



CHEMISTRY

BOOKS - VK GLOBAL PUBLICATION

CHEMISTRY (HINGLISH)

**PERIODIC CLASSIFICATION OF
ELEMENTS**

Ncert Intext Questions

1. Did Döbereiner's triads also exist in the columns of Newlands' Octaves? Compare and find out.



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2. What were the limitations of Döbereiner's classification?



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3. What were the limitations of Newlands' Law of Octaves?



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4. Use Mendeléeev's Periodic Table to predict the formulae for the oxides of the following elements:

K, C, Al, Si, Ba.



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5. Besides gallium, which other elements have since been discovered that were left by MendeléeV in his Periodic Table? (any two)



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6. What were the criteria used by MendeléeV in creating his Periodic Table?



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7. Why do you think the noble gases are placed in a separate group?



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8. How could the Modern Periodic Table remove various anomalies of Mendeléeév's Periodic Table?



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9. Name two elements you would expect to show chemical reactions similar to magnesium. What is the basis for your choice?



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10. Name

(a) three elements that have a single electron in their outermost shells.

(b) two elements that have two electrons in

their outermost shells.

(c) three elements with filled outermost shells.



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11. (a) Lithium, sodium, potassium are all metals that react with water to liberate hydrogen gas. Is there any similarity in the atoms of these elements?

(b) Helium is an unreactive gas and neon is a gas of extremely low reactivity. What, if anything, do their atoms have in common?



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12. In the Modern Periodic Table, which are the metals among the first ten elements?



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13. By considering their position in the Periodic Table, which one of the following elements would you expect to have maximum metallic characteristic?

Ga Ge As Se Be



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Ncert Exercises

1. Which of the following statements is not a correct statement about the trends when going from left to right across the periods of periodic Table.

A. The elements become less metallic in nature.

B.

C.

D.

Answer:



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2. Element X forms a chloride with the formula 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

A. Na

B.

C.

D.

Answer:



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3. Which element has two shells, both of which are completely filled with electrons?



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4. Which element has the electronic configuration 2, 8, 2?



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5. Which element has a total of three shells, with four electrons in its valence shell?



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6. Which element has a total of two shells, with three electrons in its valence shell?



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7. Which element has twice as many electrons in its second shell as in its first shell?



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8. (a) What property do all elements in the same column of the Periodic Table as boron have in common?

(b) What property do all elements in the same column of the Periodic Table as fluorine have in common?



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9. An atom has electronic configuration 2, 8, 7.

(a) What is the atomic number of this

element?

(b) To which of the following elements would it be chemically similar? (Atomic numbers are given in parentheses.)

N(7) F(9) P(15) Ar(18)



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10. The position of three elements A, B and C in the Periodic Table are shown below:

| Group 16 | Group 17 |
|----------|----------|
| — | — |
| — | A |
| — | — |
| B | C |

(a) State whether A is a metal or a non-metal.

(b) State whether C is more reactive or less reactive than A.

(c) Will C be larger or smaller in size than B?

(d) Which type of ion-cation or anion will be formed by element A?



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11. Nitrogen (atomic number 7) and phosphorus (atomic number 15) belong to group 15 of the Periodic Table. Write the

electronic configuration of these two elements. Which of these will be more electronegative? Why?



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12. How does the electronic configuration of an atom relate to its position in the Modern Periodic Table?



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13. In the Modern Periodic Table, calcium (atomic number 20) is surrounded by elements with atomic numbers 12, 19, 21 and 38. Which of these have physical and chemical properties resembling calcium?



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14. Compare and contrast the arrangement of elements in Mendeléeev's Periodic Table and the Modern Periodic Table.





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Very Short Answer Questions

1. What was Dobereiner's basis of classifying elements?



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2. State Mendeleev's periodic law.



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3. What is meant by Newlands law of octaves?



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4. What were the limitations of Newlands' Law of Octaves?



