CHEMISTRY

BOOKS - UNIVERSAL BOOK DEPOT 1960 CHEMISTRY (HINGLISH)

CLASSIFICATION OF ELEMENTS AND PERIODIC PROPERTIES

Ordinary Thinking Objective Questions Extended Or Long Form Of Periodic Table

1. Modern periodic table is based on the atomic number of the elements. The experiment which proved the

significance of the atomic number was

A. Mullikan's oil drop experiment

B. Moseley's work on X-ray spectra

C. Bragg's work on X-ray diffraction

D. Discovery of X-ray by Rontgen

Answer: B

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2. The electronic configuration of an element X is $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$. What is the atomic number of the element which is just below the element X in the periodic table?

A. 33

B. 34

C. 31

D. 49

Answer: A

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3. An atom has electronic configuration $1s^2 2s^2 2p^6 3s^2 3P^6 3d^3 4s^2$. In which group wouold it be placed ?

A. Second group

B. Third group

C. Fifth group

D. Sixth group

Answer: C

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4. The number of d-electrons in Fe^{2+} (Z=26) is not equal to the number of electrons in which one of the following ?

A. p-electrons in Cl (Z=17)

B. d-electrons in Fe (Z=26)

C. p-electrons in Ne (Z=10)

D. s-electrons in Mg (Z=12)

Answer: A

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5. Elements up to atomic number 103 have been synthesized and studied. If a newly discovered element is found to have an atomic number 106, its electronic configuration will be

A. $[Rn]5f^{14}6d^{4}7s^{2}$

B. $[Rn]5f^{14}6d^{5}7s^{1}$

C. $[Rn]5f^{14}6d^{6}7s^{0}$

D. $[Rn]5f^{14}6d^{1}7s^{2}7p^{3}$

Answer: A

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6. Chloride of an element A gives neutral solution in watt . In the periodic table, the elements A belong to

A. First group

B. Third group

C. Fifth group

D. First transition series

Answer: A

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7. Which of the following compounds are analogous to the lanthanides?

A. Actinides

B. Borides

C. Carbides

D. Hydrides

Answer: A

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8. Which of the following is the atomic number of a metal?

A. 32

B. 34

C. 36

D. 38

Answer: D

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9. Which of the following statement is not correct regarding hydrogen atom?

A. It resembles halogens in some properties

B. It resembles alkali metals in some properties

C. It can be placed in 7^{th} group of periodic table

D. It can not be placed in first group of periodic table

Answer: C

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10. Which of the following is metalloid

A. Pb

B. Zn

C. As

D. None of these

Answer: C

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11. Which of the following pair has both members from the same group of the periodic table?

A. Na-Na

B. Na-Cl

C. Ca-Cl

D. Cl-Br

Answer: B

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12. Who is called the father of chemistry

A. Faraday

B. Priestley

C. Rutherford

D. Lavoiser

Answer: D

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13. The elements with atomic number 10, 18, 36, 54 and 86 are all

A. Light metals

B. Inert gases

C. Halogens

D. Rare-earths

Answer: B

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14. The heaviest atom amongst the following is

A. U

B. Ra

C. Pb

D. Hg

Answer: A

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15. the elements on the right side of the periodic table are

A. Metalss

B. Metalloids

C. Non-metals

D. Transition elements

Answer: C

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16. The most important active step in the development of periodic table was taken by

A. Mendeleev

B. Dalton

C. Avogadro

D. Cavendish

Answer: A

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17. Elements of atomic number 6 is placed in

A. IV group

B. IV period

C. VI group

D. III group

Answer: A

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18. The elements A, B, C and D have indicated electronic arrangement, which is the most metallic element?

A. A=2,8,4

B. B=2,8,8

C. C=2,8,8,1

D. D=2,8,8,7

Answer: C

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19. In the periodic table, going down in fluorine group

A. Reactivity will increase

B. Electronegativity will increase

C. Ionic radius will increase

D. Ionisation potential will increase

Answer: C

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20. The element having the electronic configuration $[Kr]4d(10)4f^{14}5s^25p^65d^26s^2$ belongs to

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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21. Which of the following pairs has both members from the same group of the periodic table ?

A. Mg-Ba

B. Mg-Na

C. Mg-Cu

D. Mg-K

Answer: A

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22. The long form of periodic table has

A. Eight horizontal rows and seven vertical columns

B. Seven horizontal rows and eighteen vertical columns

C. Seven horizontal rows and seven vertical columns

D. Eight horizontal rows and eight vertical columns

Answer: B

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23. On moving from left to right across a period in the periodic table the metallic character

A. Increase

B. Decreases

C. Remains constant

D. First increase and then decreases

Answer: B

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24. The element with electronic configuration $1s^2 2s^2 2p^6 3s^2$ is

A. A metal

B. A non-metal

C. An inert gas

D. A metalloid

Answer: A

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25. the tenth elements in the periodic table resembles with the

A. First period

B. Second period

C. Fourth group

D. Ninth group

Answer: B

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26. Aluminium is diagonally related to (in periodic table)

A. Li

B. C

C. B

D. Be

Answer: D

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27. An element with atomic number 29 belongs to

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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28. The total number of rare earth elements is

A. 8

B. 32

C. 14

D. 10

Answer: C

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29. The long form of periodic table is based on

A. Shape of the atom

B. Mass of the atom

C. Atomic number of the atom

D. Electronegativity

Answer: C

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30. Which of the following denegative anion is quite common?

A. S^{2-}

B. Se^{2-}

C. Te^{2-}

D. O^{2-}

Answer: D

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31. An element has electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^4$. Predict its group, period and block

A. Period = 3^{rd}, block = p, group = 16

B. Period = 5^{th}, block = s, group = 1

C. Period = 3^{rd}, block = p, group = 10

D. Period = 4^{th}, block = d, group = 12

Answer: A

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32. The lightest metal is

A. Li

B. Mg

C. Ca

D. Na

Answer: A

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33. The telluric helix was given by

A. De Chan Courtois

B. Newlands

C. L.Meyer

D. Mendeleev

Answer: A

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34. Which of the following elements is a lanthanide (Rare-earth element) ?

A. Cadmium

B. Californium

C. Cerium

D. Cesium

Answer: C

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35. The most common lanthanoid is :

A. Lanthanum

B. Cerium

C. Samarium

D. Plutonium

Answer: B

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36. Lithium shows similarities to magnesium in its chemical behaviour because.

A. Similar size, same electronegativity and lower polarizing power

B. Similar size, greater electronegativity and similar polarizing power

C. Similar size, same electronegativity and similar high polarizing power

D. None of these

Answer: C

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37. Which of the following has the same number of electrons in its outermost shell and penultimate shell ?

A. N , O

B. Na , Ca

C. As , Bi

D. Pb , Sb

Answer: C

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38. Which of the following does not reflect periodicity of elements ?

A. Bonding behaviour

B. Electronegativity

C. Ionisation energy

D. Neutron/proton ratio

Answer: D

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39. The element with atomic number $9, 17, 35, 53, 85$ are all

A. Noble gases

B. Halogens

C. Heavy metals

D. Light metals

Answer: B

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40. Chemical property of Li and Mg are similar because

A. These belong to same group

B. Both ionisation potential is same

C. Shows diagonal relationship

D. Both electron affinity is same

Answer: C

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41. Be and Al exhibit diagonal relationship . Which of the following statements about them is/are not true ?

(i) Both react with HCl to liberate H_2.

(ii) They are made passive by HNO_3.

(iii) Their carbides give acetylene on treatment with water .

(iv) Their oxides are amphoteric .

A. Only (i)

B. (ii) and (iii)

C. Only (iv)

D. (ii) and (iv)

Answer: C

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42. The electronic configuration of four elements are :

(P) $[Xe]6s^2$

(Q) $[Xe]4f^{14}, 5d^1, 6s^2$

(R) $[Ar]4s^2, 4p^5$

(S) $[Ar]3d^{10}, 4s^2, 4p^3$

Which of the following is/are correct?

A.

B.

C.

D.

Answer: c

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43. An element X belongs to the fourth period and the fifteenth group of the periodic table. Which one of the following is true regarding the outer electronic configuration of X? It has

A. Partially filled d orbitals and completely filled s orbitals

B. Completely filled s-orbital and completely filled p-orbitals

C. Completely filled s-orbital and half-filled p-orbitals

D. Half-filled d-orbitals and completely filled s-orbitals

Answer: C

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44. Diagonal relationship is shown by

A. Elements of first period

B. Elements of second period

C. Elements of third period

D. Both (b) and (c)

Answer: D

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45. Last element of group-IV is found to be

A. Strong metallic

B. Weak metallic

C. Strong non-metallic

D. Weak non-metallic

Answer: B

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46. Elements of d-group are called

A. Transition elements

B. Transuranic elements

C. Metals

D. Metalloids

Answer: A

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47. Which one of the following configuration represents a noble gas ?

A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^6$

C. $1s^2 2s^2 2p^6$

D. $1s^2 2s^2 2p^6 3s^2$

Answer: c

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48. The last member in each period of the periodic table is

A. An inert gas element

B. A transition element

C. A halogen

D. An alkali metal

Answer: A

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49. Which one of the following combination represent a metallic element?

A. 2, 8, 7

B. 2, 8, 8

C. 2, 8, 4

D. 2, 8, 2

Answer: D

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50. Which pair of elements has same chemical properties ?

A. 13, 22

B. 3, 11

C. 4, 24

D. 2, 4

Answer: B

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51. In the long form of periodic table all the non-metals are placed under

A. s-block

B. p-block

C. d-block

D. f-block

Answer: B

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52. Which pair of atomic numbers represent s-block elements?

A. 7, 15

B. 6, 12

C. 9, 17

D. 3, 12

Answer: D

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53. According to modern periodic law, the physical and chemical properties of elements are the periodic functions of their ?

A. Atomic volume

B. Atomic Number

C. Atomic weight

D. Atomic size

Answer: B

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54. Which among the following has smallest bond angle ?

A. H_2O

B. NH_3

C. CH_4

D. CO_2

Answer: A

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55. The metal-having highest melting point is

A. Chromium

B. Tungsten

C. Diamond

D. Silver

Answer: B

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56. The element with atomic number 117 if discovered would be placed in

A. Noble gas family

B. Alkali family

C. Alkaline earth family

D. Halogen family

Answer: D

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57. The d-block elements consists mostly of

A. Monovalent metals

B. All non-metals

C. Elements which generally form stoichiometric metal oxide

D. Many metals with catalytic properties

Answer: D

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58. The element with atomic number 57 belongs to:

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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59. The electronic configuration of an atom A is $1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2 4p^3$. The chemistry of A is therefore likely to be similar to that of

A. Chlorine

B. Nitrogen

C. Oxygen

D. Boron

Answer: B

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60. Alkali metals in each period have

A. Smallest size

B. Lowest ionisation potential

C. Highest ionisation potential

D. Highest electronegativity

Answer: B

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61. A metal having electronic configuration

$1s^2, 2s^2 2p^6, 3s^2 3p^6 3d^{10}, 4s^2$ is in

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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62. Element of atomic number 23 is placed in the periodic table in

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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63. All the elements in a group in the periodic table have the same

A. Atomic number

B. Electronic configuration

C. Atomic weight

D. Number of electrons in the outermost shell or number of electrons for bonding

Answer: D

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64. Which of the following remains unchanged in descending in a group in the periodic table?

