Science

Time: 3 Hours **Max. Marks: 80**

S. No.	Typology of Question	Very Short Answer (VSA) 1 Mark	Short Answer– I (SA I) 2 Marks	Short Answer– II (SA II) 2 Marks	Long Answer (LA) 5 Marks	Total Marks	% Weightage
1.	**Remembering**	2	-	1	1	10	15%
2.	**Understanding**	-	1	4	2	24	35%
3.	**Application**	-	1	2	2	18	26%
4.	**High Order Thinking Skills**	-	-	1	1	8	12%
5.	**Inferential and Evaluative**	-	1	1 + 1**	-	8	12%
	Total (Theory Based Questions)	2 × 1 = 2	3 × 2 = 6	10 × 3 = 30	6 × 5 = 30	68(21)	100%
	Practical Based Questions		6 × 2 = 12	-	-	12(6)	
	Total	2 × 1 = 2	9 × 2 = 18	10 × 3 = 30	6 × 5 = 30	80(27)	

1. Question paper will consist of 27 questions

2. All questions would be compulsory. However, an internal choice will be provided in two questions of 3 marks each and one question of 5 marks.

** One Question of 3 marks will be included to assess the values inherent in the texts.

SCIENCE

Time allowed: 3 hours **Maximum marks: 80**

General Instructions:

($\boldsymbol{i}$) The question paper comprises two sections, A and B. You are to attempt both the sections.
($\boldsymbol{ii}$) All questions are compulsory.
($\boldsymbol{iii}$) All questions of Section-A and B are to be attempted separately
($\boldsymbol{iv}$) There is an internal choice in three questions of three marks each, two questions of five marks each and one question of two marks each (practical skills).
($\boldsymbol{v}$) Question numbers 1 and 2 in Section-A are one-mark questions. They are to be answered in one word or in one sentence.
($\boldsymbol{vi}$) Question numbers 3 to 5 in Section-A are two marks questions. These are to be answered in 30 words each.
($\boldsymbol{vii}$) Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.

(vii) Question numbers 16 to 21 in Section-A are five marks questions. These are to be answered in 70 words each.
(ix) Question numbers 22 to 27 in Section-B are based on practical skills. Each question is a two marks question.

These are to be answered in brief.

SECTION - A

1. Why are lungs divided into very small sac-like structures called alveoli? 1

2. Why is pituitary called as the master gland? 1

3. Element X forms a chloride XCl_2, which is a solid with a high melting point. X would most likely be in the same group of the periodic table as :

   (i) Na (ii) Mg (iii) Al (iv) Si.

   Give reason for your choice. 2

4. A convex lens forms a real and inverted image of a needle at a distance of 50 cm from it. Where is the needle placed in front of the convex lens if the image is equal to the size of the object? Also find the power of the lens. 2

5. Can you suggest some changes in your school which would make it environment friendly? 2

6. Draw a schematic labelled diagram of a domestic wiring circuit which includes

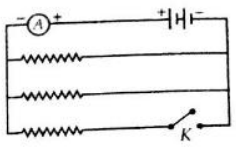
   (i) a main fuse (ii) a power meter

   (iii) one light point (iv) a power output socket 3

   OR

   What is the function of an earth wire? Why is it necessary to earth metallic appliances? 3

7. In the shown diagram, the cell and the ammeter both have negligible resistance. The resistors are identical. With the switch K open, the ammeter reads 0.6 A. What will be the ammeter reading when the switch is closed? 3



8. Write the balanced chemical equations for the following reactions :

   (i) phosphorus burns in presence of chlorine to form phosphorus pentachloride.

   (ii) burning of natural gas.

   (iii) the process of respiration. 3

9. (i) Give one difference between Modern Periodic Table and Mendeleev's Periodic Table.

   (ii) What are the merits of Mendeleev's Periodic Table? 3

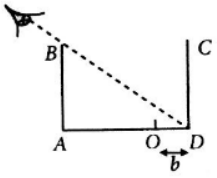
10. Which part of the human heart is considered as pacemaker? Why is it so called? 3

    OR

    Describe the mechanism of blood clotting. 3

11. Explain how the sex of the child is determined at the time of conception in human beings. 3

12. A cubical vessel with opaque walls, is so placed that the eye of an observer cannot see its bottom but can see the entire wall *CD*. A small object is placed at *O* at a distance $b = 10$ cm from corner *D*. What minimum depth of water should be poured into the vessel which will enable the observer to see the object? (Refractive index of water = 4/3) 3



13. (i) How would you distinguish between baking powder and washing soda by heating? Write the chemical reactions involved.

(ii) Write the chemical equation for the preparation of bleaching powder and give one of its uses. 3

OR

Answer the following :

(a) What is plaster of Paris? Mention one of its uses.

(b) Why is sodium hydrogen carbonate an essential ingredient in antacids?

(c) When electricity is passed through an aqueous solution of sodium chloride, what are the products obtained. Why is the process called chlor-alkali? 3

14. What is the importance of hydropower plants in India? Describe how electric energy is generated in such plants. 3

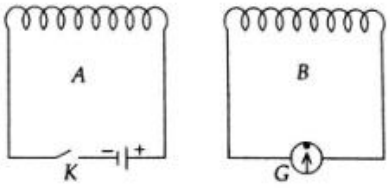
15. In a village, people used to dump their wastes in park area due to which it became very dirty. Then school children organised a camp near the park to create awareness among the people about cleanliness. They told people that they should throw the garbage in dustbins. They also emphasised village people to keep blue and green coloured dustbins in public areas and discard organic waste in green dustbins and non-biodegradable wastes like plasticwares in blue dustbins.

(a) What values were shown by school children?