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5. Who classified the elements on the basis of fundamental properties of elements like

atomic mass?



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6. Define groups.



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7. What do you understand by periods in the Periodic Table?



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8. In how many groups and periods, the Modern Periodic Table of elements is divided?



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9. Name the elements present in the first period.



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10. Which period is the longest period in the Modern Periodic Table?



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11. How many vertical columns are there in the Modern Periodic Table?



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12. Out of Li, C and N, which forms the most basic oxide and which forms the most acidic oxide?



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13. A metal M belongs to 13th group in the Modern Periodic Table, Write the valency of the metal.



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14. Find the period and group of the element whose atomic number is 12



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Short Answer Questions I

1. The three elements A, B and C with similar properties have atomic masses X, Y and Z respectively. This mass of Y is approximately equal to the average mass of X and Z. What is

such an arrangement of elements called as ?

Give an example of such a set of elements.



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2. Elements have been arranged in the following sequence on the basis of their increasing atomic masses. F, Na, Mg, Al, Si, P, S, Cl, Ar, K.

(a) Pick two sets of elements which have similar properties

(b) The given sequence represents which law of classification of elements ?



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3. Why did Mendeleev leave some gaps in his Periodic Table?



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4. State Periodic Law on which the Modern Periodic Table is based.



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5. What do you understand by the term periodicity? Does the periodicity in properties is a function of valence electrons? Illustrate.



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6. What does each group in the Periodic Table signify?



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7. Why do elements in any given group have similar properties?



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8. Why do group 1 elements form unipositive ions?



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9. Why are the elements of group 18 called zero valent?



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10. Why group 17 elements form uninegative anions?



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11. Would you place the two isotopes of chlorine, Cl-35 and Cl-37 in different slots because of their different atomic masses or in the same slot because their chemical properties are the same? Justify your answer.



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12. How does the metallic character change along the period?



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13. What is atomic radius? Why does atomic radius decrease across a period?



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14. Why does the size of the atom increase down the group?



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15. Can the following groups of elements be classified as Dobereiner's triad ?

(a) Na, Si, Cl

(b) Be, Mg, Ca

Atomic mass of Be 9 , Na 23 , Mg 24 , Si 28 , Cl

35 , Ca 40

Explain by giving reason.



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16. Write the formulae of chlorides of Eka-Silicon and Eka-aluminium, the elements predicted by Mendeleev.



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17. If an element X is placed in group 14, what will be the formula and the nature of bonding of its chloride ?



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18. Arrange the following elements in increasing order of their atomic radii

(a) Li, Be, F, N

(b) Cl, At, Br, I



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19. Identify and name the metal out of the following elements whose electronic configurations are given below.

(a) 2,8,2

(b) 2,8,1

(c) 2,8,7

(d) 2,1.



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20. Arrange the following elements in the increasing order of their metallic character

Mg, Ca, K, Ge, Ga.



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21. Which group of elements could be placed in Mendeleev's periodic table without disturbing the original order? Give reason.



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22. (i) Why do we classify elements?

(ii) In Mendeleev's Periodic Table, why was there no mention of noble gases like Helium, Neon and Argon?



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23. Explain why sodium is more reactive than lithium.



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Short Answer Questions II

1. Write the main aim of classifying elements.

Name the basic property of elements used in the development of Modern Periodic Table.

State the Modern Periodic Law. On which side

(part) of the Modern Periodic Table do you find metals, metalloids and non-metals?



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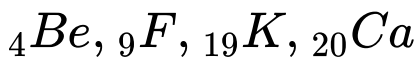
2. How many groups and periods are there in the Modern Periodic Table? How do the atomic size and metallic character of elements vary as we move:

(a) down a group and (b) from left to right in a period



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3. From the following elements:



(i) Select the element having one electron in the outermost shell.

(ii) Two elements of the same group. Write the formula and mention the nature the compound formed by the union of ${}_{19}\text{K}$ and element X (2,8, 7).