A. Atomic size

B. Density

C. Valence electrons

D. Metallic character

Answer: C

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65. In the periodic table, the element with atomic number 16 will be placed in the group

A. Third

B. Fourth

C. Fifth

D. Sixth

Answer: D

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66. Which one of the following elements is most metallic?

A. P

B. As

C. Sb

D. Bi

Answer: D

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67. Which of the following pairs show diagonal relationship?

A. B and Si

B. B and Al

C. B and Ga

D. B and C

Answer: A

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68. On going left to right in a period, in transition metals, their atomic volumes

A. Decrease

B. Increase

C. Remain same

D. None of these of correct

Answer: D

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69. The elements in which 4f orbitals are progressively field up are called as

A. Transition elements

B. Lanthanides

C. Actinides

D. Inert gases

Answer: B

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70. Who developed the long form of periodic table?

A. Lother Meyer

B. Niels Bohr

C. Mendeleev

D. Moseley

Answer: B

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71. The hydration energy of Mg^{2+} is larger than that of

A. Na^+

B. Al^{3+}

C. Be^{2+}

D. Cr^{3+}

Answer: A

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72. Dobereiner traids is

A. Na, K, Rb

B. Mg, S, As

C. Cl, Br, I

D. P, S, As

Answer: C

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73. The screening effect of d-electron is

A. Equal to that of p-electrons

B. More than that of p-electrons

C. Same as f-electrons

D. Less than p-electrons

Answer: D

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74. Hydrogen can be put in halogen group because:

A. It has deuterium and tritium as isotopes

B. It forms hydrides like chlorides

C. It contains one electron only

D. It is light

Answer: B

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75. Which of the following element is metalloid

A. Bi

B. Sn

C. Ge

D. C

Answer: C

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76. Highest density will be of this element

A. It

B. Os

C. Pb

D. Hg

Answer: B

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77. Under normal condition which of the following electronic configuration is able to form dipositive ion

A. $[Ar]4s^1$

B. $[Ne]2s^2 3p^6$

C. $[Ne]3s^2$

D. None of these

Answer: C

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78. Group comprising all metals is

A. IIIA

B. IVA

C. VIIA

D. IIA

Answer: D

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79. Astatine is :

A. Halogen

B. Rare earth element

C. Alkaline earth metal

D. None of these

Answer: A

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80. According to periodic law of elements, the variation in properties of elements is related to their:

A. Atomic masses

B. Nuclear masses

C. Atomic numbers

D. Nuclear neutron-proton number

Answer: C

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81. The following statements regarding the periodic trends of chemical reactivity of the alkali metals and the halogens are given. Which of these statement gives the correct picture:

A. The reactivity decreases in the alkali metals but increases in the halogens with increase in atomic

number down the group

B. In both alkali metals and the halogens the chemical reactivity decreases with increase in atomic number down the group

C. Chemical reactivity increase with increase in atomic number down the group in both the alkali metals and halogens

D. In alkali metals the reactivity increases but in the halogens it decreases with increase in atomic number down the group

Answer: D

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82. The electronic configuration of the element which is just above the element with atomic number 43 in the same periodic group is

A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^5 4s^2$

B. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^5$

C. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1$

D. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^1 4p^6$

Answer: A

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83. Which one of the following belongs to representative group of elements in the periodic table?

A. Lanthanum

B. Argon

C. Chromium

D. Aluminium

Answer: D

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84. An element with atomic number 21 is a

A. Transition elements

B. Alkali metal

C. Halogen

D. Representative element

Answer: A

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85. Which one of the following is a 'd-block element' ?

A. Gd

B. Hs

C. Es

D. Cs

Answer: B

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86. Properties of elements are periodic function of number of present in the nucleus

A. Protons

B. Electrons

C. Neutrons

D. Mesons

Answer: A

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87. Whose name is not associated with the development of Periodic Table

A. Prout's

B. Newlands

C. Rutherford

D. Loother Meyer

Answer: C

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88. The element with atomic number 36 belongs to ..... Block in the periodic table

A. p

B. s

C. f

D. d

Answer: A

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89. All the s - block elements of the periodic table and placed in the groups

A. IA and IIA

B. IIIA and IVA

C. B sub groups

D. VA to VIIA

Answer: A

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90. Which set has the same number of unpaired electrons in their ground state?

A. Cl^-, Fe^{3+}, Cr^{3+}

B. Na^+, Mg^{2+}, Al

C. Na, P, Cl

D. N, P, V

Answer: D

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91. The electronic structure $(n-1)d^{1-10}ns^{0-2}$ is characteristic of

A. Transition elements

B. Lanthanides

C. Actinides

D. Rare gases

Answer: A

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92. Coloured salts are formed by

A. Alkali metals

B. Lanthanides

C. Actinides

D. Transition metals

Answer: D

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93. The elements in which s and p-orbital are present

A. Common elements

B. Inert gases

C. Halogens

D. Transitional elements

Answer: B

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94. Which of the following statement is not correct for the element having electronic configuration $1s^2, 2s^2, 2p^6, 3s^1$

A. It is a monovalent electropositive

B. It forms basic oxide

C. It is a non-metal

D. It has low electron affinity

Answer: C

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95. Hydrogen by donating one electron forms H^+ . In this property , it resembles with

A. Transitional metals

B. Alkaline earth metals

C. Alkali metals

D. Halogens

Answer: C

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96. The element with quantum numbers n=2, l=1, m=1, s=-1/2 has the following position in the periodic table

A. Group VII-A, period II

B. Group 0, period II

C. Group VII-A, period III

D. Group 0, period III

Answer: B

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97. The element having the electronic configuration $1s^2, 2s^2 2p^6, 3s^2 3p^1$ is

A. A transition element

B. A representative element

C. An inert gas

D. An inner-transition element

Answer: B

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98. Which metal has 2 electrons in the outermost orbit

A. Na

B. Cu

C. Au

D. Be

Answer: D

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99. Of the following pairs, the one containing examples of metalloid elements in the periodic table is:

A. Sodium and potassium

B. Fluorine and chlorine

C. Calcium and magnesium

D. Ge and silicon

Answer: D

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100. The number of elements in each of the long periods in the periodic table is

A. 2

B. 8

C. 18

D. 32

Answer: C

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101. The element or elements whose position is anomalous the periodic table is

A. Halogens

B. Fe, Co and Ni

C. Inert gases

D. Hydrogen

Answer: D

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102. An element M has an atomic mass 19 and atomic number 9. Its ion is represented by

A. M^+

B. M^-

C. M^{2+}

D. M^{2-}

Answer: B

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103. Which of the following is a normal element

A. Ce

B. He

C. Li

D. Ar

Answer: C

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104. Cause of diagonal relationship is

A. Similar electronic configuration of the elements

B. Similar e/r ratio of the elements

C. Same number of valency electrons in the elements

D. Same atomic weights of the elements

Answer: B

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105. For a p - block element, its 3d, 3s, 3p and 4s orbitals are completely filled and the differentiating electron goes to the 4p orbital. The element should have its atomic number in the range

A. 13-18

B. 21-26

C. 31-36

D. 49-54

Answer: C

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106. Assertion : Noble gases have maximum electron affinity.

Reason : High electron affinity shows that the electron is loosely bonded to the atom.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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107. Assertion : Atomic number of the element ununbium is 112.

Reason : Name for digits 1 and 2 is un-and bi-respectively in latin words.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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108. Assertion (A): Chemistry of Actinoids is more complicated than Lanthanoids

Assertion (R): Actionid elements are radio active

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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109. Assertion: Shielding effect increases as we go down the group.

Reason: More is the number of electrons in the penultimate shell, more is shielding.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: A

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Ordinary Thinking Objective Questions Atomic And Ionic Radii

1. Elements of which of the following groups will form anions most readily ?

A. Oxygen family

B. Nitrogen group

C. Halogens

D. Alkali metals

Answer: C

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2. Which of the following statement concerning lanthanides elements is false.

A. Lanthanides are separated from one another by ion exchange method

B. Ionic radii of trivalent lanthanides steadily increases with increase in the atomic number

C. All lanthanides are highly dense metals

D. More characteristic oxidation state of lanthanide elements is +3

Answer: B

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3. Which of the following is largest

A. Cl^-

B. S^{2-}

C. Na^+

D. F^-

Answer: B

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4. Which of the following has the smallest size?

A. Na^{+}

B. Mg^{+2}

C. Cl^{-}

D. F^{-}

Answer: B

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5. Which one is the correct order of the size of the iodine species?

A. $l > l^{+} > l^{-}$

B. $l > l^{-} > l^{+}$

C. $l^+ > l^- > l$

D. $l^- > l > l^+$

Answer: D

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6. Which of the following does not represent the correct order of the property indicated?

A. $Sc^{3+} > Cr^{3+} > Fe^{3+} > Mn^{3+}$: ionic radii

B. $Sc < Ti < Cr < Mn$: Density

C. $Mn^{2+} > Ni^{2+} < Co^{2+} < Fe^{2+}$: ionic radii

D. $FeO < CaO > MnO > CuO$: Basic nature

Answer: A

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7. Ionic radii are

A. Directly proportional to effective nuclear charge

B. Directly proportional to square of effective nuclear charge

C. Inversely proportional to effective nuclear charge

D. Inversely proportional to square of effective nuclear charge

Answer: C

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8. Identify the correct order of the size of the following

A. $Ca^{2+} < K^{+} < Ar < S^{2-} < Cl^{-}$

B. $Ca^{2+} < K^{+} < Ar < Cl^{-} < S^{2-}$

C. $Ar < Ca^{2+} < K^{+} < Cl^{-} < S^{2-}$

D. $Ca^{2+} < Ar < K^{+} < Cl^{-} < S^{2-}$

Answer: B

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9. Among the following Ca ,Mg, P and CI the order of increasing atomic radius is

A. $Mg < Ca < Cl < P$

B. $Cl < P < Mg < Ca$

C. $P < Cl < Ca < Mg$

D. $Ca < Mg < P < Cl$

Answer: B

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10. Among the following which has the highest cation to anion size ratio ?

