



CHEMISTRY

BOOKS - MAXIMUM PUBLICATION

CLASSIFICATION OF ELEMENTS & PERIODICITY IN PROPERTIES

Example

1. Which of the following is not a Dobereiner triad?

A. Cl, Br, I

B. Ca, Sr, Ba

C. Li, Na, K

D. Fe, Co, Ni

Answer:



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2. The elements of s and p-block are collectively called___



3. The cause of periodicity of properties is

A. Increasing atomic radius

B. Increasing atomic weights

C. Number of electrons in the valence shell

D. The recurrence of similar outer
electronic configuration

Answer:



4. Halogen with highest ionization enthalpy is__

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5. Which of the following represents the most electropositive element?





Answer:



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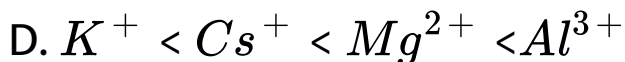
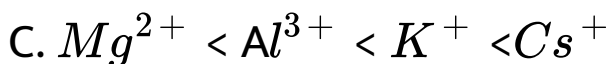
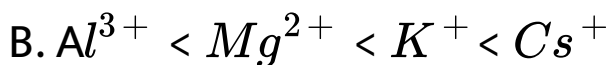
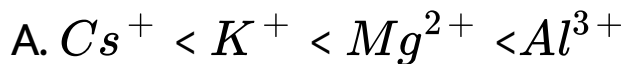
6. Second electron gain enthalpy is__



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7. Correct order of polarising power is Cs^+ ,

K^+ , Mg^{2+} , Al^{3+}



Answer:



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8. The IUPAC name of the element with atomic number 109 is ___



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9. The size of iso electronic species F^- , Ne and Na^+ is affected by

A. Nuclear charge

B. Principal quantum number

C. Electron - electron interaction in outer orbitals

D. None of the factors because their size is the same.

Answer:



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10. In transition elements the incoming electron occupies $(n-1)d$ sublevel in preference to___



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11. The arguments made by two students are as given:

Student 1 : 'Hydrogen belongs to Group 1.

Student 2: 'Hydrogen belongs to Group 17.

a) Who is right?

b) What is your opinion?



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12. Match the following:

Sodium	f-block
Oxygen	s-block
Uranium	d-block
Silver	p-block



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13. a) Which one has greater size, Na or K?

b) Justify your answer.



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14. The general characteristics of a particular block of elements is as given:

They are highly electropositive, soft metals.

They are good reducing agents. They lose the outermost electron(s) readily to form 1+ ion or 2+ ion.

a) Which block has these general characteristics?

b) Write down two general characteristics of p-block



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15. The variation in electron gain enthalpies of elements is less systematic than for ionization enthalpies. Out of oxygen and sulphur which has greater negative value for electron gain enthalpy? Justify.



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16. Some elements are given. Li, Cs, Be, C, N, O
F, I, Ne, Xe.

a) Arrange the above elements in the increasing order of ionization enthalpy.

b) Arrange the given elements in the decreasing order of negative electron gain enthalpy.



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17. a) What is meant by atomic radius?

b) Explain covalent radius.

c) Write down another two types of terms expressed as atomic size.



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18. Consider the statement: 'The element with $1s^2$ configuration belongs to the p-block.'

- a) Identify the element.
- b) Do you agree with this statement?
- c) Justify.



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19. The properties of elements are a periodic function of their atomic weights.

- a) Who proposed this law?
- b) Can you see anything wrong in this law? If

yes, justify your answer.

c) State modern periodic law.



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20. a) Define ionisation enthalpy.

b) $IE_1 < IE_2 < IE_3$

What is meant by this? Justify.



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21. Say whether the following are true or false:

a) On moving across a period ionization enthalpy decreases.

b) Mg is bigger than Cl.

c) Ionization enthalpy of Li is less than that of K.



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22. a) On moving down a group what happens to electron gain enthalpy?

b) Why chlorine shows more negative electron gain enthalpy than fluorine?



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23. Electron gain enthalpy is an important periodic property.

a) What is meant by electron gain enthalpy?

b) What are the factors affecting electron gain enthalpy?

c) How electron gain enthalpy varies on moving across a period? Justify.



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24. a) The electron gain enthalpies of Be and Mg are positive. What is your opinion? Justify.
- b) Electron gain enthalpies of noble gases have large positive values. Why?