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4. Name any two elements of group one and write their electronic configurations. What similarity do you observe in their electronic configurations? Write the formula of oxide of any of the aforesaid element



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5. Write the number of periods the Modern Periodic Table has. State the changes in valency and metallic character of elements as

we move from left to right in a period. Also state the changes, if any, in the valency and atomic size of elements as we move down a group.



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6. The elements ${}_4\text{Be}$, ${}_{12}\text{Mg}$ and ${}_{20}\text{Ca}$, each having two valence electrons in their valence shells, are in periods 2, 3 and 4 respectively of the Modern Periodic Table. Answer the following questions associated with these

elements, giving reason in each case:

(a) In which group should they be? (b) Which one of them is least reactive? (c) Which one of them has the largest atomic size?



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7. Given below are some elements of the Modern Periodic Table. Atomic number of the element is given in the parentheses:

A(4), B(9), C(14), D(19), E(20)

(a) Select the element that has one electron in

the outermost shell. Also write the electronic configuration of this element.

(b) Which two elements amongst these belong to the same group? Give reason for your answer.

(c) Which two elements amongst these belong to the same period? Which one of the two has bigger atomic radius?



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8. Nitrogen (atomic no. 7) and phosphorous (atomic no. 15) belong to group 15 of the Periodic Table. Write the electronic configuration of these two elements in terms of K, L, M, N shell. Predict whether these are metallic or non-metallic



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9. Na, Mg and Al are the elements having one, two and three valence electrons respectively.

Which of these elements (i) has the largest atomic radius, (ii) is least reactive ? Justify your answer stating reason for each.



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10. Two elements 'P' and 'Q' belong to the same period of the modern periodic table and are in Group-1 and Group-2 respectively.

Compare their following characteristics in tabular form:

(a) The number of electrons in their atoms

- (b) The sizes of their atoms
- (c) Their metallic characters
- (d) Their tendencies to lose electrons
- (e) The formula of their oxides
- (f) The formula of their chlorides



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11. The position of three elements A, B and C in the Periodic Table is shown below:

| Groups → | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------|---|---|---|---|---|---|---|---|
| Periods ↓ | | | | | | | | |
| 1 | | | | | | | | |
| 2 | | | B | | | | | |
| 3 | A | C | | | | | | |

Giving reasons, explain the following:

- (i) Element A is a metal.
- (ii) Element C has larger size than element B.
- (iii) Element B has a valency of 3.



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12. Identify, the elements with the following property and arrange them in increasing order of their reactivity.

- (a) An element which is a soft and reactive metal.
- (b) The metal which is an important

constituent of limestone

(c) The metal which exists in liquid state at room temperature.



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13. Properties of the elements are given below.

Where would you locate the following elements in the periodic table ?

(a) A soft metal stored under kerosene

(b) An element with variable (more than one) valency stored under water.

(c) An element which is tetravalent and forms the basis of organic chemistry

(d) An element which is an inert gas with atomic number 2

(e) An element whose thin oxide layer is used to make other element corrosion resistant by the process of "anodising".



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14. The atomic number of an element "X" is 20.

(i) Determine the position of the element 'X' in

the periodic table. (ii) Write the formula of the compound formed when 'X' reacts/combines with another element 'Y' (atomic number 8).

(iii) What would be the nature (acidic or basic) of the compound formed? Justify your answer.



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15. The following table shows the position of six elements A, B, C, D, E and F in the Periodic Table.

| Groups → Periods ↴ | 1 | 2 | 3 to 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------------------|---|---|---------|----|----|----|----|----|----|
| 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 3? (d) Write a common name for the family of elements C and F. (e) Out of D and E, which one has a bigger atomic radius and why?