A. CsI

B. CsF

C. LiF

D. NaF

Answer: B

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11. Identify the wrong statement in the following ?

A. Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius

B. Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius

C. Atomic radius of the elements increases as one moves down the first group of the periodic table

D. Atomic radius of the elements decreases as one moves across from left to right in the 2^{nd} period of the periodic table

Answer: A

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12. Which of the following orders of ionic radii is correctly represented?

A. $F^- > O^{2-} > Na^+$

B. $Al^{3+} > Mg^{2+} > Na^{3-}$

C. $H > H^+ > H^-$

D. $Na^+ > F^- > O^{2-}$

Answer: C

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13. Which has the maximum atomic radius?

A. Al

B. Si

C. P

D. Mg

Answer: D

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14. The radii of F, F^-, O and O^{-2} are in the order of

A. $O^{2-} > F^- > O > F$

B. $O^{2-} > F^- > F > O$

C. $F^- > O^{2-} > F > O$

D. $O^{2-} > O > F^{-} > F$

Answer: A

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15. Which of the following ion is the smallest ion is the smallest ion?

A. O_2^{+}

B. O_2^{-}

C. O_2

D. O_2^{-2}

Answer: A

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16. Of the following, the one with largest size is

A. Cl^-

B. Ar

C. K^+

D. Ca^{2+}

Answer: A

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17. Which of the following is the correct order of ionic radii

A. $F > Li > Na > K$

B. $F > K > Na > Li$

C. $Na > K > F > Li$

D. $Li > Na > K > F$

Answer: B

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18. Which of the following has the largest ionic raduis?

A. Na^{+}

B. Ni^{+}

C. Cs^{+}

D. Mg^{+2}

Answer: C

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19. The ionic radii $(A^{\circ})$of C^{-4} and O^{-2} are 2.60 and 1.40 respectively .The ionic radius of the isoelectronic ion N^{-3} would be

A. 2.6

B. 1.71

C. 1.4

D. 0.95

Answer: B

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20. In a period, elements are arranged in strict sequence of

A. Decreasing charges in the nucleus

B. Increasing charges in the nucleus

C. Constant charges in the nucleus

D. Equal charges in the nucleus

Answer: B

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21. Arrange the following in increasing order of their atomic radius: Na, K, Mg, Rb

A. $Mg < K < Na < Rb$

B. $Mg < Na < K < Rb$

C. $Mg < Na < Rb < K$

D. $Na < K < Rb < Mg$

Answer: B

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22. The correct order of increasing radii of the ions Br^-, F^-, O^{2-} and S^{2-} is as follows

A. $Br^- < F^- < O^{2-} < S^{2-}$

B. $S^{2-} < O^{2-} < F^- < Br^-$

C. $F^- < O^{2-} < S^{2-} < Br^-$

D. $F^- < Br^- < O^{2-} < S^{2-}$

Answer: C

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23. In the isoelectronic species the ionic radii of N^{3-}, O^{2-}, F^{-} are respectively given by

A. 1, 36, 1.40, 1.71

B. 1.36, 1.71, 1.40

C. 1.71, 1.40, 1.36

D. 1.71, 1.36, 1.40

Answer: C

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24. Which of the ions in the table below would have the largest value of enthalpy of hydration?

Ionic radius in nm Charge of ion

A. $\begin{matrix}\text{Ionic radius in nm} & \text{Charge of ion} \\ (a)\ 0.0065 & +2\end{matrix}$

B. $\begin{matrix}\text{Ionic radius in nm} & \text{Charge of ion} \\ (b)\ 0.095 & +1\end{matrix}$

C. $\begin{matrix}\text{Ionic radius in nm} & \text{Charge of ion} \\ (c)\ 0.135 & +2\end{matrix}$

D. $\begin{matrix}\text{Ionic radius in nm} & \text{Charge of ion} \\ (d)\ 0.169 & +1\end{matrix}$

Answer: A

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25. Which of the following alkali metal ions has the lowest ionic mobility in aqueous solutions?

A. Rb^+

B. Cs^+

C. Li^+

D. Na^+

Answer: C

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26. Which one of the following indicates the correct order of atomic size

A. $Be > F > C > Ne$

B. $Be < C < F < Ne$

C. $Be > C > F > Ne$

D. $F < Ne < Be < C$

Answer: C

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27. Al^{3+} has low ionic radius than Mg^{2+} because

A. Mg atom has less number of neutrons than Al

B. Al^{3+} has a higher nuclear charge than Mg^{2+}

C. `Their electronegative are different

D. Al has a lower ionisation potential than Mg atom

Answer: B

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28. Which one of the following ions has the highest value of ionic radius?

A. O^{2-}

B. B^{3+}

C. Li^{+}

D. F^{-}

Answer: A

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29. Which of the following sets will have highest hydration energy and highest ionic radii

A. Na and Li

B. Li and Rb

C. K and Na

D. Cs and Na

Answer: B

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30. Which of the following is the correct increasing order of the ionic radii

A. $Li^+ < Mg^{2+} < K^+ < Al^{3+}$

B. $Al^{3+} < Li^+ < Mg^{2+} < K^+$

C. $Al^{3+} < Mg^{2+} < K^+ < Li^+$

D. $K^+ < Al^{3+} < Mg^{2+} < Li^+$

Answer: C

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31. In third row of periodic table the atomic radii from Na and Cl

A. Continuosly decreases

B. Continuosly increases

C. Remains constant

D. Increases but not continuously

Answer: A

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32. An element of atom mass 39 has the electron configuration 2,8,8,1 which of the following statements are correct ? a)it is transition element b)its isotone is $._{18}^{38}Ar$ c)its isotone oxide is M_2O d)its first ionisation value is high

A. The element's valency is 7

B. The element exists as a diatomic molecule

C. The element is of non-metallic nature

D. The element forms a basic oxide

Answer: D

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33. Which of the following has largest size

A. Al

B. Al^{+}

C. Al^{+2}

D. Al^{+3}

Answer: A

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34. The order of magnitude of ionic radii of ions Na^+, Mh^{2+}, Al^{3+} and Si^{4+} is

A. $Na^+ < Mg^{2+} < Al^{3+} < Si^{4+}$

B. $Mg^{2+} > Na^+ > Al^{3+} > Si^{4+}$

C. $Al^{3+} > Na^+ > Si^{4+} > Mg^{2+}$

D. $Na^+ > Mg^{2+} > Al^{3+} > Si^{4+}$

Answer: D

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35. Point out the wrong statement

In a given period of the periodic table the s-block element has, in general, a lower value of

A. Ionisation energy

B. Electronegativity

C. Atomic radius

D. Electron affinity

Answer: C

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36. Which of the following is the biggest ion?

A. Al^{+3}

B. Ba^{+2}

C. Mg^{+2}

D. Na^{+}

Answer: B

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37. Which of the following set of elements has the strongest tendency to form anions?

A. N, O, F

B. P, S, Cl

C. As, Se, Br

D. Sb, Te, I

Answer: A

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38. In which of the following pairs, the difference between the convalent radii of the two metals is maximum.

A. K, Ca

B. Mn, Fe

C. Co, Ni

D. Cr, Mn

Answer: A

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39. The atomic radii in periodic table among elements from right to left

A. Decreases

B. Increases

C. Remain constant

D. First decreases and then increases

Answer: B

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40. Of the following the ion with the smallest ionic radius is

A. K^+

B. Ca^{2+}

C. Ti^{3+}

D. Ti^{4+}

Answer: D

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41. The atomic radius of elements of which of the following series would be nearly the same

A. Na K Rb Cs

B. Li Be B C

C. Fe Co Ni Cu

D. F Cl Br I

Answer: C

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42. Which one of the following should be most stable

A. H_2^+

B. H^+

C. H

D. H^-

Answer: D

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43. The trivalent ion having size in lanthanide series is

A. Ti

B. Zr

C. Hf

D. La

Answer: D

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44. Chloride ion and potassium ion are isoelectronic. Then

A. Potassium ion is relatively bigger

B. Depends on the other cation and anion

C. Their size are same

D. Chloride ion is bigger than potassium ion

Answer: D

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45. The correct enegry value order is

A. ns np nd(n-1) f

B. ns np(n-1)d(n-2)f

C. ns np(n-1)d(n-1)f

D. ns(n-1)d n(n-1)f

Answer: B

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46. The ionic conductance of the following cations in a given concentration is in the order

A. $Li^+ < Na^+ > K^+ < Rb^+$

B. $Li^+ > Na^+ > K^+ > Rb^+$

C. $Li^+ < Na^+ > K^+ > Rb^+$

D. $Li^+ = Na^+ < K^+ < Rb^+$

Answer: A

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47. Which of the following has the largest size?

A. S^{2-}

B. Se^{2-}

C. O^{2-}

D. Te^{2-}

Answer: D

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48. Difference between S and S^{2-} as S^{2-} has

A. Larger radii and larger size

B. Smaller radii and larger size

C. Larger radii and small size

D. Smaller radii and small size

Answer: A

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49. Increase in atomic size down the group is due to

A. Increase in number of ORBIT

B. Increase in number of protons and neutrons

C. Increase in number of protons

D. Increase in number of protons, neutrons and electrons

Answer: A

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50. In the main group elements

(i) as we proceed down the same group in the periodic table and

(ii) as we proceed from left to right in the same period, the atomic radius

A. (i) Increase continuously, (ii) Decreases continuously

B. (i) Decreases continuously, (ii) Increases continuously

C. (i) Increases continuously, (ii) Decreases upto the group IV and then increases upto the end of the period

D. (i) Decreases continuously, (ii) Decreases upto the group IV and then increases upto the end of the period

Answer: A

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51. Point out the wrong statement

On moving horizontally from left to right across a period in the periodic table

A. Metallic character decreases

B. Electronegativity increases

C. Gram atomic volume first decreases and then increases

D. Size of the atoms increases for normal elements

Answer: D

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52. Which statement is correct

A. For potassium, the atomic radius $<$ ionic radius, but for bromine, the atomic radius $>$ ionic radius

B. For potassium and bromine both, the atomic radii $>$ ionic radii

C. For potassium and bromine both, the atomic radii $<$ ionic radii

D. For potassium, the atomic radius $>$ ionic radius but for bromine, the atomic radius $<$ ionic radius

Answer: D

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53. Assertion : Positive ions will be wider than parent atoms.

