CHEMISTRY

BOOKS - BRILLIANT PUBLICATION

CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES

Level I Homework

1. 'Table of valences and 'Atomic Volume Curve were contributed by (1) Julius Lothar Meyer (2) H.G. J Mosely (3) W.L. Bragg (4) G.T. Seaborg

A. Julius Lothar Meyer

B. H.G. J Mosely

C. W.L. Bragg

D. G.T. Seaborg

Answer:

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2. The law of triads is not applicable with

A. Cl, Br, I

B. Na, K, Rb

C. S, Se, Te

D. Ca, Sr, Ba

Answer:

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3. Among the atomic volume curve, alkali metals occupied _____

A. Peaks

B. Troughs

C. Ascending slopes

D. Descending slopes

Answer:

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4. Law of Octaves was put forward by

A. Mendeleev

B. Moseley

C. Lothar Mayer

D. New land's

Answer:

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5. Eka Al and Eka Si predicted by Mendeleev was

A. Sc, Ga

B. Ga, Ge

C. B, Ge

D. Ga, Tc

Answer:

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6. Which of the following is not a merit of Mendeleev's original periodic table?

a) Prediction of undiscovered elements and their properties

b) Correction of atomic masses of a few elements

c) Systematic arrangement of elements based on atomic mass

d) Similar elements were placed in different groups

e) Separate positions are given for isotopes

f) Order of increasing atomic weight is not observed. The correct code is

A. a, b, c

B. a, b, d

C. d, e, f

D. c, d, e, f

Answer:

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7. In which of the following compounds, manganese shows maximum radius

A. MnO_2

B. $KMnO_4$

C. K_2MnO_4

D. MnO

Answer:

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8. The bridge elements in Mendeleev's periodic table are

A. Mg, Al, Si

B. Li, Be, B

C. B, Si, As

D. Zn, Cd, Hg

Answer:

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9. Which of the following is/are wrong statements?

a) Alkali metals, alkaline earth metals and helium are s-block elements.

b) Pnicogens and halogens are p-block elements.

c) The first member of the lanthanide series is lanthanum.

d) The lightest liquid metal is gallium.

e) Group 17 contains no metals.

f) Elements whose atoms have two outermost shells incomplete are called transition elements

A. c, d

B. a, c, e

C. a, d, e

D. All are incorrect

Answer:

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10. Match the following

I. Pb	a) Transition element
II. Nb	b) Metalloid
III. Pm	c) Represent active element
iv. Np	d) Actinide
v. Te	e) Lanthanide

A. i-c, ii-a, iii-e, iv-d, v-b

B. i-a, ii-c, iii-d, iv-e, v-b

C. i-c, ii-a, iii-b, iv-e, v-d

D. i-a, ii-d, iii-b, iv-c, v-e

Answer:

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11. Total number of elements accommodated in period 6 and group 3 are respectively

A. 32 and 32

B. 32 and 18

C. 32 and 4

D. 18 and 18

Answer:

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12. Which of the following is not correctly matched?

A. Z = 80 Period 6, d block Gr 12

B. $[Xe]4f^{7}5d^{1}6s^{2}$ Period 6, f block Gr 3

C. Z = 74 Period 6, d block Gr 5

D. $[Rn]6d^{2}5f^{14}7s^{2}$ Period 7, d block Gr 4

Answer:

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13. Which of the following ions have electronic configuration $[Ar]3d^7$

A. Mn^{3+}

B. Co^{3+}

C. Fe^{3+}

D. Ni^{3+}

Answer:

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14. An element recently discovered is Moscovium (Mc). Its group number and electronic configuration are respectively

A. 13, $[Rn]5f^{14}6d^{10}7s^27p^1$

B. 13, $[Rn]5f^{14}6d^{10}7s^2$

C. 15, $[Rn]5f^{14}6d^{10}7s^27p^3$

D. 15, $[Rn]5f^{14}6d^{10}7s^27p^1$

Answer:

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15. Which of the following set contains atomic number of only s-block

A. 55, 12, 18, 53

B. 13, 33, 54, 83

C. 3, 20, 55, 87

D. 22, 33, 55, 66

Answer:

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16. Typical elements are

A. Second period elements

B. Third period elements

C. Group 17 elements

D. Group 13 elements

Answer:

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17. Which of the following order of atomic/ionic radius is not correct

A. $Li > Be > B$

B. $I^- > I > I^+$

C. $P^{+5} < P^{+3}$

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

Answer:

