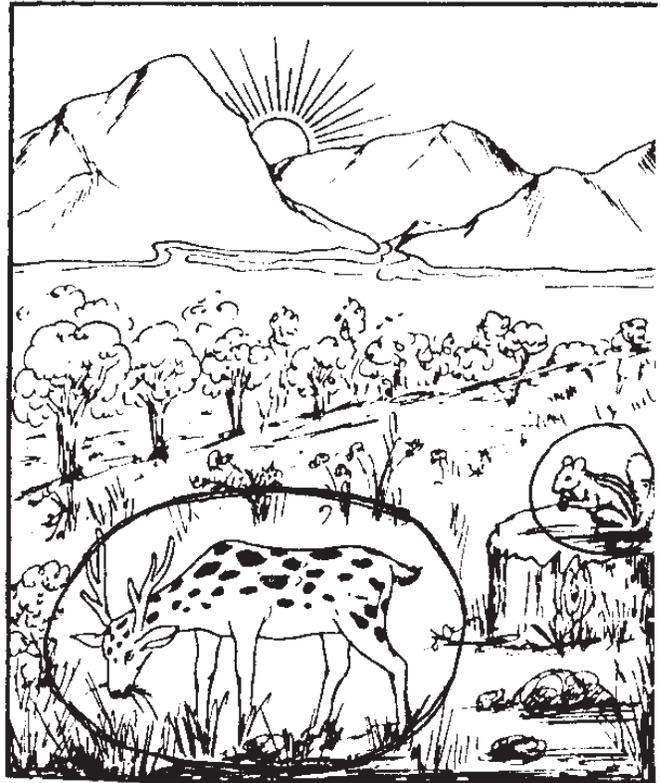
Parental plants cross fertilised & seeds collected	F ₁ (first generation off spring)	F ₂ (offspring of self pollination of F ₁)
Male parent always bore red flowers. Female parent always had white flowers.	330 seeds sown and observed All 330 gave red flowers	Out of 44 seeds 33 seeds gave plants with red flowers and 11 seeds gave plants with white flowers

- (i) What is the term for this type of cross?
- (ii) What does the data of the column marked F₁ indicate?
- (iii) Express the genotype of the (a) parents (b) F₁ Progeny and (c) F₂ Progeny 5

OR

Study the picture given below and comment on the encircled organisms with respect to

- (i) the category according to the food they eat.
- (ii) trophic level to which they belong.
- (iii) percentage of energy available at their trophic level.
- (iv) two abiotic components of the ecosystem inhabited by them.
- (v) energy used for food production by the producers.



X SCIENCE (THEORY)

BLUE PRINT II

Unit / Form of Questions	VSA (1 Mark)	SA - I (2 Marks)	SA - II (3 Marks)	LA (5 Marks)	Total
Chemical Substances	3(3)	4(2)	6(2)	5(1)	18(8)
World of Living	2(2)	6(3)	3(1)	5(1)	16(7)
Effects of current	1(1)	4(2)	-	5(1)	10(4)
Light	2(2)	-	6(2)	-	8(4)
Natural Resources	1(1)	4(2)	3(1)	-	8(4)
Total	9(9)	18(9)	18(6)	15(3)	60(27)

SAMPLE QUESTION PAPER II

X - SCIENCE (Theory)

Time : 2½ Hours

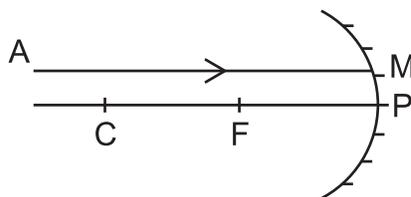
Max. Marks : 60

General Instructions

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8. Questions 15 and 16 in section A and question 27 in section B are long answer type questions and carry five marks each.

SECTION A

1. A ray of light AM is incident on a spherical mirror as shown in the diagram.



- Redraw the diagram on the answer sheet and show the path of reflected ray. Also indicate and mark the angle of reflection in the diagram.
2. A metal M forms an oxide having the formula M_2O_3 . It belongs to 3rd period in the modern periodic table. Write the atomic number and valency of the metal.
 3. The ciliary muscles of a normal eye are in their (i) most relaxed (ii) most contracted state. In which of the two cases is the focal length of the eye-lens more?