Reason : Nuclear charge pulls them closer.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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54. Assertion: The atomic radii of calcium is smaller than sodium

Reason: Calcuim has a lower nuclear charge than sodium.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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55. The correct order of atomic radii in group 13 elements is

A. $B < Al < In < Ga < Tl$

B. $B < Al < Ga < In < Tl$

C. $B < Ga < Al < Tl < In$

D. $B < Ga < Al < In < Tl$

Answer: D

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Ordinary Thinking Objective Questions Ionisation Energy

1. The first ionisation potentials (eV) of Be and B respectively are

A. 8.29eV, 9.32eV

B. 9.32eV, 9.32eV

C. 8.29eV, 8.29eV

D. 9.32eV, 8.29eV

Answer: D

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2. Which of the following order of ionisation energy is correct?

A. $Be > B > C > N > O$

B. $B < Be < C < O < N$

C. $Be < B < C < N < O$

D. $B < Be < N < C < O$

Answer: C

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3. Which of the following order is wrong-

A. $NH_3 < PH_3 < AsH_3$ - acidic nature

B. $Li^+ < Na^+ < K^+ < Cs^+$ -ionic radius

C. $Al_2O_3 < MgO < Na_2O < K_2O$-basic

D. $Li < Be < B < C < 1^{st}$ ionisation potential

Answer: D

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4. Which of the following electrons configruations of an atom has the lowest ionisaytion enthalpy ?

A. $1s^2 2s^2 2p^5$

B. $1s^2 2s^2 2p^3$

C. $1s^2 2s^2 2p^5 3s^1$

D. $1s^2 2s^2 2p^6$

Answer: C

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5. Which has the highest second ionisation potenitial?

A. Nitrogen

B. Carbon

C. Oxgyen

D. Fluorine

Answer: C

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6. Which of the following transitions involves maximum amount of energy?

A. $M^-(g) \rightarrow M(g)$

B. $M(g) \rightarrow M^+(g)$

C. $M^+(g) \rightarrow M^{2+}(g)$

D. $M^{2+}(g) \rightarrow M^{3+}(g)$

Answer: D

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7. Hydrogen has high ionization energy than alkali metals, due to its:

A. Large size

B. Small size

C. Ionic bond

D. Covalent bond

Answer: B

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8. Which of the following gaseous atoms has highest value of IE?

A. P

B. Si

C. Mg

D. Al

Answer: A

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9. Among the following options , the sequence of increasing first ionisation potential will be

A. $B < C < N$

B. $B > C > N$

C. $C < B < N$

D. $N > C > B$

Answer: A

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10. Which of the following element has maximum, first ionisation potential?

A. V

B. Ti

C. Cr

D. Mn

Answer: D

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11. Spectrum of Li^{2+} is similar to that of

A. H

B. He

C. Be

D. Ne

Answer: A

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12. The correct order of reactivity of halogens is

A. $F > Cl > Br > I$

B. $F < Cl > Br < I$

C. $F < Cl < Br < I$

D. $F < Cl < Br > I$

Answer: A

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13. Correct order of polarising power is

A. $Cs^+ < K^+ < Mg^{2+} < Al^{3+}$

B. $K^+ < Cs^+ < Mg^{2+} < Al^{3+}$

C. $Cs^+ < K^+ < Al^{3+} < Mg^{2+}$

D. $K^+ < Cs^+ < Al^{3+} < Mg^{2+}$

Answer: A

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14. Which of the following has the highest first ionisation energy?

A. Li

B. Be

C. B

D. C

Answer: D

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15. The ionisation energy of nitrogen is more than that of oxygen because

A. Greater attraction of electrons by the nucleus

B. The size of nitrogen atom being smaller

C. The half-filled p-orbitals possess extra stability

D. Greater penetration effect

Answer: C

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16. In a period from Li to F, ionisation potential

A. Increases

B. Decreases

C. Remain same

D. Cannot be pridicted

Answer: D

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17. which of the following has the least ionisation potential?

A. Li

B. Cs

C. Cl

D. I

Answer: B

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18. The ionisation potential is lowest for the

A. Halogens

B. Inert gases

C. Alkaline earth metals

D. Alkali metals

Answer: D

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19. The ionisation potential of hydrogen from ground state to the first excited state is

A. $-13.6eV$

B. 13.6 eV

C. $-3.4eV$

D. 3.4 eV

Answer: B

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20. First I.P. of Mg is ..... than that of Al

A. Less

B. More

C. Equal

D. None of these

Answer: B

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21. Which one of the following relations is correct with respect to first (I) and second (II) ionization potentials of sodium and Magnesium?

A. $I_{Mg} = II_{Na}$

B. $I_{Na} > I_{Mg}$

C. $II_{Mg} > II_{Na}$

D. $II_{Na} > II_{Mg}$

Answer: D

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22. The first ionisation potential will be maximum for

A. Lithium

B. Hydrogen

C. Uranium

D. Iron

Answer: B

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23. Fluorine is the best oxidising agent because it has

A. Highest electron affinity

B. Highest E°_{red}

C. Highest E°_{oxid}

D. Lowest electron affinity

Answer: B

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24. Which among the following elements have the lowest value of IE_1?

A. Pb

B. Sn

C. Si

D. C

Answer: B

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25. Ionistion energy is highest for

A. Noble gases

B. Platinum metals

C. Transition elements

D. Inner-transition elements

Answer: A

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26. The increasing order of the first ionisation enthalpies of the elements B, P, S and F (lowest first) is:

A. $F < S < P < B$

B. $P < S < B < F$

C. $B < P < S < F$

D. $B < S < P < F$

Answer: D

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27. In a given shell, the order of screeing effect is

A. $s > p > d > f$

B. $f > d > p > s$

C. $p < d < s < f$

D. dgtfltsgtp`

Answer: A

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28. The successive ionzation enegry values for an element X are given below:

(i) $1st$ ionization enegry $= 410kJmol^{-1}$

(ii) $2nd$ ionization energy $= 820kJmol^{-1}$

(iii) $3rd$ ionization enegry $= 1100kJmol^{-1}$

(iv) $4th$ ionization enegry $= 1500kJmol^{-1}$

(v) $5th$ ionization enegry $= 3200kJmol^{-1}$

Find out the number of valence electrons for the atom X.

A. 4

B. 3

C. 5

D. 2

Answer: A

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29. Among the following transition elements, pick out the element/elements with highest second ionization energy

(a) V(At. No. 23) (v) Cr(At. No. 24)

(c) Mn(At. No. =25) (d) Cu (At. No. =29)

(e) Zn(At. No.=30)

A. (A) and (C)

B. (B) and (D)

C. (B) and (E)

D. Only (D)

Answer: B

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30. The first ionzation enegry of oxygen is less than that of nitrogen. Which of the following is the correct reason for this observation?

A. Lesser effective nuclear charge of oxygen than nitrogen

B. Lesser atomic size of oxygen than nitrogen

C. Greater inter-electron repulsion between two electrons in the same p orbital counter balances the increase in effective nuclear charge on moving from nitrogen to oxygen

D. Greater effective nuclear charge of oxygen than nitrogen

Answer: C

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31. The correct decreasing order of first ionisation enthalpies of five elements of second period is

A. $Be > B > C > N > F$

B. $N > F > C > B > Be$

C. $F > N > C > Be > B$

D. $N > F > B > C > Be$

Answer: C

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32. Among the following, the third ionisation energy is highest for

A. Magnesium

B. Boron

C. Beryllium

D. Aluminium

Answer: C

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33. The decreasing order of the first ionization energy (in kJ mol^{-1}) of He, Mg and Na is $He > Mg > Na$. The increasing order of the 2^{nd} ionization energy (in kJ mol^{-1}) of these elements will be

A. $Na < Mg < He$

B. $Mg < Na < He$

C. $Mg < He < Na$

D. $Na < He < Mg$

Answer: B

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34. The screening effect of inner electrons of an atom can cause

A. A decrease in the ionisation potential

B. An increase in the ionisation potential

C. No effect on the ionisation potential

D. An increase in the attraction of the nucleus to the electrons

Answer: A

35. The first ionization energies of alkaline earth metal are higher than those of the alkali metals. This is because:

A. There is increase in the nuclear charge of the alkaline earth metals

B. There is a decrease in the nuclear charge of the alkaline earth metals

C. There is no change in the nuclear charge

D. None of the above

Answer: A

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36. Highest energy will be absorbed to eject out the electron in the configuration

A. $1s^2 2s^2 2p^1$

B. 1s^(2)2s^(2)2p^(3)`

C. $1s^2 2s^2 2p^2$

D. $1s^2 2s^2 2p^4$

Answer: B

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37. In which of the following process highest energy is absorbed?

A. $Cu \rightarrow Cu^+$

B. $Br \rightarrow Br^-$

C. $I \rightarrow I^-$

D. $Li \rightarrow Li^+$

Answer: A

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38. The formation of the oxide ion $O^{2-}_{(g)}$ requires first an exothermic and then an endothermic step as shown below.

$O_{(g)} + e^- = O^-_{(g)} \Delta H^\circ = -142 kJ mol^{-1}$

$O^-_{(g)} + e^- = O^{2-}_{(g)} \Delta H^\circ = 844 kJ mol^{-1}$ This is because of :

A. O^- ion will tend to resist the addition of another electron

B. Oxgyen has high electron affinity

C. Oxygen is more electronegative

D. O^- ion has comparatively larger size than oxygen atom

Answer: A

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39. With reference to ionisation potential which one of the following sets is correct?

A. $Li > K > Cs$

B. $B > U > K$

C. $Cs > U > B$

D. $Cs < U < K$

Answer: A

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40. Which of the element is expected to have lowest first ionisation enthalpy

A. Sr

B. As

C. Xe

D. S

Answer: A

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41. Which of the following elements will have the lowest first ionisation energy?

A. Mg

B. Rb

C. Li

D. Ca

Answer: B

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42. Which of the following species has lowest ionisation potential?

A. O

B. O_2

C. O_2^+

D. O_2^-

Answer: D

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43. The correct order in which the first ionisation potential increases is

A. K, Be, Na

B. Be, Na, K

C. Na, K, Be

D. K, Na, Be

Answer: D

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44. Generally, the first ionisation energy increases along a period. But there are some exceptions one which is not an exception is

A. N and O

B. Na and Mg

C. Mg and Al

D. Be and B

Answer: B

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45. Ionisation energy in group I-A varies in the decreasing order as

A. $Li > Na > K > Cs$

B. $Na > Li > K > Cs$

C. $Li > Cs > K > Na$

D. $K > Cs > Na > Li$

Answer: A

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46. The second ionisation potential of an element M is the energy required to

A. Remove one mole of electron from one mole of gaseous anion

B. Remove one mole of electron from one mole of gaseous cation of the element

C. Remove one mole of electron from one mole of monovalent gaseous cation of the element

D. Remove 2 moles of electrons from one mole of gaseous atoms

Answer: C

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47. Arrange S, P and As in order of increasing ionisation energy.