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18. The correct order of variation of ionic radius is:

A. $F^- < O^{2-} < N^{3-} < Na^+ < Mg^{2+}$

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

C. $Mg^{2+} < Na^+ < F^- < O^{2-} < N^{3-}$

D. $N^{3-} < O^{2-} < F^- < Na^+ < Mg^{2+}$

Answer:

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19. The amount of energy released for the process $X(g) + e^- \rightarrow (X)^-(g)$ is minimum and maximum respectively for

a) F

b) Cl

c) N

d) B

The correct answer is/are

A. c and a

B. d and b

C. a and b

D. c and b

Answer:

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20. $\Delta_i H_1$ and $\Delta_{eg} H_1$ of an element are 1680 and $-329 kJ mol^{-1}$ respectively. Its electronegativity in Mullicken scale is

A. 10.4

B. 3.7

C. 8.5

D. 6.4

Answer:

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21. The value of E.N of atom A and B are 1.2 and 4.0 respectively. The percentage ionic character of A-B and bond is

A. 50

B. 72.24

C. 55.3

D. 43

Answer:

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Level I Assertion Reason

1. Assertion : Modern periodic table is also called Moseley's P.T

Reason : Moseley proposed the relation $v = [a(z-b)]^2$

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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2. Assertion : f-block elements are called inner transition elements

Reason : Lanthanides and actinides are inner transition elements

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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3. Assertion : Ionic radius of $^{35}Cl^{-} < {}^{37}Cl^{-}$

Reason : Both are isotopes

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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4. Assertion : EGE of oxygen is less -ve than that of fluorine but more -ve than nitrogen

Reason : lonisation enthalpy follows the order $N > O > F$

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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5. Assertion : The E.N varies with hybridisation in the order $sp^3 > sp^2 > sp$

Reason: As the s-character increases, the E.N also increases

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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6. Assertion : Ionisation potential of Li is greater than He

Reason : Zeff of Li is greater than He

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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7. Assertion : Size of Ca^{+2} is larger than K^{+}

Reason : Number of electrons in Ca^{+2} is more than K^{+}

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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8. Assertion : The 1^{st} IP of Be is greater than that of B

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

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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9. Assertion : First ionization energy of nitrogen is lower than oxygen

Reason : Across the period effective nuclear charge decreases

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

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

C. If assertion is true statement but reason is false

D. If both assertion and reason are false statements

Answer:

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Level Ii

1. Which of the following is/are wrong w.r.t. atomic volume curve developed by Lothar Mayer?

A. Alkali metals occupied the crests and transition elements occupied the troughs.

B. Alkaline earth metals occupied at about the mid-points of the descending positions of the curve.

C. Boron has the least atomic volume among all elements.

D. Tans uranic elements are placed as a horizontal row below the curve.

Answer:

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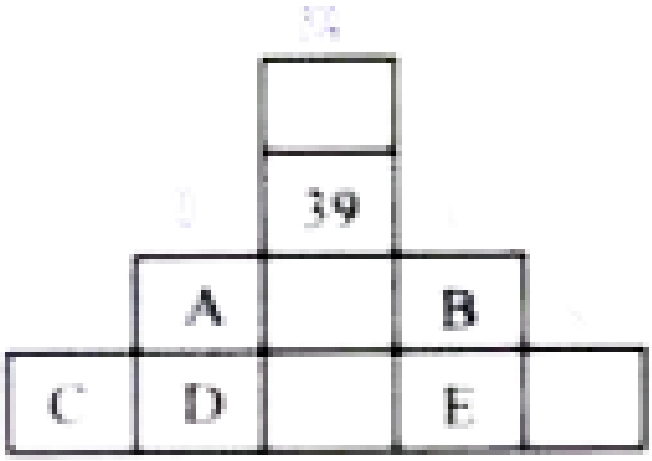
2.



On the basis of the given part of the P.T the incorrect statement is

A. A is an alkaline earth metal.

B. The atomic number of B is 72 and belongs to Group 3

C. D on alpha decay gives a noble gas

D. E is a transuranic element with symbol Ku

Answer:

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3. The total number of p-bock elements among the given atomic numbers 50, 80, 42, 64, 86, 32 is

A. 5

B. 3

C. 4

D. 6

Answer:

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4. Which of the following pairs of atomic numbers represent elements of the same group?