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16. The atomic radii of first group elements of the Periodic Table are as follows:

| | | | | | |
|--------------------|-----|-----|-----|-----|-----|
| Group I elements | Na | Li | Rb | Cs | K |
| Atomic radius (pm) | 186 | 152 | 244 | 262 | 231 |

(i) Arrange these elements in the increasing order of their atomic radii. (ii) Name the elements which have the smallest and the largest atoms. (iii) How does the atomic size vary as you go down a group?



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17. The elements of the second period of the Periodic Table are given below:

Li, Be, B, C, N, O, F

(i) Explain why atomic radius decreases from Li to F.

(ii) Identify the most metallic and non-metallic elements among the above elements.



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18. The atomic numbers of nitrogen, oxygen and fluorine are 7, 8 and 9 respectively. Write the electronic configuration of each element and answer the following questions:

(a) Which one of N, O and F is most electronegative and which one is least electronegative? (b) What is the number of valence electrons of F?

(c) What is valency of each one of N, O and F?



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19. Four elements P, Q, R and S belong to the third period of the Modern Periodic Table and have respectively 1, 3, 5 and 7 electrons in their outermost shells. Write the electronic configurations of Q and R and determine their valencies. Write the molecular formula of the compound formed when P and S combine.



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20. Consider the following elements: Li, Cl, Br, Na, K, I

(i) Arrange the elements according to the groups to which they belong in the Periodic Table. (ii) What are the common properties on the basis of which the elements have been grouped together?



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

Why?

How does metallic character of elements vary on moving from (i) left to right in a period? (ii) from top to bottom in a group? Give reasons for your answers.



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22. Two elements with symbol X (atomic no. 16) and Y (atomic no. 12) are placed in the III period of the Modern Periodic Table.

(i) Which amongst the two has more metallic character? (ii) Calculate the valency of each

element. (iii) Element 'Y' is smaller than 'X' in terms of atomic size. Is the statement true, justify?



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23. Taking the example of an element of atomic number 16, explain how the electronic configuration of the atom of an element relates to its position in the Modern Periodic Table and how valency of an element is calculated on the basis of its atomic number.



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24. Calcium is an element with atomic number 20. Stating reason answer each of the following questions: (i) Is calcium a metal or non-metal? (ii) Will its atomic radius be larger or smaller than that of potassium with atomic number 19? (iii) Write the formula of its oxide.



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Long Answer Questions

1. How do you calculate the valency of an element from its electronic configuration?



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2. What is the valency of magnesium with atomic number 12 and sulphur with atomic number 16?



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3. How does the valency vary in a period on going from left to right?



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4. How does the valency vary in going down a group?



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5. An element is placed in 2nd group and 3rd period of the periodic table, burns in presence of oxygen to form a basic oxide

(a) Identify the element

(b) Write the electronic configuration

(c) Write a balanced equation when it burns in the presence of air

(d) Write a balanced equation when this oxide is dissolved in water

(e) Draw the electron dot structure for the formation of this oxide.



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6. Atomic number of few elements are given below 10, 20, 7, 14

(a) Identify the elements

(b) Identify the group number of these elements in the periodic table

(c) Identify the periods of these elements in the periodic table

(d) What would be the electronic configuration for each of these elements

(e) Determine the valency of these elements.



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7. Mendeleev predicted the existence of certain elements not known at that time and named two of them as Eka-Silicon and Eka-aluminium

(a) Name the elements which have taken the place of these elements

(b) Mention the group and the period of these elements in the modern periodic table

(c) Classify these elements as metals, non-metals or metalloids

(d) How many valence electrons are present in each one of them ?



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8. An element X which is a yellow solid at room temperature shows catenation and allotropy. X forms two oxides which are also formed during the thermal decomposition of ferrous sulphate crystals and are the major air pollutants

(a) Identify the element X

(b) Write the electronic configuration of X

(c) Write the balanced chemical equation for the thermal decomposition of ferrous sulphate crystals ?

(d) What would be the nature (acidic/basic) of oxides formed ?

