CHEMISTRY

BOOKS - U-LIKE CHEMISTRY (HINGLISH)

PERIODIC CLASSIFICATION OF ELEMENTS

N C E R T 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 Mendeleev's Periodic Table to predict the formulae for the oxides of the following elements :

$K, C, AI, Si, Ba.$

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

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6. What were the criteria used by Mendeleev 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 Modem Periodic Table remove various anomalies of Mendeleev'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 and 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 Modem 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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N C E R T 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) The number of valence electrons increases.

(c) The atoms lose their electrons more easily.

(d) The oxides become more acidic.

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2. Element X forms a chloride with the formula XCI_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) Mg (c) Al (d) Si

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3. Which element has

(a) two shells, both of which are completely filled with electrons ?

(b) the electronic configuration 2, 8, 2?

(c) a total of three shells, with four electrons in its valence shell?

(d) twice as many electrons in its second shell as in its first shell ?

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4. (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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5. 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.)

$N(71), F(9), P(15), Ar(18)$.

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6. 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 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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7. 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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8. How does the electronic configuration of an atom relate to its position in the Modern Periodic Table?

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9. 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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10. Compare and contrast the arrangement of elements in Mendeleev's Periodic Table and the Modern Periodic Table.

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Case Based Source Based Integrated Questions

1. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

In 1913, Henry Moseley showed that the atomic number (symbolised as Z) of an element is a more fundamental property than its atomic mass. Accordingly, Mendeleev's Periodic Law was modified and atomic number was adopted as the

basis of Modern Periodic Table and the Modern Periodic Law can be stated as follows :

'Properties of elements are a periodic function of their atomic number.' Let us recall that the atomic number gives us the number of protons in the nucleus of an atom and this number increases by one in going from one element to the next. Elements, when arranged in order of increasing atomic number, lead us to the classification known as the Modern Periodic Table. Prediction of properties of elements could be made with more precision when elements were arranged on the basis of increasing atomic

number.

(a) Name the principle on which Mendeleev's Periodic Table was based.

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2. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

In 1913, Henry Moseley showed that the atomic number (symbolised as Z) of an element is a more fundamental property than its atomic mass. Accordingly, Mendeleev's Periodic Law was

modified and atomic number was adopted as the basis of Modern Periodic Table and the Modern Periodic Law can be stated as follows :

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were arranged on the basis of increasing atomic number.

(b) What is Modern Periodic Law ?

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3. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

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were arranged on the basis of increasing atomic number.

(c) Differentiate between atomic weight and atomic number.

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4. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

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mass. Accordingly, Mendeleev's Periodic Law was modified and atomic number was adopted as the basis of Modern Periodic Table and the Modern Periodic Law can be stated as follows :

'Properties of elements are a periodic function of their atomic number.' Let us recall that the atomic number gives us the number of protons in the nucleus of an atom and this number increases by one in going from one element to the next. Elements, when arranged in order of increasing atomic number, lead us to the classification known as the Modern Periodic Table. Prediction of properties of elements could

be made with more precision when elements were arranged on the basis of increasing atomic number.

(d) What are the advantages of Periodic Table based on Moseley concept ?

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5. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

The Modern Periodic Table has 18 vertical columns known as 'groups' and 7 horizontal rows

known as 'periods'. Let us see what decides the placing of an element in a certain group and period. Group 1 of Modern Periodic Table contains the same number of valence electrons i.e ., 1. Similarly, you will find that the elements present in any one group have the same number of valence electrons. For example, elements fluorine (F) and chlorine (Cl), belong to Group 17, and contain seven electrons in their outermost shells. Hence, we can say that groups in the Periodic Table signify an identical outer shell electronic configuration. On the other hand, the number of shells increases as we go down the

group. There is an anomaly when it comes to the position of hydrogen because it can be placed either in Group 1 or Group 17 in the first period.

(a) What names are given to the horizontal rows and vertical columns in the Periodic Table ?

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6. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

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group. There is an anomaly when it comes to the position of hydrogen because it can be placed either in Group 1 or Group 17 in the first period.

(b) What is the electronic configuration of the second element in Group 17 ?

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7. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

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group. There is an anomaly when it comes to the position of hydrogen because it can be placed either in Group 1 or Group 17 in the first period.

(c) Name the first element in Group 2 and the atomic number of this element.