A. 26 and 74

B. 28 and 72

C. 24 and 74

D. 44 and 62

Answer:

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5. The incorrect relationship is

A. Atomic size αZ_{eff}

B. Atomic size α negative charge

C. Atomic size $\alpha \frac{1}{\text{bond order}}$

D. Atomic size α screening effect

Answer:

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6. The correct order of the size is

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

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

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

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

Answer:

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7. The ionic conductance of the following cations in a given concentration are in the order

A. $Li^{+} > Na^{+} > K^{+} > Rb^{+}$

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

C. $Li^{+} = Na^{+} > K^{+} < Rb^{+}$

D. $Li^{+} < Na^{+} < K^{+} < Rb^{+}$

Answer:

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8. One mole of magnesium in the vapour state absorbed 1200 kJ 'm o l^(-1)' of energy. If the first and second ionization energies of 'Mg' are 750 and '1450 kJ mol^(-1)' respectively, the final composition of the mixture is

A. $69\ \%\ Mg^{+}$

B. $69\ \%\ Mg^{2+}$

C. $59\ \%\ Mg^{+}$

D. $59\ \%\ Mg^{2+}$

Answer:

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9. Aqueous solutions of two compounds $M_1 - OH$ and $M_2 - OH$ are prepared in two different beakers. If the E.N of M_1 = 3.4, M_2 =1.2, O = 3.5 and H = 2.1 then the nature of two solutions will be respectively

A. Acidic, Acidic

B. Basic, Basic

C. Acidic, Basic

D. Basic, Acidic

Answer:

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10. Five successive ionisation enthalpies of a metal are 577.6, 1816.7, 2744.8, 11578.0 and 14831.0 KJ mol^{-1} respectively. The stable oxidation state of the metal would be

A. $+2$

B. $+4$

C. $+5$

D. $+3$

Answer:

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11. X, Y and Z are three elements with ΔiH_1, ΔiH_2 and ΔegH_1 as

Which of the following assumptions about X, Y and Z are true?

i) X, Y and Z are non metals

ii) They are hightly electronegative

iii) Atomic size varies as $Z > Y > X$

iv) Y may be more reactive than X and Z

v) X may be more reactive than Y and Z

A. all except (v) are true

B. All except (iii) and (iv) are true

C. All except (i), (iii) and (v) are true

D. All except (iv) are true

Answer:

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12. Find the true statement/statements

a) In a given period $\Delta_i H_1$ is the lowest for an alkali metal and highest for noble gas.

b) Cs has the lowest and He has the highest $\Delta_i H_1$ among all elements.

c) Lowest $\Delta_i H_2$ among the elements of third period is for Mg.

d) The metal with the highest $\Delta_i H_1$ is mercury.

e) Ni (II) compounds are thermodynamically more stable than Pt(II) compounds while Ni(IV) compound are less stable than Pt(IV) compounds.

A. a, b, c, d

B. a, b, c, e

C. All except e

D. All are correct

Answer:

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13. $K \xrightarrow{a} K^+ \xrightarrow{b} K^{2+}$

$Ca \xrightarrow{c} Ca^+ \xrightarrow{d} Ca^{2+}$

If a, b, c, d are ionisation energies, then which of the following is not correct

A. $c > a$

B. $b < d$

C. $b > a$

D. $d > c$

Answer:

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14. $X(g) \rightarrow X^+(g) + e^-$ $\Delta H = +720 kJ mol^{-1}$. Calculate the amount of energy required to convert 110 mg of X atom in gaseous state into X^+ ions (At. Wt of X = 7 g/mol)

A. 11.3 kJ

B. 10.1 kJ

C. 14.5 kJ

D. 12.3 kJ

Answer:

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15. Consider the following changes

a) $M(s) \rightarrow M(g)$

b) $M(s) \rightarrow M^{2+}(g) + 2e^-$

c) $M(g) \rightarrow M^+(g) + e^-$

d) $M^+(g) \rightarrow M^{2+}(g) + e^-$

e) $M(g) \rightarrow M^{2+}(g) + 2e^-$

The second 1 E of M could be calculated from the energy values associated with

A. a + c + d

B. b - (a + c)

C. a + e

D. e - c

Answer:

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16. Which among the following is not correct: The $1E_1$ of Zn, Cd, Hg are very high, $1E_2$ of $Cr > Mn$ and $Cu > Zn$, $1E_2$ of $V < Cr > Mn$ and $Ni < Cu > Zn$, $1E_3$ of Mn is comparatively low.