(e) Locate the position of the element in the modern table.



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9. An element X of group 15 exists as diatomic molecule and combines with hydrogen at 773 K in presence of the catalyst to form a compound, ammonia which has a characteristic pungent smell

(a) Identify the element X. How many valence electrons does it have ?

(b) Draw the electron dot structure of the diatomic molecule of X. What type of bond is formed in it ?

(c) Draw the electron dot structure for

ammonia and what type of bond is formed in it ?



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10. Give an account of the process adopted by Mendeleev for the classification of elements. How did he arrive at "periodic law" ?



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11. The atomic number of an element 'X' is 19.

(a) Write its electronic configuration. (b) To which period of the Modern Periodic Table does it belong and what is its valency? (c) If 'X' burns in oxygen to form its oxide, what will be its nature - acidic, basic or neutral? (d) Write balanced chemical equation for the reaction when this oxide is dissolved in water.



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12. (a) How does the atomic radius change as you go (i) from left to right in a period? (ii) down a group in the 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?



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13. (a) How would the tendency to lose electrons change as you go (i) from left to right across a period? (ii) down a group?

(b) An element X (2,8, 2) combines separately with $(NO_3)^-$, $(SO_4)^{2-}$ and $(PO_4)^{3-}$ 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?



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14. The position of eight elements in the Modern Periodic Table is given below where atomic numbers of elements are given in the parenthesis.

| Period No. | | |
|------------|---------|---------|
| 2. | Li (3) | Be (4) |
| 3. | Na (11) | Mg (12) |
| 4. | K (19) | Ca (20) |
| 5. | Rb (37) | Sr (38) |

- (i) Write the electronic configuration of Ca. (ii) Predict the number of valence electrons in Rb.
- i (iii) What is the number of shells in Sr? (iv) Predict whether K is a metal or a non-metal. (v) Which one of these elements has the largest atom in size? (vi) Arrange Be, Ca, Mg and Rb in

the increasing order of the size of their respective atoms.



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15. Atoms of eight elements A, B, C, D, E, F, G and H have the same number of electronic shells but different number of electrons in their outermost shell. It was found that elements A and G combine to form an ionic compound which can also be extracted from sea water. This compound is added in a small

amount to almost all vegetable dishes during cooking. Oxides of elements A and B are basic in nature while those of E and F are acidic. The oxide of D is almost neutral. Based on the above information, answer the following questions:

- (i) To which group or period of the periodic table do the listed elements belong?
- (ii) What would be the nature of compounds formed by a combination of elements B and F?
- (iii) Which two of these elements could definitely be metals and which are likely to be non-metals?
- (iv) Which one of the eight elements is most

likely to be found in gaseous state at room temperature? (v) If the number of electrons in the outermost shell of elements C and G be 3 and 7 respectively, write the formula of the compound formed by the combination of C and G. (vi) Which one of the eight elements is likely to be a noble gas? (vii) Which one of the eight elements would have the largest atomic radius? (viii) Which one of these eight elements is likely to be a semi-metal or metalloid?



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16. Atoms of seven elements A, B, C, D, E, F and G have a different number of electronic shells but have the same number of electrons in their outermost shells. The elements A and C combine with chlorine to form an acid and common salt respectively. The oxide of element A is liquid at room temperature and is a neutral substance, while the oxides of the remaining six elements are basic in nature. Based on the above information answer the following questions:

(i) What could the element A be? (ii) Will

elements A to G belong to the same period or same group of the periodic table? (iii) Write the formula of the compound formed by the reaction of the element A with oxygen. (iv) Show the formation of the compound by a combination of element C with chlorine with the help of electronic structure. (v) What would be the ratio of number of combining atoms in a compound formed by the combination of element A with carbon? (vi) Which one of the given elements is likely to have the smallest atomic radius?