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8. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

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group. There is an anomaly when it comes to the position of hydrogen because it can be placed either in Group 1 or Group 17 in the first period.

(d) Which position would you give to the element hydrogen ?

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9. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

You will see that the atomic size increases down the group. This is because new shells are being

added as we go down the group. This increases the distance between the outermost electrons and the nucleus so that the atomic size increases in spite of the increase in nuclear charge. As we can see, the metals like Na and Mg are towards the left-hand side of the Periodic Table while the non-metals like sulphur and chlorine are found on the right-hand side. In the middle, we have silicon, which is classified as a semi-metal or metalloid because it exhibits some properties of both metals and non-metals. In the Modern Periodic Table, a zig-zag line separates metals from non-metals. The borderline elements -

boron, silicon, germanium, arsenic, antimony, tellurium and polonium - are intermediate in properties and are called metalloids or semi-metals.

(a) Arrange the following elements in increasing order of atomic size :

oxygen, tellurium, sulphur, selenium.

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10. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following paragraph and related studied concepts.

You will see that the atomic size increases down the group. This is because new shells are being added as we go down the group. This increases the distance between the outermost electrons and the nucleus so that the atomic size increases in spite of the increase in nuclear charge. As we can see, the metals like Na and Mg are towards the left-hand side of the Periodic Table while the non-metals like sulphur and chlorine are found on the right-hand side. In the middle, we have silicon, which is classified as a semi-metal or metalloid because it exhibits some properties of both metals and non-metals. In the Modern

Periodic Table, a zig-zag line separates metals from non-metals. The borderline elements - boron, silicon, germanium, arsenic, antimony, tellurium and polonium - are intermediate in properties and are called metalloids or semi-metals.

(b) Why does the atomic size increase when we move down the group ?

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11. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following

paragraph and related studied concepts.

You will see that the atomic size increases down the group. This is because new shells are being added as we go down the group. This increases the distance between the outermost electrons and the nucleus so that the atomic size increases in spite of the increase in nuclear charge. As we can see, the metals like Na and Mg are towards the left-hand side of the Periodic Table while the non-metals like sulphur and chlorine are found on the right-hand side. In the middle, we have silicon, which is classified as a semi-metal or metalloid because it exhibits some properties of

both metals and non-metals. In the Modern Periodic Table, a zig-zag line separates metals from non-metals. The borderline elements - boron, silicon, germanium, arsenic, antimony, tellurium and polonium - are intermediate in properties and are called metalloids or semi-metals.

(c) What are semi-metals or metalloids ?

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12. Answer question numbers $(a) - (d)$ on the basis of your understanding of the following

paragraph and related studied concepts.

You will see that the atomic size increases down the group. This is because new shells are being added as we go down the group. This increases the distance between the outermost electrons and the nucleus so that the atomic size increases in spite of the increase in nuclear charge. As we can see, the metals like Na and Mg are towards the left-hand side of the Periodic Table while the non-metals like sulphur and chlorine are found on the right-hand side. In the middle, we have silicon, which is classified as a semi-metal or metalloid because it exhibits some properties of

both metals and non-metals. In the Modern Periodic Table, a zig-zag line separates metals from non-metals. The borderline elements - boron, silicon, germanium, arsenic, antimony, tellurium and polonium - are intermediate in properties and are called metalloids or semi-metals.

(d) Give some examples of metalloids.

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Multiple Choice Questions

1. Which of the following elements would lose an electron easily ?

A. Mg

B. Na

C. K

D. Ca

Answer: C

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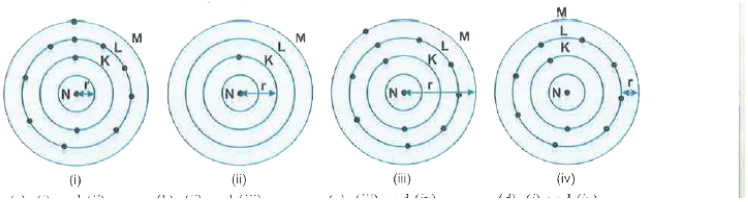
2. Which one of the following depict the correct representation of atomic radius (r) of an atom ?



A. (i) and (ii)

B. (ii) and (iii)

C. (iii) and (iv)

D. (i) and (iv)

Answer: C

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3. According to Mendeleev's Periodic Law, the elements were arranged in the Periodic Table in the order of

A. increasing atomic number

B. decreasing atomic number.

C. increasing atomic masses.

D. decreasing atomic masses.

Answer: B

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4. Which of the following statement(s) about Modem Periodic Table are incorrect ?