A. The $1E_1$ of Zn, Cd, Hg are very high

B. $1E_2$ of $Cr > Mn$ and $Cu > Zn$

C. $1E_2$ of $V < Cr > Mn$ and $Ni < Cu > Zn$

D. $1E_3$ of Mn is comparatively low.

Answer:

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17. Find the true statement/statements

i. $\Delta_{eg}H$ is related to electron affinity (Ae) as per the equation $\Delta_{eg}H = -\left[Ae + \frac{5}{2}RT\right]$

ii. At absolute zero temperature, EGE and A_e are the same.

iii. $\Delta_{eg}H_2$ of a number of elements is +ve.

iv. $\Delta_{eg}H_1$ of Be, Mg, N and noble gases are -ve.

v. A higher -ve value of $\Delta_{eg}H_1$ shows a higher electron affinity, but not always.

vi. $\Delta_{eg}H_1$ is of N, O, F and Ne have a relatively lower -ve values as compound with the next group member.

vii. Group 14 elements (except lead) have a higher -ve value of $\Delta_{eg}H_1$ compound with group 15 elements.

A. i,ii,iii,vi

B. iii,iv,v and vi

C. All except iii and iv

D. v, vi and vii

Answer:

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18. Consider the following conversions

i. $O_{(g)} + e^- \rightarrow O_g^- \quad \Delta H_1$

ii. $F_{(g)} + e^- \rightarrow F_{(g)}^- \quad \Delta H_2$

iii. $Cl_{(g)} + e^- \rightarrow Cl_{(g)}^- \quad \Delta H_3$

iv. $Na_{(g)} \rightarrow Na_{(g)}^+ + e^- \quad \Delta H_3$

The incorrect statement is

A. ΔH_1 and ΔH_2 is less -ve than ΔH_3

B. ΔH_2 and ΔH_3 are -ve while ΔH_1 is +ve

C. ΔH_2 is more -ve than ΔH_1

D. $\Delta H_1, \Delta H_2$ and ΔH_3 are -ve while ΔH_4 is +ve

Answer:

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19. $\frac{3N_0}{2}$ atoms of $X_{(g)}$ are converted into $X^+_{(g)}$ by energy E_1, $\frac{2N_0}{3}$ atoms of $X_{(g)}$ are converted into $X^-_{(g)}$ by energy E_2. Hence ionisation energy and electron gain enthalpy of $X_{(g)}$ are (N_0 = Avogadro Number)

A. $\frac{2E_1}{3N_0}, \frac{2E_2}{3N_0}$

B. $\frac{2E_1}{3N_0}, \frac{3E_2}{2N_0}$

C. $\frac{3E_1}{2N_0}, \frac{3E_2}{2N_0}$

D. $\frac{3E_1}{2N_0}, \frac{2E_2}{3N_0}$

Answer:

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20. Which will have the maximum value of electron affinity O^X, O^Y, O^Z (X, Y, Z respectively are 0, -1 and -2)

A. O^X

B. O^Y

C. O^Z

D. All have equal

Answer:

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21. In which of the following options, the order of arrangement does not agree with the variation of property indicated against it?

A. $Li < Na < K < Rb$ (Increasing metallic character)

B. $Al^{3+} < Mg^{2+} < Na^{+} < F^{-}$ (Increasing ionic size)

C. $B < C < N < O$ (Increasing first 1E)

D. $I < Br < F < Cl$ (Increasing EGE)

Answer:

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22. Select the group where E.N increase down the group?

A. Ca, Sr, Ba

B. Zn, Cd, Hg

C. F, Cl, Br

D. Li, Na, K

Answer:

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23. If electronegativity of A 2.0 and that of B is 3.0. What is the covalent % of the bond

A. $19.5\ \%$

B. $80.5\ \%$

C. 0.46

D. 0.54

Answer:

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24. A compound contains three elements A, B and C. If the oxidation number of A = $+2$, B = $+5$ and C = -2, then the possible formula of the compound is

A. $A_3(BC_4)_2$

B. $A_3(B_4C)_2$

C. $A_2(BC_3)_2$

D. ABC_2

Answer:

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25. There are three elements A, B, C. Their atomic number are Z_1, Z_2 and Z_3 respectively. If $Z_1 - Z_2 = 2$ and $\frac{Z_1 + Z_2}{2} = Z_3 - 2$ and the electronic configuration of element A is $[Ar]3d^6 4s^2$ then the correct order of magnetic moment of