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17. In the following table, six elements A, B, C, D, E and F of the modern periodic table with atomic numbers 3 to 18 are given:

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | | | | | E | | G |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| B | C | | D | | | F | |

(a) Which of these is (i) Noble gas (ii) halogen?

(b) Which of these is the most active metal in

3rd period? (c) Identify the most

electronegative element in the third period.

(d) In the compound between B and F what

type of bond will be formed? (e) What would be the nature of oxide formed by C?



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Higher Order Thinking Skills

1. Using the part of the Periodic Table given below, answer the questions that follow:

| Groups → Periods ↓ | 1 | 2 | 13 | 14 | 15 | 16 | 17 | 18 |
|-----------------------|----|----|----|----|----|----|----|----|
| 1 | H | | | | | | | He |
| 2 | Li | Be | B | C | N | O | F | Ne |
| 3 | Na | Mg | Al | Si | P | S | Cl | Ar |
| 4 | K | Ca | | | | | | |

(i) Na has physical and chemical properties

similar to which element (s) and why? (ii) Write the electronic configuration of N and P. Which one of these will be more electronegative and why? (iii) State a chemical property common to fluorine and chlorine.



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2. Is it possible to have an element with atomic number 2.5?



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3. An element 'X' has mass number 35 and number of neutrons 18. Write atomic number and electronic configuration of 'X'. Also write group number, period number and valency of 'X'.



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4. Three elements A, B and C have 3,4 and 2 electrons respectively in their outermost shell. Give the group number to which they belong

in the modern periodic table. Also, give their valencies.



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5. Compare the radii of two species X and Y.

Give reasons for your answer.

(a) X has 12 protons and 12 electrons

(b) Y has 12 protons and 10 electrons.



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6. Write the formula of the product formed when the element A (atomic number 19) combines with the element B (atomic number 17) Draw its electronic dot structure. What is the nature of the bond formed ?



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7. An element X (atomic number 17) reacts with an element Y (atomic number 20) to form a divalent halide

(a) Where in the periodic table are elements X and Y placed ?

(b) Classify X and Y as metal (s), non-metal (s) or metalloid (s)

(c) What will be the nature of oxide of element Y ? Identify the nature of bonding in the compound formed

(d) Draw the electron dot structure of the divalent halide.



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8. (a) Electropositive nature of the element(s) increases down the group and decreases across the period

(b) Electronegativity of the element decreases down the group and increases across the period

(c) Atomic size increase down the group and decreases across a period (left to right)

(d) Metallic character increases down the group and decreases across a period

On the basis of the above trends of the periodic table, answer the following about the

electron with atomic number 3 to 9

(a) Name the most electropositive element among them

(b) Name the most electronegative element

(c) Name of the element with smallest atomic size

(d) Name the element which is a metalloid

(e) Name the element which shows maximum valency.



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9. In the following table, the positions of six elements A, B, C, D, E and F are given as they are in the Modern Periodic Table:

| Group → Period ↓ | 1 | 2 | 3-12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---------------------|---|---|------|----|----|----|----|----|----|
| 2 | A | | | B | | C | | | D |
| 3 | | | | | E | | | | F |

On the basis of the above table, answer the following questions:

(i) Name the element which forms only covalent compounds. (ii) Name the element which is a metal with valency three. (iii) Name the element which is a non-metal with valency three. (iv) Out of B and C, whose atomic radius

is bigger and why? (v) Write the common name for the family to which the elements D and F belong.



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10. Two elements 'A' and 'B' belong to the 3rd period of Modern periodic table and are in group 2 and 13 respectively. Compare their following characteristics in tabular form:

(a) Number of electrons in their atoms (b) Size of their atoms (c) Their tendencies to lose

electrons (d) The formula of their oxides (e)

Their metallic character The formula of their chlorides



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Proficiency Exercise Very Short Answer Questions

1. The atomic number of an element is 12. State whether its oxide is acidic or basic.



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2. The basis for the classification of elements in the modern periodic table is



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3. Two elements X and Y have atomic numbers 10 and 14 respectively. Identify the group numbers of these elements in the periodic table.