(i) The elements in the Modern Periodic Table are arranged on the basis of their decreasing atomic number.

(ii) The elements in the Modern Periodic Table are arranged on the basis of their increasing atomic masses.

(iii) Isotopes are placed in adjoining group(s) in the Periodic Table.

(iv) The elements in the Modern Periodic Table

are arranged on the basis of their increasing atomic number.

A. (i) only.

B. (i), (ii) and (iii)

C. (i), (ii) and (iv)

D. (iv) only.

Answer: B

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5. The concept of triads in the elements was given by

A. Newlands.

B. Dobereiner.

C. Mendeleev.

D. Bohr.

Answer: B

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6. Upto which element, the Law of Octaves was found to be applicable ?

A. Oxygen

B. Calcium

C. Cobalt

D. Potassium

Answer: B

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7. The elements A, B, C, D and E have atomic number 9, 11, 17, 12 and 13 respectively. Which pair of elements belong to the same group ?

A. A and B

B. B and D

C. A and C

D. D and E

Answer: C

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8. 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. The number of valence electrons increases.

C. The atoms lose their electrons more easily.

D. The oxides become more acidic.

Answer: C

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9. Element X forms a chloride with formula XCI_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. Mg

C. AI

D. Si

Answer: B

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10. In Mendeleev's Periodic Table, gaps were left for the elements to be discovered later. Which of the following elements found a place in the Periodic Table later ?

A. Germanium

B. Chlorine

C. Oxygen

D. Silicon

Answer: A

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11. Which of the given elements A, B, C, D and E with atomic number 2, 3, 7, 10 and 30 respectively belong to the same period ?

A. A, B, C

B. B, C, D

C. A, D, E

D. B, D, E

Answer: B

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12. Which of the following is the outermost shell for elements of period 2 ?

A. K shell

B. L shell

C. M shell

D. N shell

Answer: B

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13. Where would you locate the element with electronic configuration 2, 8 in the Modem Periodic Table ?

A. Group 8

B. Group 2

C. Group 18

D. Group 10

Answer: C

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14. Which of the following statements about the Modem Periodic Table is correct?

A. It has 18 horizontal rows known as Periods.

B. It has 7 vertical columns known as Periods.

C. It has 18 vertical columns known as Groups

D. It has 7 horizontal rows known as Groups.

Answer: C

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15. Arrange the following elements in the order of their increasing non-metallic character

Li, O, C, Be, F

A. $F < O < C < Be < Li$

B. $Li < Be < C < O < F$

C. $F < Be < C < O < Li$

D. $F < O < Be < C < Li$

Answer: B

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16. Three elements B, Si and Ge are

A. metals.

B. non-metals.

C. metalloids.

D. metal, non-metal and metalloid respectively.

Answer: C

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17. Which one of the following elements exhibit maximum number of valence electrons?

A. Na

B. AI

C. Si

D. P

Answer: D

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18. Which of the following are the characteristics of isotopes of an element ?

(i) Isotopes of an element have same atomic masses.

(ii) Isotopes of an element have same atomic number.

(iii) Isotopes of an element show same physical properties.

(iv) Isotopes of an element show same chemical properties.

A. (i), (ii) and (iv)

B. (ii), (iii) and (iv)

C. (ii) and (iii)

D. (ii) and (iv)

Answer: D

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19. Which is not the limitation of Mendeleev's classification ? Mendeleev's Table

A. does not satisfactorily explain the position of hydrogen.

B. lists the elements in order of increasing atomic masses.

C. does not explain how to place the isotopes of an element in the periodic table.

D. does not predict how many elements could be discovered between two elements.

Answer: B

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20. The elements in Groups 1 and 17 in the third period are

A. Na and F respectively.

B. K and F respectively.

C. Na and Cl respectively.

D. K and Cl respectively.

Answer: C

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21. Law of Octaves was given by

A. Dalton.

B. Mendeleev.

C. Newland.

D. Moseley.

Answer: C

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22. Chlorine occurs in the form of the following isotopes.