A. $S < P < As$

B. $P < S < As$

C. $As < S < P$

D. $As < P < S$

Answer: C

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48. Which ionisation potential (IP) in the following equations involves the greatest amount of energy

A. $Na \rightarrow Na^{+} + e^{-}$

B. $K^{+} \rightarrow K^{2+} + e^{-}$

C. $C^{2+} \rightarrow C^{3+} + e^{-}$

D. $Ca^{+} \rightarrow Ca^{2+} + e^{-}$

Answer: B

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49. Which of the following has highest ionisation energy ?

A. Oxygen

B. Nitrogen

C. Fluorine

D. Sulphur

Answer: D

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50. Which one of the following elements has the highest ionisation energy?

A. Na

B. Mg

C. C

D. F

Answer: D

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51. Which of the following electrons should generally have the highest value of ionization energy (for the same value of the principal quantum number)

A. s

B. p

C. d

D. f

Answer: A

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52. The first ionisation energy of beryllium is more than that of boron because

A. Boron has higher nuclear charge

B. Atomic size of boron is more than that of beryllium

C. Boron has only one electron in p-sub-shell

D. Atomic size of boron is less than that of beryllium

Answer: C

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53. $A \to A^+ + e, E_1$ and $A^+ \to A^{2+} + e, E_2$. The energy requried to pull out the two electrons are E_1 and

E_2 respectively. The correct relationship between two energy would be

A. $E_1 < E_2$

B. $E_1 = E_2$

C. $E_1 > E_2$

D. $E_1 \neq E_2$

Answer: A

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54. Which of the following explanation is best for not placing hydrogen in either the group of alkali metals or halogens?

A. The ionisation energy of hydrogen is too high for group of alkali metals, but too low of halogen group

B. Hydrogen can form compounds with all other elements

C. Hydrogen is much lighter element than the alkali metals of the halogens

D. None of the above

Answer: A

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55. Choose the correct statement

A. Ionisation energy and electron affinity increases across a period

B. Ionisation energy increases but electron affinity decreases along a period

C. Ionisation energy decreases but electron affinity increases

D. Both decreases along a period

Answer: A

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56. The ionisation energy of an element is

A. The same as the electron affinity of the element

B. Equal in magnitude but of opposite sign to the electron affinity of the element

C. The energy released when an electron is added to an atom of the element

D. The energy required to remove the outermost electron of an atom of the element

Answer: D

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57. Assertion :First ionization energy is lower than oxygen.

Reason :Across a period effective charge decreases.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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58. Assertion: E° for Mn^{3+}/Mn^{2+} is more positive than Cr^{3+}/Cr^{2+}

Reason: The third ionisation energy of Mn is larger than that of Cr.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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59. Assertion : Ionisation enthalpy is always negative.

Reason : Energy is always released when electrons are removed.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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60. Assertion: Ionisation potential across the period is $Na < Al < Mg < Si$.

Reason : Ionisation potential decreases with decrease in atomic size.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: C

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Ordinary Thinking Objective Questions Electron Affinity

1. Which one of the following arrangements represents the correct order of electron gain enthalpy of the given atomic species?

A. $Cl < F < S < O$

B. $O < S < F < Cl$

C. $S < O < Cl < F$

D. $F < Cl < O < S$

Answer: B

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2. Which one of the following ionic species has the greatest proton affinity to form stable compound ?

A. HS^-

B. NH_2^-

C. F^-

D. I^-

Answer: B

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3. Which one of the following arrangements represents the correct order of least negative to most negative electron gain enthalpy for C, Ca, Al , F and O ?

A. $Al < Ca < O < C < F$

B. $Al < O < C < Ca < F$

C. $C < F < O < Al < Ca$

D. $Ca < Al < C < O < F$

Answer: D

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4. The amount of energy which is released due to addition of ectra electron to the outermost orbit of gaseous atom is called

A. Electron capacity

B. Electron affinity

C. Ionisation potential

D. Electronegativity

Answer: B

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5. The electron affinity of

A. Carbon is greater than oxygen

B. Sulphur is less than oxygen

C. Iodine is greater than bromine

D. Bromine is less than chlorine

Answer: D

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6. Fluorine has lower electron affinity than chlorine because of

A. Smaller radius of fluorine, high density

B. Smaller radius of chlorine, high density

C. Bigger radius of fluorine, less density

D. Bromine radius of chlorine, less density

Answer: A

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7. Order of electron affinity of F, Cl, Br and I is

A. $F < Cl > Br > I$

B. $F > Cl > Br > I$

C. $F < Cl < Br < I$

D. $F > Cl < Br > I$

Answer: A

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8. Which of the following has the least electron affinity in $kJmol^{-1}$?

A. Oxygen

B. Carbon

C. Nitrogen

D. Boron

Answer: C

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9. Which of the following species has the highest electron affinity?

A. F^-

B. O

C. O^-

D. Na^+

Answer: B

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10. Which of the following properties show gradual decrease with increase in atomic number across a period in the periodic table?

A. Electron affinity

B. Ionisation potential

C. Electronegativity

D. Size of atom

Answer: D

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11. The electronic configuration of the element with maximum electron affinity is

A. $1s^2, 2s^2, 2p^3$

B. $1s^2, 2s^2, 2p^5$

C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$

D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$

Answer: C

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12. Match the entries listed in column I with appropriate properties listed in Column II

	Column I		Column II
(A)	He	(i)	High electron affinity
(B)	Cl	(ii)	Most electropositive element
(C)	Ca	(iii)	Strongest reducing agent
(D)	Li	(iv)	Highest ionization energy

The correct match of contents in Column I with those in Column II

A. $A-iii \quad B-i \quad C-ii \quad D-iv$

B. $A-iv \quad B-iii \quad C-ii \quad D-i$

C. $A-ii \quad B-iv \quad C-i \quad D-iii$

D. $A-iv \quad B-i \quad C-ii \quad D-iii$

Answer: D

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13. The element with positive electron gain enthalpy is

A. Hydrogen

B. Sodium

C. Oxygen

D. Neon

Answer: D

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14. The electron affinity values (in $kJmol^{-1}$) of three halogens, X, Y and Z are respectively -349, -333 and -325. Then X, Y and Z are respectively

A. F_2, Cl_2 and Br_2

B. Cl_2, F_2 and Br_2

C. Cl_2, Br_2 and F_2

D. Br_2, Cl_2 and F_2

Answer: B

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15. Which one of the following is an incorrect statement?

A. The ionisation potential of nitrogen is greater than that of oxygen

B. The electron affinity of fluorine is greater than that of chlorine

C. The ionisation potential of beryllium is greater than that of boron

D. The electronegativity of fluorine is greater than that of chlorine

Answer: B

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16. Electron affinity depends on

A. Atomic size

B. Nuclear charge

C. Atomic number

D. Atomic size and nuclear charge both

Answer: D

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17. The electron affinity for the inert gases is

A. Zero

B. High

C. Negative

D. Positive

Answer: A

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18. The correct order of electron affinity of B, C, N, O is

A. $O > C > N > B$

B. $B > N > C > O$

C. $O > C > B > N$

D. $O > B > C > N$

Answer: C

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19. the amount of energy released when 10^6 atoms of iodine in vapour state are converted to I^- ions is $4.8 \times 10^{-13} J$. What is the electron affinity of iodine in ev/atom.

A. 2.0

B. 2.5

C. 2.75

D. 3.06

Answer: D

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20. The electron affinity of Be is almost similar to that of

A. Ne

B. B

C. Li

D. Na

Answer: A

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21. Which among the following factors is the most important in making fluorine oxidizing halogen?

A. Hydration enthalpy

B. Ionisation enthalpy

C. Electron affinity

D. Bond dissociation energy

Answer: D

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22. Which of the following pairs show reverse properties on moving along a period from left to right and from top to down in a group?

A. Nuclear charge and electron affinity

B. Ionisation energy and electron affinity

C. Atomic radius and electron affinity

D. None of these

Answer: C

23. Nitrogen has lower electron affinity than its preceding element carbon because

A. Electron affinity decreases along a period

B. Electron affinity generally increases along a period

C. Nitrogen atom has half filled p-orbital

D. Nitrogen is a p-block element

Answer: C

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24. In comparison with alkali metals, the electron affinity of halogens is

A. Very high

B. Very low

C. Nearly same

D. Exactly same

Answer: A

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25. Assertion : More is the electron affinity greater is the reducing character.

Reason : Reducing character depends on number of electrons gained.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: D

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Ordinary Thinking Objective Questions Electronegativity

1. Which one of the following represents the electronic configuration of the most electropositive element?

A. $[He]2s^1$

B. $[Xe]6s^1$

C. $[He]2s^2$

D. $[Xe]6s^2$

Answer: B

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2. Which of the following is the most electropositivite element?

A. Aluminium

B. Magnesium

C. Phosphorus

D. Sulphur

Answer: B

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3. Which element has the lowest electronegativity

A. Li

B. F

C. Fe

D. Cl

Answer: A

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4. Which of the following elements has maximum electronegativity?

A. Al

B. S

C. Si

D. P

Answer: B

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5. Electronegativity is a measure of the capacity of an atom to

A. Attract electrons

B. Attract protons

C. Repel electrons

D. Repel protons

Answer: A

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6. Most electronegative element is

A. Al

B. C

C. Si

D. Be

Answer: B

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7. The chemical elements are arranged in the order of increasing electronegativities in the sequence:

A. P, Si, Se, Br, N

B. Si, Se, P, Br, N

C. Si, P, Se, Br, N

D. Se, P, Si, Br, N

Answer: C

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8. Which of the following have no unit?

A. Electronegativity

B. Electron affinity

C. Ionisation energy

D. Excitation potential

Answer: A

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9. An atom with high electronegativity has

A. Large size

B. High ionisation potential

C. Low electron affinity

D. Low ionisation potential

Answer: B

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10. The correct order of decreasing electronegativity values among the element I-beryllium, II-oxygen, III-nitrogen and IV-magnesium is

A. $(II) > (III) > (I) > (IV)$

B. $(III) > (IV) > (II) > (I)$

C. $(I) > (II) > (III) > (IV)$

D. $(I) > (II) > (IV) > (III)$

Answer: A

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11. In the following, the element with the highest electropositivity is

A. Copper

B. Cesium

C. Barium

D. Chromium

Answer: B

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12. On going from right to left in a period in the periodic table the electronegativity of the elements:

A. Increases

B. Decreases

C. Remain unchanged

D. Decreases first then increases

Answer: B

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13. The element with highest electronegativity is

A. C

B. Mg

C. O

D. S

Answer: A

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14. Going from fluorine to chlorine, bromine and iodine, the electronegativity

A. Increases

B. Decreases

C. First decreases then increases

D. Changes randomly

Answer: B

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15. With respect of chlorine, hydrogen will be

A. Electropositive

B. Electronegative

C. Neutral

D. None of the above

Answer: A

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16. Between HBr, Hl, HF has the highest ionic character because

A. F has the highest electron affinity

B. In HF, electronegativity difference is highest

C. F^- ion has the highest value of ionic radius

D. Atomic orbitals of H and F have almost similar energy

Answer: B

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17. In third period of the long form of the periodic table that is from Na to Cl

A. Electronegativity increases

B. Electronegativity decreases

C. Ionisation energy decreases

D. Atomic volume increases

Answer: A

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18. On Pauling scale which of the following does not have electronegativity value greater than 3.0?

