JEE Mains 2019 Chapter wise Question Bank

Periodic Table and Periodicity - Questions

Q1

In general, the properties that decrease and increase down a group in the periodic table, respectively, are:
(1) atomic radius and electronegativity.
(2) electron gain enthalpy and electronegativity.
(3) electronegativity and atomic radius.
(4) electronegativity and electron gain enthalpy.

9 Jan Morning

Q2

Aluminium is usually found in +3 oxidation state. In contrast, thallium exists in +1 and + 3 oxidation states. This is due to:
(1) inert pair effect (2) diagonal relationship
(3) lattice effect (4) lanthanoid contraction

9 Jan Morning

Q3

When the first electron gain enthalpy($\Delta_{eg}H$) of oxygen is – 141 kJ/mol, its second electron gain enthalpy is:
(1) a more negative value than the first
(2) almost the same as that of the first
(3) negative, but less negative than the first
(4) a positive value

9 Jan Evening

Q4

The electronegativity of aluminium is similar to:
(1) Carbon (2) Beryllium
(3) Boron (4) Lithium

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Q5

The 71st electron of an element X with an atomic number of 71 enters into the orbital:
(1) 6*p* (2) 4*f*
(3) 5*d* (4) 6*s*

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Q6

The correct order of the atomic radii of C, Cs, Al, and S is :
(1) C < S < Al < Cs
(2) S < C < Cs < Al
(3) S < C < Al < Cs
(4) C < S < Cs < Al

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Q7

The correct option with respect to the Pauling electronegativity values of the elements is:
(1) Te > Se (2) Ga < Ge
(3) Si < Al (4) P > S

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Q8

The relative stability of +1 oxidation state of group 13 elements follows the order :
(1) Al < Ga < Tl < In
(2) Tl < In < Ga < Al
(3) Ga < Al < In < Tl
(4) Al < Ga < In < Tl

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Q9

The element with Z=120 (not yet discovered) will be an/a:
(1) Inner-transition metal
(2) Alkaline earth metal
(3) Alkali metal
(4) Transition metal

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Q10

The size of the iso-electronic species Cl^-, Ar and Ca^{2+} is affected by :

(1) azimuthal quantum number of valence shell
(2) electron-electron interaction in the outer orbitals
(3) principal quantum number of valence shell
(4) nuclear charge

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Q11

The IUPAC symbol for the element with atomic number 119 would be :

(1) uue (2) une (3) unh (4) uun

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Q12

The correct statements among I to III regarding group 13 element oxides are,

(I) Boron trioxide is acidic.
(II) Oxides of aluminium and gallium are amphoteric.
(III) Oxides of indium and thallium are basic.

(1) (I) and (II) only (2) (I), (II) and (III)
(3) (I) and (III) only (4) (II) and (III) only

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Q13

In comparison to boron, berylium has :

(1) lesser nuclear charge and lesser first ionisation enthalpy.
(2) greater nuclear charge and lesser first ionisation enthalpy.
(3) greater nulear charge and greater first ionisation enthalpy.
(4) lesser nuclear charge and greater first ionisation enthalpy.

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Periodic Table and Periodicity - Answers

Q1

(3) Generally, electronegativity decreases down the group as the size increases. This can also be formulated as:
Electronegativity $= \frac{1}{\text{size}}$

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Q2

(1) Due to the inert pair effect, thallium exists in more than one oxidation state. Also, for thallium + 1 oxidation state is more stable than +3 oxidation state.

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Q3

(4) The second electron gain enthalpy of oxygen is positive as energy has to be added for the addition of another electron.

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Q4

(2) Be and Al show diagonal relationship due to which these two elements have similar electronegativity.

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Q5

(3) $_{71}X = [Xe]6s^2 4f^{14} 5d^1$
$\therefore$ Orbital occupied by last e^- is $5d$.

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Q6

(1) On going down the group, size increases while going from left to right in a period size decreases, so order is C < S < Al < Cs.

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Q7

(2) Correct order of electronegativity values of the elements is
Si > Al; S > P; Se > Te; Ge > Ga.

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Q8

(4) Due to inert pair effect, the stability of +1 oxidation state increases down the group.
Thus, correct order of stability is Al < Ga < In < Tl

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Q9

(2) Elements with Z = 120 will belong to alkaline earth metals.
Its electronic configuration may be represented as [Og] $8s^2$.

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Q10

(4) Iso-electronic species differ in size due to different effective nuclear charge.

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Q11

(1) Symbol for 1 is u and for 9 is e.
$\therefore$ IUPAC symbol for 119 is uue.

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Q12

(2) (I) B_2O_3 – Acidic oxide
(II) Al_2O_3 & Ga_2O_3 – Amphoteric oxide
(III) In_2O_3 & Tl_2O – Basic oxide

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Q13

(4) Nuclear charge : B > Be

Be = $1s^2\ 2s^2$ (more stable)

B = $1s^2\ 2s^2\ 2p^1$

$\therefore$ Ionisation energy of Be is greater than B due to ns^2 outer electronic configuration.

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