A. Cl-35 and Cl-36

B. Cl-35 and Cl-37

C. Cl-34 and Cl-35

D. Cl-37 and Cl-39

Answer: B

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23. Na and Mg

A. belong to the same group.

B. belong to the same period.

C. have the same atomic number.

D. both catch fire in the air.

Answer: B

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24. Maximum number of electrons that can be accommodated in a shell is given by

where n is the number of shell.

A. n^2

B. $2n^2$

C. $(n^2 - 1)$

D. $2n^3$

Answer: B

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Fill In The Blanks One Mark Each

1. Elements in the Modern Periodic Table are arranged in ___ vertical columns called _____.

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2. Non-metals are formed on the ___ of the Periodic Table towards the ___ _____.

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3. Down the group in the Periodic Table, the effective nuclear charge experienced by valence electrons ___ ___.

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4. Silicon is classified as ____ or ____ because it exhibits some properties of both metals and non-metals.

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5. Mendeleev's Periodic Law was modified and ____ was adopted as the basis of Modem Periodic Table.

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6. Elements of the second period do not have the same number of ____ but they contain the same number of ____ .

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7. Metals tend to ___ electrons, that is, they are ___ in nature.

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8. Elements are classified on the basis of similarities in their ___ .

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True Or False

1. Valency of an element is determined by the number of electrons present in the first shell.

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2. As we move from left to right in the Periodic Table, the atoms lose the valence electrons more easily.

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3. Non-metals tend to form bonds with other atoms by gaining electrons.

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4. The elements Na, Mg, Al, Si, P, S, Cl and Ar belong to the second period of the Periodic Table.

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5. Elements in the Modem Periodic Table are arranged in 17 vertical columns called groups.

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6. In the Periodic Table, a straight line seperates metals from non-metals.

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Assertion Reason Questions

1. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Atomic radius decreases in moving from left to right in the Periodic Table.

Reason (R) : As we move from L.H.S. to R.H.S., the nuclear charge increases which tends to pull the electrons closer to the nucleus.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: A

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2. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Position of an element in the Periodic Table tells us about its chemical reactivity.

Reason (R) : There are 18 elements in the fourth table.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: B

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3. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Metalloids have properties intermediate between the metals and non-metals.

Reason (R) : Newlands gave the Law of Triads.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: C

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4. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : There are 18 elements in the sixth period of Periodic Table.

Reason (R) : Modem Periodic Law was given by Moseley.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: D

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5. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Atomic size increases down the group in the Periodic Table.

Reason (R) : New shells are being added as we go down the group.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: A

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6. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Non-metals like sulphur and chlorine are located on the left-hand side of the Periodic Table.

Reason (R) : Atomic radius decreases in moving from left to right in a period.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: D

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7. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Metallic character increases down the group.

Reason (R) : Elements in the Periodic Table are arranged in six horizontal rows called periods.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: C

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8. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Boron, silicon and germanium are metalloids.

Reason (R) : The position of an element in the Periodic Table tells us about its reactivity.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: B

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9. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : There is an anomaly in the position of hydrogen in the Periodic Table.

Reason (R) : The elements Al, Si and P belong to the fourth period in the Periodic Table.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: C

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10. Note: Read the assertion and reason carefully and then mark the correct option out of the options given below:

Assertion (A) : Moseley showed that atomic number is a more fundamental property than atomic mass.

Reason (R) : Atoms of the same element having the same atomic number but different atomic masses are called isotopes.

A. Both (A) and (R) are true and (R) is correct explanation of the assertion.

B. Both (A) and (R) are true but (R) is explanation of the assertion.

C. (A) is true but (R) is false.

D. (A) is false but (R) is true.

Answer: B

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Very Short Answer Questions

1. Name three elements discovered after Mendeleev gave his Periodic Table.

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2. State Periodic Law on which the Modem Periodic Table is based.

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3. What are the elements of Group 1 and Group 17 ?

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4. Which one has the bigger size ?

Na (11) or Cl (17), Cl (17) or F (9)

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5. What is meant by 'groups' of Periodic Table ?

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6. An element B belongs to the second period and Group 13. Give the formula of the oxide.

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7. A, B and C are elements of Dobereiner's triad. If the atomic mass of A is 7 and that of C is 23, what will be the atomic mass of B.

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8. State Mendeleev's law.

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9. Mendeleev classified the elements on the basis of two factors. What were these two factors?