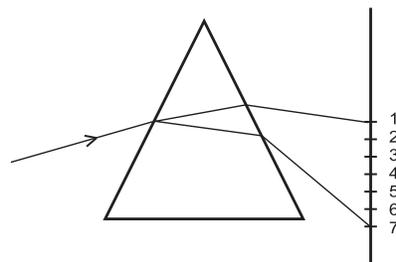
4. Tap water conducts electricity whereas distilled water does not. Why?
5. An electric geyser has the ratings 2000W, 220V marked on it. What should be the minimum rating, in whole number of a fuse wire, that may be required for safe use with this geyser?
6. An organic compound burns with a sooty flame. Is it a saturated or an un saturated compound?
7. Two metallic wires A and B are connected in parallel. Wire A has length l and radius r , wire B has a length $2l$ and radius $2r$. Compute the ratio of the total resistance of parallel combination and the resistance of wire A.
8. A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that
 - (i) the direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are inter changed.
 - (ii) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.

Which of the above observations of the student is incorrect and why?

9. A housewife wanted her house to be whitewashed. She bought 10kg of quick lime from the market and dissolved it in 30 litres of water. On adding lime to water she noticed that the water started boiling even when it was not being heated. Give reason for her observation. Write the corresponding chemical equation and name the product formed.
10. Write the electron - dot structure for sodium and chlorine atoms. How do these form a chemical bond? Name the type of bond so formed. Why does a compound so formed have high melting point?
11. Two carbon compounds A and B have the molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition reaction? Justify your answer. Explain with the help of a chemical equation, how an addition reaction is useful in vegetable ghee industry.
12. A beam of white light falling on a glass prism gets split up into seven colours marked 1 to 7 as shown in the diagram.

A student makes the following statements about the spectrum observed on the screen.

- a) The colours at positions marked 3 and 5 are similar to the colour of the sky and the core of a hard boiled egg respectively. Is the above statement made by the student correct or incorrect? Justify.
- b) Which two positions correspond closely to the colour of



- (i) a solution of potassium permanganate?
 - (ii) 'danger' or stop signal lights?
13. Baking soda is used in small amount in making bread and cake. It helps to make these soft and spongy. An aqueous solution of baking soda turns red litmus blue. It is also used in soda acid fire extinguisher.
Use this information to answer the following questions:
- (i) How does Baking Soda help to make cakes and bread soft and spongy?
 - (ii) How does it help in extinguishing fire?
 - (iii) is the pH value of baking soda solution lesser than or greater than 7?
14. A concave mirror produces three times enlarged image of an object placed at 10 cm in front of it. Calculate the radius of curvature of the mirror.
15. a) What were the two major shortcomings of Mendeleev's periodic table? How have these been removed in the modern periodic table?
b) Two elements X and Y have atomic numbers 12 and 16 respectively. Write the electronic configuration for these elements. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why?

OR

- a) What were the two achievements of Mendeleev's Periodic table? What was the basis of classification of elements in it ?
 - b) An element X (2,8,2) combines separately with NO_3 and $(\text{SO}_4)^{2-}$, $(\text{PO}_4)^{3-}$ radicals. Write the formulae of the three compounds so formed. To which group of the periodic table does the element 'X' belong? Will it form covalent or ionic compound? Why?
16. a) The electric power consumed by a device may be calculated by using either of the two expressions $P = I^2R$ or $P = \frac{V^2}{R}$. The first expression indicates that it is directly proportional to R whereas the second expression indicates inverse proportionality. How can the seemingly different dependence of P on R in these expressions be explained?
b) Explain the following:
- (i) Why is tungsten used almost exclusively for filament of electric lamps?
 - (ii) Why are copper and aluminium wires usually used for electricity transmission?

OR

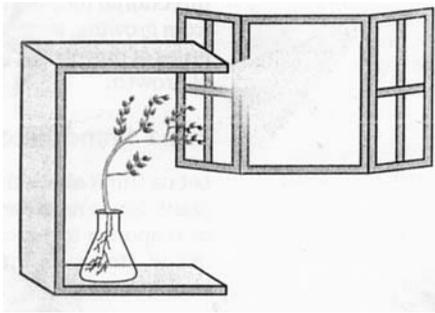
Explain the meaning of the word 'electromagnetic' and 'induction' in the term electromagnetic induction. On what factors does the value of induced current produced in a circuit depend? Name and state the rule used for determination of direction of induced current. State one practical application of this phenomenon in everyday life.

Section B

17. From the list given below, pick out the items which can be recycled:-
Used clothes, polythene carry bags, glass bottles, newspaper

1

18.



What does the given experimental set-up demonstrate?