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4. List any two properties of the elements belonging to the first group of the Modern Periodic Table.



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5. Why are isotopes of an element having different atomic masses placed at the same position in the Periodic Table?



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Proficiency Exercise Short Answer Questions I

1. Write two elements for each of the following: (i) Alkali metals, (ii) Noble gases.



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2. Account for the following:

(a) Cations are smaller in size than the corresponding atom.

The noble gases were discovered very late.



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3. The electronic configuration of four elements A, B, C and D is given as follows:

A-2,8 B- 2,8,1 C-2,8,2 D - 2, 8, 8

(a) Which of them belong to the same period?

Name the period.

(b) Which of them belong to the same group?

Name the group.



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4. Elements in Periodic Table show periodicity of properties". List any four properties.



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5. What are the basic differences between Mendeleev's periodic table and modern periodic table?



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1. Four elements A, B, C and D have atomic numbers 12, 13, 14 and 15 respectively. Answer the following questions giving reasons:

(a) What is the number of valence electrons and valency of D? (b) Which of them will have largest atomic radii? (c) Which of these elements will form the most basic oxide?



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2. An element A on combining with O_2 produces an oxide A_2O which is basic in nature.

(a) How many electrons must be there in the outermost shell of the element A? (b) To which group of periodic table it belongs? (c) Identify whether it is a metal or non-metal.



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3. An element 'X' belongs to 3rd period and group 16 of the Modern, Periodic Table.

(a) Determine the number of valence electrons and the valency of 'X'.

(b) Molecular formula of the compound when 'X' reacts with hydrogen and write its electron dot structure.

(c) Name the element 'X' and state whether it is metallic or non-metallic.



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4. An element 'X' (Atomic number = 20) burns in the presence of oxygen to form a basic oxide.

(a) Identify the element and write its electronic configuration. (b) State its group number and period number in the Modern Periodic Table. (c) Write a balanced chemical equation for the reaction when this oxide is dissolved in water.



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5. How does the tendency of the elements to lose electrons change in the Modern Periodic Table in (a) a group, (b) a period and why?



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Proficiency Exercise Long Answer Questions

1. The elements of a period of the periodic table are given below in order from left to right with one of its element missing:

Na Mg Al Si S Cl Ar .

(a) To which period do these elements belong?

(b) One element of this period is missing.

Which is the missing element and where

should it be placed? (c) Which one of these

elements in this period shows the property of

catenation? (d) Which one of these elements

is least reactive? (e) Identify the halogen from

this period.



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2. The position of some elements A, B, C, D, E, F and G in the Modern Periodic Table is given as under:

| Group → | 16 | 17 | 18 |
|----------|----|----|----|
| Period ↓ | | | |
| 1 | | | A |
| 2 | B | C | D |
| 3 | E | F | G |

- (a) In which group are inert elements placed?
- (b) What type of ions would B, C, E and F form?
- (c) Which elements would have chemical properties similar to C? (d) How many shells would A have? (e) What is the similarity between A and D? (f) Identify the most abundant element in the earth's crust.



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3. (a) The following is a list of the electron distributions of atoms of unknown elements.

| Element | Electron distribution |
|---------|-----------------------|
| A | 2, 5 |
| B | 2, 8, 4 |
| C | 2, 8, 8, 2 |
| D | 2, 8, 18, 8 |
| E | 2, 8, 18, 8, 1 |
| F | 2, 8, 18, 18, 7 |

Choose an element from the list for each of the following descriptions.

(i) It is a noble gas. (ii) It is a soft metal with a low density. (iii) It has a giant covalent structure similar to diamond. (iv) It can form a

negative ion of the type X^{3-})

(b) How does electronic configurations of atoms change in a period with increase in atomic number?



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