



# CHEMISTRY

## BOOKS - CAMBRIDGE CHEMISTRY

### (KANNADA ENGLISH)

## PERIODIC CLASSIFICATION OF ELEMENTS

**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 Dobreiner'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, Al, 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 ?



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6. What were the criteria used by Mendeléeey 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 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, 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, and Be?



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## Exercise

1. Which of the following statements is not a correct statement about the trends when going from left to right across the periods of the 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 oxide become more acidic.

**Answer: C**



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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. Mg

C. Al

D. Si

**Answer: B**



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3. Which element has :

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

(ii) the electronic configuration, 2, 8, 2.

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

(iv) a total of two shells, with three electrons in its valence shell ?

(v) Twice as many electrons in its second shell as in its first shell ?



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4. What property do all elements in the same column of the Periodic Table as boron have in common?

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5. An atom has electronic configuration 2, 8, 7 what is the atomic number of this element ?

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6. The position of three elements A, B and C in the periodic Table is 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 C?



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7. Nitrogen (atomic number 7) and phosphorous (atomic number 15) belong to group 15 of the periodic table. Write the electron configurations of these two elements. Which of these is more electronegative?



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8. How does the electronic configuration of an atom related 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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## **Additional Questions Choose The Correct Answer**

**1.** 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. Mg

C. Al

D. Si

**Answer: B**



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2. Which of the following is a Doberiner's triad.

A. Ne, Ca, Na

B.  $H_2$ ,  $N_2$ ,  $O_2$

C. *Li*, *Na*, *K*

D. *Na*, *Br*, *Ar*

**Answer: C**



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3. Name the scientist who gave the law of octaves ?

A. Mendeleev

B. Newlands

C. Dolton

D. Dobcreiner

**Answer: B**



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4. Mendeleev periodic table was based on

A. Atomic weight

B. Atomic number

C. Atomic radius

D. Atomic volume

**Answer: A**



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5. Which of the following is not an inert gas

A. Helium

B. Argon

C. Bromine

D. Radon

**Answer: C**



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**6. Across the period, electron affinity**

A. Remain the same

B. Approach Zero

C. Decreases

D. Increases

**Answer: D**



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7. Which elements still has dicey position in modern periodic table ?

A. Carbon

B. Nitrogen

C. Oxygen

D. Hydrogen

**Answer: D**



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**8. Modern periodic table is based on**

A. Atomic mass

B. Mass number



C. Atomic number

D. Atomic volume

**Answer: C**



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**9. The law of triads is applicable to**

A. *Cl, Br, I*

B. *S, Se, Te*

C. *Na, K, Rb*

D. *Ca, Sr, Ba*

**Answer: C**



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**10.** Which of the following elements is a semi metal.

A. Aluminum

B. Chlorine

C. Sodium

D. Silicon

**Answer: D**



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**11.** Why are group 1 elements called alkali metals?

A. Group 1

B. Group 2

C. Group 17

D. Group 18

**Answer: A**



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**12.** Group 17 elements are also called as

A. Alkali metals

B. Alkali earth metals

C. Halogene

D. Noble gases

**Answer: D**



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## **Additional Questions Answer The Following Questions**

**1. Explain law of octaves.**



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**2. Why is silicon classified as metalloid?**



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3. Chlorine, Bromine and Iodine form a Dobereiner's triad. The atomic masses of Chlorine and iodine are 35.5 and 126.9 respectively. Predict the atomic mass of Bromine.



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4. Why was the system of classification of elements into triads not found suitable ?



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5. How would the tendency to lose electrons change as you go

i] from left to right across a period

ii] down a group



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6. What is the achievement of Doberiner's law of triads ?



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



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**8.** Give reason :

i) Element in a group have similar chemical properties.

ii) Elements of groups I form ions with a charge of + 1.



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**9.** The atomic number of an element is 16.

predict

1) The number of valence electrons in its atom.

2) Its valency.

3) Its group number

4) Whether it is a metal or a non metal.

5) The nature of oxide formed by it.

6) The formula of its chloride.



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**10.** An element 'M' has atomic number 11.

a) Write its electronic configuration.

b) State the group to which 'M' belongs

c) is 'M' a metal or a non - metal ?

d) Write the formula of its chloride.



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**11.** Choose from the following

${}_6C$ ,  ${}_8O$ ,  ${}_{10}Ne$ ,  ${}_{11}Na$ ,  ${}_{14}Si$

a] Elements that should be in the same period

b] elements that should be in the same group

State reason for your selection in each case.



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**12.** How are the following related ?

a) Number of valence electrons of different elements in the same group.

b) Number of shells of elements in the same period.



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**13.** How do the following change ?

(a) Number of shells of elements as we go down a group.

(b) Number of valence electrons of elements

on moving from, left to right in a period.

(c ) Atomic radius in moving from left to right along a period.

(d) Atomic size down a group.



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**14.** Na, Mg and Al are the elements of the same period of modern periodic table 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 case.



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**15.** The atomic number of three elements are given below :

Element (Symbols)	<i>A</i>	<i>B</i>	<i>C</i>
Atomic number	5	7	10

Write the symbol of the elements which belongs to (a) group B, (b) groups 15, of the periodic table, state the period of the periodic

table to which these elements belong. Give reason for your answer.



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## Unit Test I Fill In The Blanks

1. Name the scientist who gave the law of octaves ?



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2. Group 17 elements are also called as



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## Unit Test Ii Answer The Following

1. What were the limitations of Dobreiner's classification?



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2. Why is silicon classified as metalloid?



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3. Which elements has

The electronic configuration 2,8,2 ?



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4. What were the criteria used by Mendeleev's  
in creating his Periodic Table ?



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5. Why do all elements of the same group have similar properties?



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6. Compare and contrast the arrangement of elements in Mendeleev's periodic table and the Modern Periodic Table.



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7. The atomic number of an element is 16.

Predict

1. The number of valence electrons in its atom

2. Its valency.

3. Its group number.

4. Whether it is a metal or a non-metal.



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

Periodic Table?



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