A. Oxygen

B. Nitrogen

C. Chlorine

D. Bromine

Answer: D

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19. The most polar bond is

A. O-F

B. N-Cl

C. N-F

D. N-N

Answer: C

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20. Which of the following is a false statement

A. Fluorine is more electronegative than chlorine

B. Nitrogen has greater IE_1 than oxygen

C. Lithium is amphoteric

D. Chlorine is an oxidising agent

Answer: C

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21. The solubilities of carbonates decreases down the magnesium group due to a decrease in

A. Lattice energies of solids

B. Hydration energies of cations

C. Inter-ionic attraction

D. Entropy of solution formation

Answer: B

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22. Among Al_2O_3, SiO_2, P_2O_5 and SO_3 the correct order of acid strength is :-

A. $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$

B. $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$

C. $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$

D. $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

Answer: D

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23. Keeping in view the peroidic law and the periodic table suggest which of the following elements should have the maximum electronegative character

A. P

B. As

C. Bi

D. Sb

Answer: A

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24. Pauling's equation for determining the electronegativity of an element, is (X_A, X_B are electronegativity value of elements A and B respectively, Δ represents the polarity of A-B bond.)

A. $X_A - X_B = 0.208\sqrt{\Delta}$

B. $X_A + X_B = 0.208\sqrt{\Delta}$

C. $X_A - X_B = 0.208\Delta^2$

D. $X_A - X_B = \sqrt{\Delta}$

Answer: A

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25. The potarising ability of which one of the following is the highest

A. Small highly +ve ion

B. Large +ve ion

C. Small highly -ve ion

D. Large -ve ion

Answer: A

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26. Which of the following is the second most electronegative element?

A. Chlorine

B. Oxygen

C. Sulphur

D. Fluorine

Answer: B

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27. If the difference in electronegativities of two elements is very large, then

A. The bond is 50% ionic

B. The bond is 100% covalent

C. The bond is more covalent than ionic

D. The bond is more ionic than covalent

Answer: D

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Ordinary Thinking Objective Questions Valency And Oxidation State

1. If the valency shell electronic structure for an element is ns^2np^5, this element will belong to the group of

A. Alkali metals

B. Inert metals

C. Noble gases

D. Halogens

Answer: D

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2. Which of the following elements shows maximum number of different oxidation states in its compounds ?

A. Eu

B. La

C. Gd

D. Am

Answer: D

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3. which of the following gas does not have an octet or eight electrons in the outer shell?

A. Ne

B. Ar

C. Rn

D. He

Answer: D

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4. Which one of the elements with the following outer orbital configuration may exhibit the larger number of oxidation states ?

A. $3d^3 4s^2$

B. $3d^5 4s^1$

C. $3d^5 4s^2$

D. $3d^2 4s^2$

Answer: C

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5. Tnallium shows different oxidation states because:

A. It is a transition element

B. Of inert pair effect

C. Of its amphoteric character

D. Of its higher reactivity

Answer: B

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6. Acidity of pentoxides in VA group

A. Decreases

B. Increases

C. Remain same

D. None

Answer: A

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7. Out of the following elements,which one is the most reactive chemically?

A. Mg

B. Ca

C. Sr

D. Ba

Answer: D

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8. Variable valency is characteristic of

A. s-block elements

B. p-block elements

C. d-block elements

D. All of these

Answer: C

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9. Which one of the following orders presents the correct sequence of the increasing basic nature of the given oxides?

A. $Al_2O_3 < MgO < Na_2O < K_2O$

B. $MgO < K_2O < Al_2O_3 < Na_2O$

C. $Na_2O < K_2O < MgO < Al_2O_3$

D. $K_2O < Na_2O < Al_2O_3 < MgO$

Answer: A

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10. Which of the following set has the strongest tendency to form anions?

A. Ga, In and Te

B. Na, Mg and Al

C. N, O and F

D. V, Cr and Mn

Answer: C

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11. the maximum valency of an element with atomic number 7 is

A. 2

B. 5

C. 4

D. 3

Answer: B

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12. In any period, the valency of an element with respect to oxygen

A. Increases one by one from IA to VIIA

B. Decreases one by one from IA to VIIA

C. Increases one by one from IA to IVA and then decreases from VA to VIIA one by one

D. Decreases one by one from IA to IVA and then increases from VA to VIIA one by one

Answer: C

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13. The correct order of increasing oxidising power

A. $F_2 < Cl_2 < Br_2 < I_2$

B. $F_2 < Br_2 < Cl_2 < I_2$

C. $Cl_2 < Br_2 < F_2 < I_2$

D. $I_2 < Br_2 < Cl_2 < F_2$

Answer: D

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14. Which of the following sequence correctly represents the decreasing acidic nature of oxides?

A. $Li_2O > BeO > B_2O_3 > CO_2 > N_2O_3$

B. $N_2O_3 > CO_2 > B_2O_3 > BeO > Li_2O$

C. $CO_2 > N_2O_3 > B_2O_3 > BeO > Li_2O$

D. $B_2O_3 > CO_2 > N_2O_3 > Li_2O > BeO$

Answer: B

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15. The halogen that is most easily reduced is

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A

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16. In the periodic table, the metallic character of elements

A. Decreases from left to right across a period and on descending a group

B. Decreases from left to right across a period and increases on desecending a group

C. Increases from left to right across a period and on descending a group

D. Increases from left to right across a period and decreases on descending a group

Answer: B

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17. Which metal exhibits more than one oxidation states in their compounds

A. Na

B. Mg

C. Fe

D. Al

Answer: C

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18. The correct order of decreasing ionic character is

A. $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$

B. $BeCl_2 < MgCl_2 < BaCl_2 > CaCl_2$

C. $BeCl_2 < BaCl_2 < MgCl_2 < CaCl_2$

D. $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$

Answer: A

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19. Which of the following electronic configuration in the outermost shell is characterstic of alkali metals? A)

$(n-1)s^2p^6, ns^2p^1$ B)$(n-1)s^2p^6, d^{10}, ns^1$ C)

$(n-1)s^2p^6, ns^1$ D)$(n-1)s^2p^6, ns^1$

A. $(n-1)s^2p^6, ns^2p^1$

B. $(n-1)s^2p^6d^{10}, ns^1$

C. $(n-1)s^2p^6, ns^1$

D. $ns^2p^6d^1$

Answer: C

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20. Which of the following elements show maximum valency ?

A. Carbon

B. Barium

C. Nitrogen

D. Sulphur

Answer: D

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21. Fluorine is the best oxidising agent because it has

A. Highest electron affinity

B. Highest E°_{red}

C. Highest E°_{oxid}

D. Lowest electron affinity

Answer: B

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22. Which of the following element is found in its native state:-

A. Al

B. Au

C. Cu

D. Na

Answer: B

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23. The basis of keeping the elements in the group of periodic table is

A. Ionisation potential

B. Electronegativity

C. Electron affinity

D. Number of electrons in the valence shell

Answer: D

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24. Beryllium and aluminimum exhibit many properties which are similar . But, the two elements differ in

A. Forming covalent halides

B. Forming polymeric hydrides

C. Exhibiting maximum covalency in compounds

D. Exhibiting amphoteric nature in their oxides

Answer: C

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25. The most stable oxidation state of thallium is +1

A. 0

B. $+1$

C. $+2$

D. $+3$

Answer: B

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26. An element X which occurs in the second short period has an outer electronic structure s^2p^1 What are the formula and acid -base character of its oxides ?

A. XO_3, basic

B. $X_2O_3)$, basic

C. X_2O_3, amphotaric

D. XO_2 acidic

Answer: C

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27. Which of these is the weakest base?

A. $NaOH$

B. KOH

C. $Ca(OH)_2$

D. $Zn(OH)_2$

Answer: D

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28. Fluorine, chlroine, bromine and iodine are placed in the same group (17) of the periodic table, because

A. They are non-metals

B. They are electronegative

C. Their atoms are generally univalent

D. They have 7 electrons in the outermost shell of their atom

Answer: D

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29. the pentavalence in phosphorus is more stable as compared to that of nitrogen even though they belong to the same group. It is due to

A. Reactivity of phosphorus

B. Inert nature of nitrogen

C. Dissimilar electronic configuration

D. Larger size of phosphorus atom

Answer: D

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30. In the periodic table, the basic character of oxides

A. Increases from left to right and decreases from top to bottom

B. Decreases from right to left and increases from top to bottom

C. Decreases from left to right and increases from top to bottom

D. Decreases from left to right and increases from bottom to top

Answer: C

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31. The stable bivalency of Pb and trivalency of Bi is

A. Due to d contraction in Pb and Bi

B. Due to relativistic contraction of the 6s orbitals of Pb and Bi, leading to inert pair effect

C. Due to screening effect

D. Due to attainment of noble configuration

Answer: B

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32. Which will show maximum non-metallic character

A. B

B. Be

C. Mg

D. Al

Answer: A

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33. All element in 3rd period have

A. An atomic number 3

B. 3 complete sub-shells

C. Valence electrons shell

D. 3 electrons less than the octet

Answer: C

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34. 3 and 6 electronic are present in the outermost orbit A and B respectively. The chemical formula of its compound will be

A. A_3B_2

B. A_2B_3

C. A_2B

D. AB

Answer: B

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35. Elements A and B with their respective electronic configurations $3d^{10}4s^1$ and $4d^{10}5s^1$ in their outermost shell are

A. Both non-metals

B. Both coinage metals

C. A is a non-metal and B is coinage metal

D. A is a coinage metal and B is non-metal

Answer: B

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36. Which of the following group of elements eliminates electron easily

A. N, P, As

B. O, S, Se

C. Li, Na, K

D. Cl, Ba, I

Answer: C

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37. An ion has 18 electrons in the outermost shell it is

A. K^+

B. Ca^{2+}

C. Na^+

D. Cu^+

Answer: D

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38. Assertion : Dinegative anion of oxygen $\left(O^{2-}\right)$ is quite common but dinegative anion of sulphur $\left(S^{2-}\right)$ is

less common.