1

19. A particular hormone requires Iodine for its synthesis. Name the endocrine gland which secretes this hormone and state its location in the human body. 1

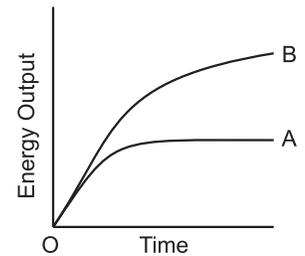
20. Why are many thermal power plants set up near coal or oilfields? 2

21. Name those parts of the flower which serve the same function as the following do in the animals:-

- (i) testis (ii) ovary (iii) eggs (iv) sperms

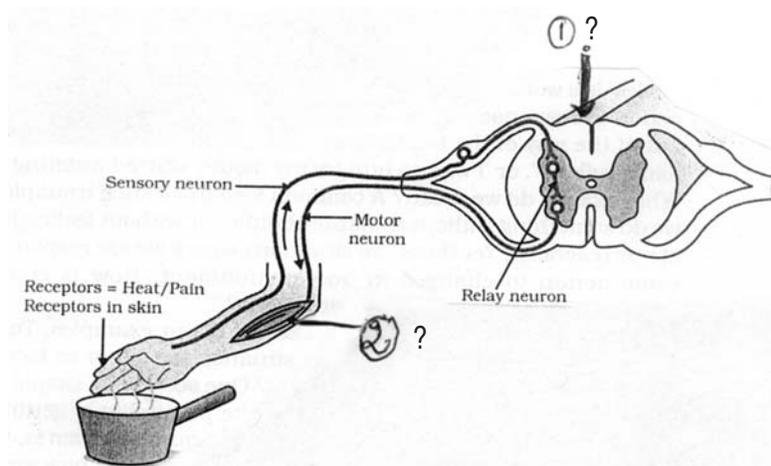
2

22. A graph was plotted to show the energy output of two types of respiration. Identify the types of respiration denoted by curves A and B. 2



23. How did the 'Chipko andolan' ultimately benefit the local population? Give any two benefits. 2

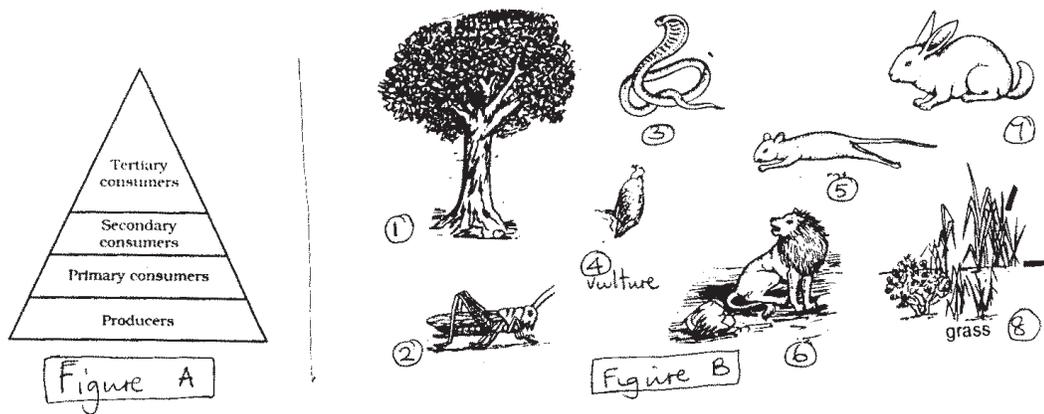
24.



(i) Label the two parts indicated by question marks and labelled 1 and 2 in the above diagram.

(ii) Suggest a suitable caption or heading for the above diagram. 2

25. Write the number given to any six of the organisms shown in Figure B against their relevant Trophic levels given in figure given below. 3



26. The genotype of green stemmed tomato plants is denoted as GG and that of purple-stemmed tomato plants as gg. When these two are crossed,
- What colour of stem would you expect in their F_1 progeny?
 - Give the percentage of purple-stemmed plants if F_1 plants are self pollinated.
 - In what ratio would you find the genotypes GG and Gg in the F_2 progeny? 3
27.
 - Draw the diagram of heart and label its four chambers
 - Construct a table to show the functions of these four chambers. 5

OR

Plants absorb water from the soil. How does this water reach the tree tops? Explain in detail

X SCIENCE (THEORY)

BLUE PRINT III

Unit / Form of Questions	VSA (1 Mark)	SA - I (2 Marks)	SA - II (3 Marks)	LA (5 Marks)	Total
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World of Living	2(2)	6(3)	3(1)	5(1)	16(7)
Effects of current	3(3)	4(2)	3(1)	-	10(6)
Light	1(1)	2(1)	-	5(1)	8(3)
Natural Resources	1(1)	4(2)	3(1)	-	8(4)
Total	9(9)	18(9)	18(6)	15(3)	60(27)

SAMPLE PAPER III
X SCIENCE (THEORY)

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8. Questions 15 and 16 in section A and question 27 in section B are long answer type questions and carry five marks each.