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10. Classify the following elements into groups of triads :

Cl, Ca, Ba, Sr, K, Li, Br, I, Na

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11. Elements A, B, C and D have atomic numbers 1, 8, 11 and 19 respectively. Choose the odd element and give reasons for your answer.

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12. Size of sodium atom is bigger than that of hydrogen atom. Why?

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13. Name the element which has twice as many electrons in its second shell as in its first shell. Write its electronic configuration also.

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14. What is meant by classification of elements ?

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15. Mention the common name given to the following elements :

Boron, Silicon, Germanium, Arsenic, Antimony.

State one property that justifies their name.

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16. Write two reasons responsible for late discovery of noble gases.

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17. Write the valency and usual number of electrons of Group 18 of the Periodic Table.

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18. How many horizontal rows are there in the Modem Periodic Table and what are they called ?

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19. Write the formulae of chlorides of Eka-silicon and Eka-aluminium, the elements predicted by Mendeleev.

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20. 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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21. State one reason for placing Mg and Ca in the same group of Periodic Table.

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22. Why does silicon have valency 4 ?

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23. Can the following group of elements be classified as Dobereiner's Triad ?

Na, Si, CI

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

CI, At, Br, I

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Short Answer Questions

1. Inert gases are placed in a separate group in the Modem Periodic Table.

(a) State the group number.

(b) How many valence electrons do most of these gases have?

(c) Why are they unreactive?

(d) Name any two inert gases.

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2. (a) Write the name of any three elements present in third period.

(b) What will be the total number of shells in each and name the valence shell of each. Write configuration of all of these.

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

Group →	I	II	III	IV	V	VI	VII	VIII
Period ↓								
1	*B*							
2								*A*
3							*C*	

Giving reasons, explain the following :

(a) Element A is a non-metal.

(b) Atom of element Chas a larger size than atom of element A.

(c) Element B has a valency of 1.

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4. valency of an element is determined by the number of electrons present in the first shell.

Group VI	Group VII
—	—
—	A
—	—
B	C

Giving reasons, explain the following :

(a) Element A is a non-metal.

(b) Element B has a larger atomic size than element C.

(c) Element Chas a valency of 1.

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

Group →	I	II	III	IV	V	VI	VII	Zero
Period ↓								
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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6. The elements of the second period of the Periodic Table are given below :

Li Be B C N O F

(a) Give reason to explain why atomic radii decrease from Li to F.

(b) Identify the most (i) metallic and (ii) non-metallic element.

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7. The elements of the third period of the Periodic Table are given below :

Group → Period ↓	I	II	III	IV	V	VI	VII
3	Na	Mg	Al	Si	P	S	Cl

(a) Which is more non-metallic, S or Cl?

(b) Which has higher atomic mass, Al or Cl?

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8. Magnesium oxide is MgO, magnesium hydroxide is $Mg(OH)_2$ and magnesium sulphate is $MgSO_4$ What would be the formulae of barium oxide, barium hydroxide and barium sulphate if barium belongs to the same group, as magnesium ?

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9. Consider the following arrangement of elements :

1	2	13	14	15	16	17	18
Lithium			Carbon		Oxygen	L	Neon
X			S		G	Q	
Y						R	
Z						T	

(a) Which is the most reactive metal?

(b) Name the family of L, Q, R, T.

(c) Name one element each from the Groups 2, 13, 15.

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10. Explain why atomic number is more important than atomic mass in determining chemical properties.

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

Li, Be, B, C, N, 0, F, Ne

(a) Give reason to explain why atomic radius decreases from Li to F.

(b) Identify the most metallic and non-metallic elements.

(c) How does valency change from Li to Ne?

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12. An element A reacts with oxygen to form A_2O

.

(i) State the number of electrons in the outermost orbit of A.

(ii) To which group of the periodic table does A belong?

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

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13. Some of the elements and their atomic numbers are given in the table.

(i) How many valence electrons are there in the element R ?

(ii) What is the valency of P?

(iii) Write the chemical formula of the compound formed by combining the elements P and Q.

Element	*Atomic number*
P	3
Q	17
R	13

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14. Calcium, magnesium and strontium have been put together in the same group of Periodic Table on the basis of their similar chemical

properties.

(i) Mention those properties. (Any two)

(ii) Out of the three elements, which one will have atoms of biggest size and why ?

(iii) Which is the first member of this group ?