Reason : Covalency of oxygen is two.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion

B. If both assertion and reason are true but reason is not a correct explanation of the assertion

C. If assertion is true but reason is false

D. If the assertion and reason both are false

Answer: B

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Critical Thinking Objective Questions

1. Which element having the following electronic configuration has minimum ionisation potential?

A. $1s^1$

B. $1s^2, 2s^2, 2p^6$

C. 1s^(2),2s^(2),2p^(6),3s^(1)`

D. $1s^2, 2s^2 2p^2$

Answer: C

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2. A sudden large jump between the values of second and third ionisation energies of an element would be associated with the electronic configuration

A. $1s^2, 2s^2, 2p^6, 3s^1$

B. $1s^2, 2s^2, 2p^6, 3s^2 3p^1$

C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^2$

D. $1s^2, 2s^2 2p^6, 3s^2$

Answer: D

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3. The elements which occupy the peaks of ionisation energy curve are

A. Na, K, Rb, Cs

B. Na, Mg, Cl, I

C. Cl, Br, I, F

D. He, Ne, Ar, Kr

Answer: D

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4. The pair of amphoteric hydroxides is

A. $Al(OH)_3, LiOH$

B. $Be(OH)_2, Mg(OH)_2$

C. $B(OH)_3, Be(OH)_2$

D. $Be(OH)_2, Zn(OH)_2$

Answer: D

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5. Which of the following statement is correct with respect to the property of elements with an increase in atomic number in the carbon family (group 14)?

A. Atomic size decrease

B. Ionisation energy increase

C. Metallic character decrease

D. Stability of +2 oxidation state increase

Answer: D

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6. What will be the order of first ionisation energy?

A. $Li > Na > K$

B. $K > Li > Na$

C. $Na > Li > K$

D. $Li > K > Na$

Answer: A

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7. Which of the following two elements in the periodic table are expected to combine in the most violent fashion?

A. H and O

B. Cl and F

C. Mg and N

D. Cs and F

Answer: D

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8. The first $(\Delta_i H_1$ and second $(\Delta_i H_2$ ionization enthalpies (in kJ/mol) and electron gain enthalpy (in kJ/mol) of few elements are given below:

Elements	$\Delta_i H_1$	$\Delta_i H_2$	$\Delta_{eg} H$
I	520	7300	-60
II	1681	3374	-328
III	899	1757	$+48$
IV	2372	5251	$+48$

Which of the following is likely to be an alkali metal?

A. I and V

B. V and II

C. II and V

D. IV and V

Answer: C

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9. Which of the following is arranged in order of increasing density

A. $Al < Mg < C_{(\text{graphite})} < B$

B. $B < Al < Mg < C_{(\text{graphite})}$

C. $C_{(\text{graphite})} < Al < B < Mg$

D. $Mg < C_{(\text{graphite})} < B < Al$

Answer: D

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10. Which has the highest melting point?

A. LiCl

B. $BeCl_2$

C. BCl_3

D. CCl_4

Answer: B

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11. One among the following is the incrorrect order of increasing ionisation energy :

A. $Cl^- < Ar < K^+$

B. $At Ag < Cu$

C. $Cs < Rb < K$

D. $K < Ca < Sc$

Answer: B

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12. Increasing order of electronegativity is

A. $Bi < P < S < Cl$

B. $P < Bi < S < Cl$

C. $S < Bi < P < Cl$

D. $Cl < S < Bi < P$

Answer: A

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13. Which is the correct order of ionic sizes (At. No. : Ce=58, Sn=50, Yb=70 and Lu=71)

A. $Ce > Sn > Yb > Lu$

B. $Sn > Ce > Lu > Yb$

C. $Lu > Yb > Sn > Ce$

D. $Sn > Yb > Ce > Lu$

Answer: B

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14. Which of the following is not the correct arrangement according to the property indicated against it ?

A. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$: Increasing ionic size

B. $B < C < N < O$: Increasing first ionisation enthalpy

C. $I < Br < F < Cl$: Increasing electron gain enthalpy (with negative sign)

D. $Li < Na < K < Rb$: Increasing metallic radius

Answer: B

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15. Which of the following oxides is amphoteric in nature?

A. CaO

B. CO_2

C. SiO_2

D. SnO_2

Answer: D

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16. which of the following configurations represents atoms of the elements having the higest second ionisation energy?

A. $1s^2 2s^2 2p^4$

B. $1s^2 2s^2 2p^6$

C. $1s^2 2s^2 2p^6 3s^1$

D. $1s^2 2s^2 2p^6 3s^2$

Answer: C

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17. In which block does 106th element belong?

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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18. Which is the wrong order for the stated property ? .

A. $Ba > Sr > Mg$: atomic radius

B. $F > O > N$: first ionisation enthalpy

C. $Cl > F > l$: electron affinity

D. $O > Se > Te$: electronegativity

Answer: B

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19. Which of the following is not a periodic property

A. Electronegativity

B. Atomic volume

C. Covalent radii

D. Atomic mass

Answer: D

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20. Which of the following has greatest tendency to lose electron ?

A. F

B. S

C. Fe

D. Be

Answer: C

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Jee Section Only One Choice Correct Answer

1. The correct order of the second ionisation potential of carbon, nitrogen, oxygen and fluorine is

A. $C > N > O > F$

B. $O > N > F > C$

C. $O > F > N > C$

D. $F > O > N > C$

Answer: C

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2. The element with highest ionization potential is

A. Boron

B. Carbon

C. Nitrogen

D. Oxygen

Answer: C

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3. The first ionisation potential in electron volts of nitrogen and oxygen atoms are respectively given by

A. 14.6, 13.6

B. 13.6, 14.6

C. 13.6, 13.6

D. 14.6, 14.6

Answer: A

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4. Fluorine and neon have atomic radii in angstrom given by

A. 0.72, 1.60

B. 1.60, 1.60

C. 0.72, 0.72

D. None of these values

Answer: A

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5. The electronegativity of the following elements increases in the order

A. C, N, Si, P

B. N, Si, C, P

C. Si, P, C, N

D. P, Si, N, C

Answer: C

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6. The first ionisation potential of Na, Mg, Al and Si are in the order

A. $Na < Mg > Al < Si$

B. $Na > Mg > Al > Si$

C. $Na < Mg < Al < Si$

D. $Na > Mg > Al < Si$

Answer: A

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7. Which of the following is paramagnetic?

A. O_2^-

B. CN^-

C. CO

D. NO^+

Answer: A

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8. Which one of the following is the strongest base ?

A. AsH_3

B. NH_3

C. PH_3

D. SbH_3

Answer: B

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9. Which one of the following is the smallest in size?

A. N^{3-}

B. O^{2-}

C. F^{-}

D. Na^+

Answer: D

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10. Arrange S, O and Se in acending order of electron affinity?

A. $O < Se < S$

B. $Se < O < S$

C. $S < O < Se$

D. $S < Se < O$

Answer: A

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11. The size of the following species increases in the order

A. $Mg^{2+} < Na^{+} < F^{-} < Al$

B. $F^{-} < Al < Na^{+} > Mg^{2+}$

C. $Al < Mg^{2+} < F^{-} < Na^{+}$

D. $Na^{+} < Al < F^{-} < Mg^{2+}$

Answer: A

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12. Amongst the following elements (whose electronic configuration an given below) the one having highest ionization energy is

A. $[Ne]3s^2 3p^1$

B. $[Ne]3s^2 3p^3$

C. $[Ne]3s^2 3p^2$

D. $[Ne]3d^{10} 4s^2 4p^3$

Answer: B

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13. The process requiring the absorption of energy is

A. $F \rightarrow F^-$

B. $Cl \rightarrow Cl^-$

C. $O \rightarrow O^{2-}$

D. $H \rightarrow H^-$

Answer: C

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14. The statement that is not correct for periodic classification of element isA)The properties of elements are periodic function of their atomic numbers B)Non-metallic elements are less in number than metallic elements C)For transition elements, the 3d-orbitals are

filled with electron after 3p-orbitals and before 4s-orbitals D)The first ionisation enthalpies of elements generally increase with increase in atomic number as we go along a period

A. The properties of elements are the periodic functions of their atomic numbers

B. Non-metallic elements are lesser in number than metallic elements

C. The first ionization energies of elements along a period do not vary in a regular manner with increase in atomic number

D. For transition elements the d-subshell are filled with electrons monotonically with increase in

atomic number

Answer: D

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15. If first orbit energy of He^+ is -54.4 eV, then the second orbit energy will be

A. $-54.4eV$

B. $-13.6eV$

C. $-27.2eV$

D. $+27.2eV$

Answer: B

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16. Which has the most stable $+2$ oxidation state ?

A. Sn

B. Pb

C. Fe

D. Ag

Answer: B

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17. $K^+, CI^-, Ca^{2+}, S^{2-}$ ions are isoelectronic. The decreasing order of other size is:

A. $K^+ > Ca^{2+} > S^{2-} > Cl^-$

B. $K^+ > Ca^{2+} > Cl^- > S^{2-}$

C. $Ca^{2+} > K^+ > Cl^- > S^{2-}$

D. $S^{2-} > Cl^- > K^+ > Ca^{2+}$

Answer: D

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18. Which one of the elements has the maximum electron affinity?

A. F

B. Cl

C. Br

D. I

Answer: B

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19. Which element has the highest electronegative

Or

Which of the following is the most electronegative

A. F

B. He

C. Ne

D. Na

Answer: A

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20. Which of the following has the maximum number of unpaired electrons ?

A. Mg^{2+}

B. Ti^{3+}

C. V^{3+}

D. Fe^{2+}

Answer: D

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21. Which one of the following oxides is neutral ? A)CO B)SnO_2 C)ZnO D)SiO_2

A. CO

B. SnO_2

C. ZnO

D. SiO_2

Answer: A

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22. The incorrect statement Among the following is A)The first ionisation potential of Al is less than the first ionisation potential of Mg. B)The first ionisation potential of Na is less than the first ionisation potential of Mg. C)The second ionisation potential of Mg greater than the second ionisation potential of Na D)The third ionisation potential of Mg greater than the third ionisation potential of Al

A. The first ionization potential of Al is less than the first ionization potential of Mg

B. The second ionization potential of Mg is greater than the second ionization potential of Na

C. The first ionization potential of Na is less than the first ionization potential of Mg

D. The third ionization of Mg is greater than third ionization of Al

Answer: B

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23. Which of the following compounds is expected to be coloured?