SECTION A

1. Dry Hydrogen Chloride gas does not turn blue litmus red whereas Hydrochloric acid does. Give one reason.
2. Identify the substance oxidised and reduced in the chemical reaction :
$$\text{MnO}_2 + 4\text{HCl} \longrightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$$
3. You are give three resistors of $10\ \Omega$, $10\ \Omega$ and $20\ \Omega$, a battery of emf 2.5V, a key, an ammeter and a voltmeter. Draw a circuit diagram showing the correct connections of all given components such that the voltmeter gives a reading of 2.0V.
4. Sketch magnetic field lines around a current carrying straight conductor.
5. The electrical resistivity of few materials is given below in ohm-meter. Which of these materials can be used for making element of a heating device?

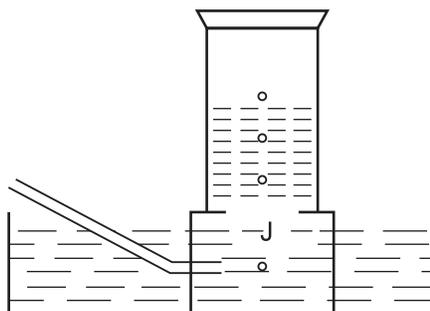
A	6.84×10^{-8}
B	1.60×10^{-8}
C	1.00×10^{-4}
D	2.50×10^{12}
E	4.40×10^{-5}
F	2.30×10^{17}
6. Refractive index of media A, B, C and D are

A	1.33
B	1.52
C	1.44
D	1.65

In which of the four media is the speed of light (i) maximum (ii) minimum.?

7. A metal is treated with dilute sulphuric acid. The gas evolved is collected by the method shown in the figure. Answer the following.

- Name the gas.
- Name the method of collection of the gas.
- Is the gas soluble or insoluble in water?
- Is the gas lighter or heavier than air?



8. A household uses the following electric appliances :

- Refrigerator of rating 400W for ten hours each day.
- Two electric fans of rating 80W each for twelve hours each day.
- Six electric tubes of rating 18W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

9. What is the meaning of the term 'frequency' of an alternating current? What is its value in India?

Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy?

10. A person is able to see objects clearly only when these are lying at distances between 50cm and 300cm from his eye.

- What kind of defects of vision he is suffering from?
- What kind of lenses will be required to increase his range of vision from 25cm to infinity? Explain briefly.

11. A student dropped few pieces of marble in dilute Hydrochloric acid contained in a test tube. The evolved gas was passed through lime water. What change would be observed in lime water? Write balanced chemical equations for both the changes observed.

12. Atomic number is considered to be a more appropriate parameter than atomic mass for classification of elements in a periodic table. Why?

How does atomic size of elements vary on moving from

- left to right in a period.
- from top to bottom in a group.

Give reasons for your answers.

13. Why does a current carrying conductor kept in a magnetic field experience force? On

what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.

14. Answer the following:

- Why is Plaster of Paris written as $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$? How is it possible to have half a water molecule attached to CaSO_4 ?
- Why is Sodium Hydrogen Carbonate an essential ingredient in antacids.?
- When electricity is passed through an aqueous solution of sodium chloride, three products are obtained. Why is the process called chlor-alkali?

15. Four metals A, B, C and D are, in turn, added to the following solutions one by one. The observations made are tabulated below:

Metal	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Displacement	—	—
B	Displacement	—	No reaction	—
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on above information.

- Which is the most active metal and why?
- What would be observed if B is added to a solution of copper (II) sulphate and why?
- Arrange the metals A, B, C and D in order of increasing reactivity.
- Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.
- Which of the above solutions can be easily stored in a container made up of any of these metals?

OR

You are given the following materials:

- Iron nails
- Copper sulphate solution
- Barium chloride solution
- Copper powder
- Ferrous sulphate crystals
- Quick Lime

Identify the type of chemical reaction taking place when.

- Barium chloride solution is mixed with copper sulphate solution and a white precipitate is observed.
- On heating copper powder in air in a China dish, the surface of copper powder turns black.
- On heating green coloured ferrous sulphate crystals, reddish brown solid is left

and smell of a gas having odour of burning sulphur is experienced.