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15. Four elements P, Q, R and S have atomic numbers 12, 13, 14 and 15 respectively. Answer the following questions giving reasons :

(i) What is the valency of Q ?

(ii) Classify these elements as metals and non-

metals.

(iii) Which of these elements will form the most basic oxide?

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16. Give one example of each :

(a) Metal having valency 2.

(b) Non-metal having valency 2.

(c) Element with three shells, having 4 electrons in the outermost shell.

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17. How do the following traits change in a period from left to right in the periodic table :

(a) Atomic size

(b) Valency

(c) Metallic character.

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18. Two elements 'X' and 'Y' belong to the second group of the Periodic Table. 'X' has 2 shells and 'Y' has 3 shells in it.

(a) Which of these is more metallic in nature and

why?

(b) What is the formula of the chloride of 'X' and sulphide of 'Y' ?

(c) Is the valency of 'X' same as that of 'Y' or different? Why?

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19. 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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20. From the following elements :

$_4Be, _9K, _{20}Ca$

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

(ii) two elements of the same group.

Write the formula of and mention the nature of the compound formed by the union of $_{19}$ K and element $X(2, 8, 7)$.

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21. An element 'M' with electronic configuration (2, 8, 2) combines separately with $(NO_3)^-$, $(SO_4)^{2-}$ and $(PO_4)^{3-}$ radicals. Write the formula of the three compounds so formed. To which group and period of the Modem Periodic Table does the element 'M' belong ? Will 'M' form covalent or ionic compounds ? Give reason to justify your answer.

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22. 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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23. An element M has atomic number 12.

(i) Write the electronic configuration and valency.

(ii) Is M a metal or non-metal ? Give reason in support of your answer.

(iii) Write the formula and nature (acidic/basic) of the oxide of M.

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Long Answer Questions

1. (a) How many elements are known till date ?

(b) List the triads that Dobereiner could identify?

(c) Which scientist believed that no more elements will be discovered in future?

(d) What was the nationality of Mendeleev? In which year was his Periodic Table published?

(e) How many periods and groups are there in the Modem Periodic Table?

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2. (a) Name first three members of Group 2 and 16.

(b) Name any four metalloids.

(c)' Which chemical properties were stressed by Mendeleev while formulating his Periodic Table?

(d) Write the following elements in order of

increasing atomic numbers :

Magnesium, Lithium, Aluminium.

(e) Give the electronic configuration of the following elements:

Carbon, Phosphorus, Chlorine.

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3. Atomic numbers of a 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 period 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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4. (i) Why do we classify elements ?

(ii) What are the two criteria used in the development of Modern Periodic Table ?

(iii) State the position of (a) metals (b) non-

metals and (c) metalloids in the Periodic Table.

(iv) Would you place two isotopes of Cl-35 and Cl-37 in different slots of the Periodic Table because of their different atomic masses or in the same slot because their chemical properties are same? Justify your answer.

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5. An element is placed in 2nd Group and 3rd period of Periodic Table, it burns in the presence of oxygen to form basic oxide.

(a) Identify the element.

(b) Write the electronic configuration.

(c) Write the 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. Consider the following elements :

$_{20}A$, $_{8}B$, $_{18}C$, $_{16}D$, $_{4}E$, $_{2}F$

Answer the following giving reasons :

Which of the above elements you would expect to be

(i) very stable.

(ii) in Group 2 of the Periodic Table.

(iii) in Group 16 of the Periodic Table.

(iv) What type of bond will be formed when the element A reacts with B? Explain.

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7. The atomic number of Cl is 17. On the basis of this information, answer the questions that follow:

(a) Write the electronic configuration of Cl.

(b) Find the valency.

(c) To which group does it belong?

(d) Identify the type of ion it will form.

(e) Write down the formula of the compound it forms with other elements.

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8. The atomic number of a is 17. On the basis of this information, answer the questions that follow :

(a) Write the electronic configuration of Cl.

(b) Find the valency.

(c) To which group does it belong ?

(d) Identify the type of ion it will form.

(e) Write down the formula of the compound it forms with other elements.

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9. (a) The modem Periodic Table has been evolved through the early attempts of Dobereiner, Newland and Mendeleev. List one advantage and one limitation of all the three attempts.'

(b) Name the scientist who first of all showed

that atomic number of an element is a more fundamental property than its atomic mass.

(c) State Modem Periodic Law.

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