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25. During a group discussion a student argued that ionization enthalpy depends only upon electronic configuration.

a) Do you agree? Comment.

b) Define shielding effect/screening effect.

c) Is there any relation between ionization enthalpy and shielding effect/screening effect? Explain



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26. a) Which of the following has higher first ionization enthalpy, N or O? Justify. b) Which one is bigger, F or F^- ? Why?



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27. Electronegativity differs from electron gain enthalpy.

a) Do you agree ?

b) What do you mean by electronegativity?



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28. Ionization enthalpy is an important periodic property.

a) What is the unit in which it is expressed?

b) What are the factors influencing ionization

enthalpy?

c) How ionisation enthalpy varies in the periodic table?



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29. The second period elements show anomalous behaviour.

a) Give reason.

b) What are the anomalous properties of second period elements?



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30. Atomic size, valency, ionization enthalpy, electron gain enthalpy and electronegativity are the important periodic properties of elements.

a) What do you mean by periodicity?

b) Periodic properties are directly related to___



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31. a) Which is the element among alkali metals having lowest ionization enthalpy?

b) What is meant by valence of an element?

How it varies in the periodic table?



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32. Li and Mg belonging to first and second group in periodic table respectively resemble each other in many respects.

a) Name the relationship.

b) B can only form $[BF_4]^-$ ion while Al can form $[AlF_6]^{3-}$ — though both B and Al belong to group 13. Justify.

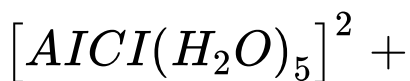


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33. During a group discussion a student argues that both oxidation state and valence are the same.

a) Do you agree?

b) Justify taking the case of



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34. Among the elements of the third period, identify the element.

a) With highest first ionization enthalpy.

b) That is the most reactive metal.

c) With the largest atomic radius.



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35. A cation is smaller than the corresponding neutral atom while an anion is larger. Justify.



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36. a) How the metallic character varies in the periodic table?

b) Categorize the following oxides into acidic, basic, neutral and amphoteric:

Al_2O_3 , Na_2O , CO_2 , Cl_2O_7 , MgO , CO , As_2O_3 ,

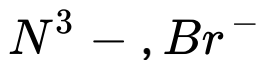
N_2O



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37. A group of ions are given below:

Na^+ , Al^{3+} , O^{2-} , Ca^{2+} , Mg^{2+} , F^- ,



- a) Find the pair which is not isoelectronic.
- b) Arrange the above ions in the increasing order of size.



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38. Statement 1: 'Atomic mass is the fundamental property of an element.'

Statement 2: 'Atomic number is a more fundamental property of an element than its atomic mass.'

a) Which statement is correct? Justify your answer.

b) Name the scientist who proposed this statement? What observation led him to this conclusion?



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39. Atoms possessing stable configuration have less tendency to loss and consequently will have high value of ionization enthalpy.

a) Justify this statement by taking the case of

half-filled and completely filled configurations.

b) The noble gases have highest ionization enthalpies in each respective periods. Why?



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40. Mendeleev arranged the elements in the order of increasing atomic weights.

a) Write down the merits of Mendeleev's periodic table.

b) What are the demerits of Mendeleev's periodic table?



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41. a) Name any three numerical scales of electronegativity.

b) How electronegativity varies in the periodic table? Justify.



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42. a) First ionization enthalpy of Na is lower than that of Mg. But its second ionization enthalpy is higher than that of Mg. Explain.

b) Which one is smaller, Na or Na^+ ? Give reason.



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43. Removal of electron becomes easier on moving down the group.

a) Comment the above statement based on ionization enthalpy.

b) How electronic configuration influences the ionization enthalpy value?



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44. The energy released during the addition of an electron to an isolated neutral atom is called electron gain enthalpy.

a) Explain how electron gain enthalpy differ from electronegativity.

b) The second ionisation enthalpy of an element is always greater than the first ionisation enthalpy. Give reason.



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45. The physical and chemical properties of elements are periodic functions of their atomic numbers.

a) The atomic number of an element 'X' is 19.

Write the group number, period and block to which 'X' belong in the periodic table.

b) Name the element with

i) highest electronegativity and

ii) highest electron gain enthalpy



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