- (d) Iron nails when left dipped in blue copper sulphate solution become brownish in colour and the blue colour of copper sulphate fades away.
- (e) Quick lime reacts vigorously with water releasing a large amount of heat.

16. Draw ray diagrams to show the formation of a three times magnified (i) real image (ii) virtual image of an object kept in front of a converging lens. Mark the positions of object, F, 2F, O and position of image clearly in the diagram.

An object of size 5 cm is kept at a distance of 25cm from the optical centre of a converging lens of focal length 10cm. Calculate the distance of the image from the lens and size of the image.

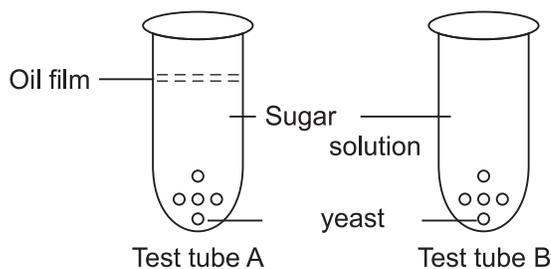
OR

Give reasons for the following:

- (i) The sky appears to be blue during day time to a person on earth.
- (ii) The sky near the horizon appears to have a reddish hue at the time of sunset and sunrise.
- (iii) The sky appears dark instead of blue to an astronaut.
- (iv) The stars appear to twinkle.
- (v) The planets do not twinkle.

(SECTION B)

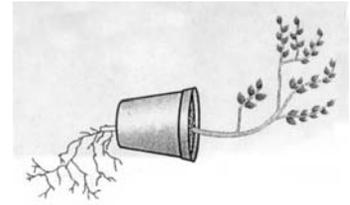
17. Justify in one sentence that hydropower (hydel electricity) is a renewable source of energy. 1
18. 'Malarial parasite' divides into many daughter individuals simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction. 1
19. The human hand, cat paw and the horse foot, when studied in detail show the same structure of bones and point towards a common origin.
- (i) What do you conclude from this?
 - (ii) What is the term given to such structures? 1
20. In the test tubes A and B shown below, yeast was kept in sugar solution. Which products of respiration would you expect in tubes A and B?



2

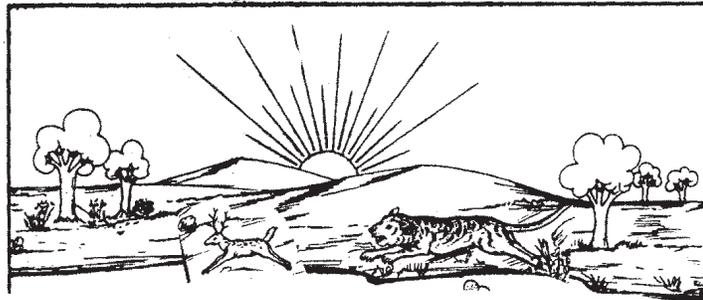
21. Write one feature which is common to each of the following pairs of terms / organs.
 (i) glycogen and starch ; (ii) chlorophyll and haemoglobin
 (iii) gills and lungs (iv) arteries and veins 2

22. The given experimental set up tests the response of different parts of plant towards gravity. Use scientific terms for the conclusions. 2



23. Select the biodegradable items from the list given below.
 Polythene bags, old clothes, wilted flowers, pencil shavings, glass bangles, bronze statue vegetable peels. 2

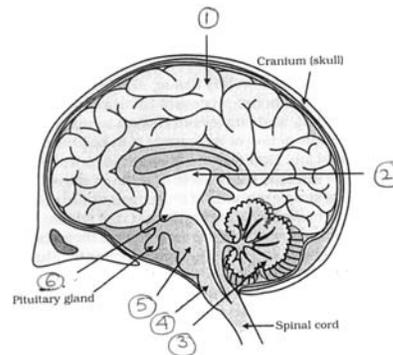
24. 2



Given above is a picture of an ecosystem. Identify any two abiotic components and any two biotic components of this ecosystem. 2

25. Quote three instances where human intervention saved the forests from destruction. 3

26. Label parts 1 to 6 in the given figure of the brain



27. Explain that it is a matter of chance whether a couple will give birth to a boy or a girl. 5

OR

Which hormone is released into blood when its sugar level rises? Name the organ which produces the hormone and its effect on blood sugar level. Also name one digestive enzyme that this organ secretes and the function of this enzyme.