A. Ag_2SO_4

B. CuF_2

C. MgF_2

D. $CuCl$

Answer: B

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24. Ionic radii of :

A. $Ti^{4+} < Mn^{7+}$

B. $._{}^{35}Cl^- < ._{}^{37}Cl^-$

C. $K^+ > Cl^-$

D. $F^{3+} > F^{5+}$

Answer: D

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25. The correct order of radii is:

A. $N < Be < B$

B. $F^- < O^{2-} < N^{3-}$

C. $Na < Li < K$

D. $Fe^{3+} < Fe^{2+} < Fe^{4+}$

Answer: B

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26. The correct order of acidic strength is

A. $Cl_2O_7 > SO_2 > P_4O_{10}$

B. $CO_2 > N_2O_5 > SO_3$

C. $Na_2O > MgO > Al_2O_3$

D. $K_2O > CaO > MgO$

Answer: A

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27. Amongest H_2O, H_2S, H_2Se and H_2Te the one with highest boiling point is :

A. H_2O because of hydrogen bonding

B. H_2Te because of higher molecular weight

C. H_2Sbecause of hydrogen bonding

D. H_2Se because of lower molecular weight

Answer: A

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28. Assertion: The first ionization energy of Be is greater than that of B.

Reason: 2p-orbital is lower in energy than 2s-orbital.

A. If both assertion and reason are Correct, but reason is the Correct explanation of the assertion

B. If both assertion and reason are Correct, but reason is Not the Correct explanation of the assertion

C. If assertion is Correct, but reason is Incorrect

D. If assertion in Incorrect, but reason is Correct.

Answer: C

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29. The set representing the correct order of the first ionisation potential is

A. $K > Na > Li$

B. $Be > Mg > Ca$

C. $B > C > N$

D. $Ge > Si > C$

Answer: B

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30. Identify the correct order of acidic strength of CO_2, CuO, CaO and H_2O.

A. $CaO < CuO < H_2O < CO_2$

B. $H_2O < CuO < CaO < CO_2$

C. $CaO < H_2O < CuO < CO_2$

D. $H_2O < CO_2 < CaO < CuO$

Answer: A

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31. Which of the following represents the correct order of increasing first ionisation enthalpy for Ca, Ba, Se, and Ar?

A. $Ca < S < Ba < Se < Ar$

B. $S < Se < Ca < Ba < Ar$

C. $Ba < Ca < Se < S < Ar$

D. $Ca < Ba < S < Se < Ar$

Answer: C

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32. The first ionisation potential of Na is $5.1eV$. The value of eectrons gain enthalpy of Na^+ will be

A. $-2.55eV$

B. $-5.1eV$

C. $-10.2eV$

D. $+2.55eV$

Answer: B

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33. The ionic radii of N^{3-}, O^{2-} and F^{-} are respectively given by:

A. 1.36, 1.40 and 1.71

B. 1.36, 1.71 and 1.40

C. 1.71, 1.40 and 1.36

D. 1.71, 1.36 and 1.40

Answer: C

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34. The group having isoelectronic species is

A. O^-, F^-, Na, Mg^+

B. O^{2-}, F^-, Na, Mg^{2+}

C. O^-, F^-, Na^+, Mg^{2+}

D. $O^{2-}, F^-, Na^+, Mg^{2+}$

Answer: D

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Jee Section More Than One Choice Correct Answer

1. Which of the following statements is/are true for the long form of the periodic table?

A. It reflects the sequence of filling the electrons in the order of sub-energy level s, p, d and f

B. It helps predict the stable valency states of the elements

C. It reflects trends in physical and chemical properties of the elements

D. It helps to predict the relative ionicity of the bond between any two elements

Answer: A::C::D

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2. The first ionisation potential of nitrogen and oxygen atoms are related as follows

A. The ionisation potential of oxygen is less than the ionisation potential of nitrogen

B. The ionisation-potential of nitrogen is greater than the ionisation potential of oxygen

C. The two ionisation-potential values are comparable

D. The difference between the two ionisation-potential is too large

Answer: A::B::C

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3. Sodium sulphate is soluble in water,whereas barium sulphate is sparingly soluble because

A. The hydration energy of sodium sulphate is more than its lattice energy

B. The lattice energy of barium sulphate is more than its hydration energy

C. The lattice energy has no role to play in solubility

D. The hydration energy of sodium sulphate is less than its lattice energy

Answer: A::B::C

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4. Amongst the following statements which is/are correct

A. The second ionization potential of boron is greater than that of carbon

B. First ionization potential of boron is greater than that of carbon

C. The second I.P. of Mg is greater than that of P

D. First I.P. of Al and Ga are almost the same

Answer: A::D

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5. Pick out the correct statement(s) of the following.

A. All atoms with an odd atomic number are necessarily paramagnetic

B. All atoms with an even atomic number are necessarily paramagnetic

C. All atoms with an even atomic number may be diamagnetic or paramagnetic

D. Atoms with an odd atomic number may be paramagnetic and in some cases diamagnetic

Answer: A::C

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6. The increasing order of ionic mobilities is/are given by

A. $K^+ < Na^+ < Li^+$

B. $Li^+ < Na^+ < K^+$

C. $Na^+ < Mg^{2+} < Al^{3+}$

D. $Al^{3+} < Mg^{2+} < Na^{+}$

Answer: A

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7. Which of the following salts solution is/are acidic in nature

A. $NaNO_3$

B. $LiCl$

C. $BeCl_2$

D. KCN

Answer: B::C

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8. Which of the following pairs have approximately the same atomic radii?

A. Zr and Hf

B. Rb and Cs

C. Pt and Pd

D. Zn and Cd

Answer: A:

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9. If Aufbau principle and Hund's rule were not followed

A. Ca would have been d-block element with zero dipole moment

B. Zn would have been s-block element

C. Ti would have been diamagnetic

D. Fe^{3+} ion would have 5 unpaired electrons

Answer: A::B::C

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10. Which of the following pair of ions have the same number of unpaired electrons

A. Mn^{2+} and Fe^{2+}

B. Mn^{2+} and Fe^{3+}

C. Ti^{2+} and Ni^{2+}

D. Co^{3+} and Cr^{3+}

Answer: B::C

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11. Select the endothermic step(s):

A. $S^{-}(g) \rightarrow S^{2-}(g)$

B. $Na^{+}(g) + Cl^{-}(g) \rightarrow NaCl(s)$

C. $N(g) \rightarrow N^{-}(g)$

D. $Al^{2+}(g) \rightarrow Al^{3+}(g)$

Answer: A::C::D

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12. The elements which are radioactive and have been named after the name of planet are

A. Hg

B. Np

C. Pu

D. Ra

Answer: B::C

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13. The process requiring the absorption of energy is

A. $Cl - Cl^-$

B. $O^- \rightarrow O^{2-}$

C. $Fe^{3+} \rightarrow Fe^{2+}$

D. $Ar \rightarrow Ar^-$

Answer: B::D

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Jee Section Reasoning Type Questions

1. Statement I $LiCl$ is predomionantly a covalent compound.

Statement II Electronegatvity difference between Li and Cl is too small

A. Statement 1 is true, statement 2 is true , statement 2 is a correct explanation for statement 1

B. Statement 1 is true, statement 2 is true , statement 2 is not a correct explanation for statement 1

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

Answer: C

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2. Assertion: F atom has a less negative electron affinity than CI atom.

Reason: Additional electrons are repelled more effectival by $3p$ electrons in CI atom than by $2p$ electrons in F atom.

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3. Assertion: The first ionisation energy of Be is greater than that of B.

Reason: 2p-orbital is lower in energy than 2s-orbital.

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4. Consider the following statement

I.Electron gain enthalpy becomes more negative with increase in atomic number across a period

II.Effective nuclear charge increases from left to right across period

III.Electron gain enthalpy becomes less negative as we go up a group

Choose the correct option

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5. Assertion (A): Ionisation potential of K is numerically the same as electron affinity of K^+

Assertion (R): Ionisation potential and electron affinity both depend on screening effect

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6. Statement 1 : If a metal forms a number of ions such as M^+, M^{2+}, M^{3+} etc. then the hydration energies associated with these ions increase in that order.

Statement 2 : The energies required to produce M^+, M^{2+} and M^{3+} ions in gaseous state from metal increase in the order $M^+ < M^{2+} < M^{3+}$.

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Jee Section Comprehension Type Questions

1. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

Ionization energies of five elements in kcal/mol are given below

Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which element is a noble gas

A. S

B. T

C. R

D. P

Answer: B

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2. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

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Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which of the following pair represents elements of same group

A. Q, R

B. P, S

C. P, Q

D. Q, S

Answer: A

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3. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

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Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which element form stable unipositive ion

A. R

B. Q

C. P

D. T

Answer: B

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4. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

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Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

If Q reacts with fluorine and oxygen, the molecular formula of fluoride and oxide will be respectively

A. QF_2, QO

B. QF, Q_2O

C. QF_3, Q_2O_3

D. None of these

Answer: B

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5. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

Ionization energies of five elements in kcal/mol are given below

Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

The element having most stable oxidation state +2 is

A. T

B. Q

C. S

D. R

Answer: C

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6. The energy required to pull the most loosely bound electron from an atom is known as ionization potential. It is expressed in electron volts. The value of ionization potential depends on three factors: (i) the charge on the nucleus (ii) the atomic radius and (iii) the screening effect of inner electron shells. The ionization energies, electron affinities, electronegativities, atomic and ionic radii and other physical properties usually shown a regular pattern of change within a group or along period with some irregularities.

Ionization energies of five elements in kcal/mol are given below

Atom	I	II	III
P	300	549	920
Q	99	734	1100
R	118	1091	1652
S	176	347	1848
T	497	947	1500

Which is a non-metal (excluding noble gas)

A. P

B. R

C. S

D. Q

Answer: A

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Jee Section Integer Type Questions

1. The value of n (i.e. principal quantum number) for the valence shell of palladium is (atomic number-40)

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2. Give the name and atomic number of the inert gas atom in which the total number of d-electrons is equal to the difference in number to the p-and $-s$-electrons.

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Jee Section Matrix Match Type Questions

1. Match the nature of aqueous solutions of the substances listed in Column I with the character listed in Column II.

	Column I		Column II
(A)	$KCN_{(aq)}$	(p)	Strongly basic
(B)	$TiOH_{(aq)}$	(q)	Neutral
(C)	$BeCl_{2(aq)}$	(r)	Weakly basic
(D)	$NaNO_{3(aq)}$	(s)	Weakly acidic

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2. Match the characteristics mentioned in Column II with the process in Column I.

	Column I		Column II
(A)	$LiF_{(s)} + Aqua \rightarrow LiF_{(aq)}$	(p)	Exothermic
(B)	$KF_{(s)} + Aqua \rightarrow KF_{(aq)}$	(q)	Endothermic
(C)	$O_{(g)} + e^- \rightarrow O^-_{(g)}$	(r)	Positive affinity
(D)	$O^-_{(g)} + e^- \rightarrow O^{2-}_{(g)}$	(s)	Negative affinity

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