(b) How can you, as an individual contribute in protecting our environment?

(c) List the initiatives taken by government to help in keeping our environment clean. 3

16. Two coils *A* and *B* are placed as shown in figure. The coil *A* is connected to a battery and a key *K* while the coil *B* is connected to a centre zero galvanometer *G*. What will you observe in the galvanometer *G* when



(i) the key *K* is closed.

(ii) the key *K* is opened.

(iii) with the key *K* closed, the coil *A* is moved rapidly towards the coil *B*.

(iv) with the key *K* closed, the coil *B* is moved rapidly towards the coil *A*.

(v) with the key *K* closed, the coils *A* and *B* are moved away from each other. **5**

17. (a) What is homologous series of compounds? List any two characteristics of homologous series.

(b) (i) What would be observed on adding 5% solution of alkaline potassium permanganate drop by drop to some warm ethanol taken in a test tube?

(ii) Write the name of the compound formed during the chemical reaction.

(c) How would you distinguish experimentally between an alcohol and a carboxylic acid on the basis of a chemical property? **5**

OR

An organic compound '*A*' having molecular formula, $C_2H_4O_2$ reacts with sodium carbonate and evolves a gas '*B*' which turns lime water milky. '*A*' also reacts with ethanol in the presence of concentrated sulphuric acid to form sweet smelling substance '*C*' used in making perfumes.

(i) Identify the compounds *A*, *B* and *C* and write their names with formula.

(ii) Write balanced chemical equations to represent the conversion of

(a) compound *A* into compound *B*. (b) compound *A* into compound *C*. **5**

18. List the functions of testosterone and estrogen. 5

19. Make a diagram to show how hypermetropia is corrected and explain. The near point of a hypermetropic eye is 1 m. What is the power of the lens required to correct this defect? Assume that the near point of the normal eye is 25 cm. 5

20. Sample of five metals '*A*', '*B*', '*C*', '*D*' and '*E*' were taken and added to the following solutions one by one. The results obtained have been tabulated as follows :

Metal	$FeSO_4$	$CuSO_4$	$ZnSO_4$	$AgNO_3$	$Al_2(SO_4)_3$	$MgSO_4$
A	No reaction	Displacement	No reaction	Displacement	No reaction	No reaction
B	Displacement	Displacement	No reaction	Displacement	No reaction	No reaction
C	No reaction	No reaction	No reaction	Displacement	No reaction	No reaction
D	No reaction	No reaction	No reaction	No reaction	No reaction	No reaction
E	Displacement	Displacement	Displacement	Displacement	No reaction	No reaction

Use the above table to answer the following questions about the given metals.

(a) Which of them is most reactive and why?

(b) What would you observe if '*B*' is added to $CuSO_4$ solution?

(c) Arrange '*A*', '*B*', '*C*', '*D*' and '*E*' in the increasing order of reactivity.

(d) Container of which metal can store zinc sulphate and silver nitrate solutions?

(e) Which of the above solutions can be stored in a container made of any of these metals and why? 5

21. Define reflex arc and draw its labelled diagram. 5

OR

(a) What is 'phototropism'? How does it occur in plants? Describe an activity to demonstrate phototropism.

(b) What are 'nastic' and 'curvature' movements? Give one example of each. 5

SECTION – B

22. Five solutions *P*, *Q*, *R*, *S* and *T* when tested with universal indicator showed pH of 13, 8, 1, 7 and 5 respectively.

(a) Which solution is (i) strong alkaline and (ii) weakly acidic?

(b) Arrange the given solutions in the increasing order of hydrogen ion concentration. 2

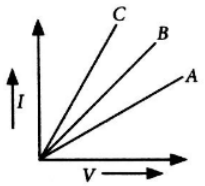
23. A student takes about 6 mL of distilled water in each of the four test tubes *P*, *Q*, *R* and *S*. He then dissolves an equal amount of four different salts namely, sodium chloride in '*P*', potassium chloride in '*Q*', calcium chloride in '*R*' and magnesium chloride in '*S*'. He then adds 10 drops of soap solution to each test tube and shakes its contents. In which of these test tubes the scum (insoluble substance) is formed with soap? 2

24. A student has to prepare a temporary mount of *Petunia* leaf peel to show stomata. List four main steps of the procedure. 2

25. A student identified the following as the parts of a embryo of a red kidney bean seed. Select the parts which have been wrongly listed stating the reason in each case.

(i) Cotyledon (ii) Testa (iii) Plumule (iv) Radicle (v) Tegman (vi) Micropyle 2

26. Study the I-V graph for the conductors A, B and C having resistance R_A, R_B and R_C. If conductors A and B are connected in series, then compare the slope of equivalent resistance of series combination with other resistances R_A, R_B and R_C.



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OR

The following apparatuses are available in a laboratory :

Battery	:	Adjustable from 0 V to 4.5 V
Resistance	:	3 Ω and 6 Ω
Ammeters	:	A_1 of range 0 to 3 A; Least count 0.1 A
		A_2 of Range 0 to 1 A; Least count 0.05 A
Voltmeters	:	V_1 of range 0 to 10 V; Least count 0.5 V
		V_2 of Range 0 to 5 V; Least count 0.1 V

Select the best combination of voltmeter and ammeter for finding the equivalent resistance of the resistors in series.

2

27. A student focused the image of a candle flame on a white screen by placing the flame at various distance from a convex lens. He noted his observation as :

S.No.	Distance of the flame from the lens (cm)	Distance of the screen from the lens (cm)
1.	60	20
2.	40	24
3.	30	30
4.	24	40
5.	12	70

From the above table, answer the following question :

(a) Find focal length of convex lens used by the student.

(b) Choose the incorrect set(s) of observation.

2