A. $B^{2+} > A^{2+} > C^{2+}$

B. $A^{3+} > B^{3+} > C$

C. $B > A > C^{2+}$

D. $B = A^{3+} > C^{3+}$

Answer:

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26. The bond length of A_2 molecule is $0.8A^\circ$ and Cl_2 bond length = $1.98A^\circ$ the difference of E.N of A-Cl is 1.0, then the bond length of A-Cl is

A. $1.30A^\circ$

B. $1.39A^\circ$

C. $2.60A^\circ$

D. $2.78A^\circ$

Answer:

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27. In which of the following properties did Be shows similarities with Al?

a) Both are comparatively stable in air.

b) They have no tendency to form peroxide and superoxides.

c) Both provide colour to Bunsen flame.

d) Both form coloured solution in NH_3

e) The oxides and hydroxides of both elements are amphoteric.

A. a, b, c, d

B. a, b, c

C. a, b, e

D. a, b, d, e

Answer:

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28. Which among the following order is correct?

a) $Ca < Mg < Be < Sr < Ba$ - density

b) $Te^{2-} < I^- < Cs^+ < Ba^{2+}$ - 1E

c) $O > S > Se > Te > Po$ Negative value of EGE

d) $N > C > P > Si$ - E.N

e) $NH_3 > PH_3 > AsH_3 > SbH_3$ - Bond angle

A. a, b, c

B. a, b, c, d

C. a, b, c, e

D. a, b, d, e

Answer:

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29. Sum of ΔegH_1 and ΔegH_2 of X, Y and Z are respectively $+703, +256$ and $+659KJmol^{-1}$. If they have ΔegH_2 of $+844, +456$ and $+690KJmol^{-1}$ and if X, Y and Z may be a collection of N, O and S, identify than correctly:

A. X = O, Y = N, Z = S

B. X = N, Y = O, Z = S

C. X = O, Y = S, Z = N

D. X = S, Y = O, Z = N

Answer:

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Level Ii Assertion Reason

1. Assertion : Size of an anion is larger than their parent atom.

Reason : Z_{eff} of anion is greater than that of their parent atom.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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2. Assertion : Hydrogen is called a rogue element.

Reason: Hydrogen contains one electron in its valence shell.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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3. Assertion : Transition elements shows horizontal similarities in addition to the main group elements.

Reason : Their addition electron in a series enters into (n-1) d subshell.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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4. Assertion : The ionic radius follows the order $I^- < I < I^+$.

Reason : Smaller the value of Z/e, the larger the size of the species.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If Assertion is false statement but Reason is true

Answer:

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5. Assertion : EGE value of Al is less -ve than that of Na.

Reason : Al atom is smaller than Na atom. : If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion, If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion, If Reason is true statement but Assertion is false, If both Assertion and Reason are false statements

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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6. Assertion : Carbon in CF_3I is more E.N than in CH_3I.

Reason : Carbon in CF_3I acquires greater +ve charge.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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7. Assertion : Nitric oxide is an acidic oxide while CrO_3 is a basic oxide.

Reason : Oxides of metals are generally acidic while oxides of non-metals are generally basic.

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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8. Assertion : Electronegativity of inert gas element is 'zero'

Reason : Inert gas elements have stable electronic configuration

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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9. Assertion : Properties of Beryllium is similar to that of aluminium

Reason: Both the elements belongs to same group

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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10. Assertion : Atomic radius of inert gases is largest in the period

Reason : Effective nuclear charge of inert gases, is minimum

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If both Assertion and Reason are false statements

Answer:

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11. Assertion : Atomic size of Boron is larger than Beryllium

Reason : Alkali metals have only one electron in the valence shell

A. If both Assertion & Reason are true and the Reason is the correct explanation of the Assertion

B. If both Assertion and reason are true but the Reason is not the correct explanation of the Assertion

C. If Assertion is true statement but Reason is false

D. If Assertion is false statement but Reason is true

Answer:

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Question

1. Find the blocks to which elements having atomic numbers 34, 37, 42 , 63 belong.

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2. Predict the period, group and block to which elements with atomic numbers 9, 22, 35, 47 belong.

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3. Name the element with atomic number 119.

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4. The electronegativities of carbon and chlorine are 2.5 and 3.00 respectively. Calculate the C-Cl bond length if C-C and Cl-Cl bond distances are 1.54A° and 1.0A°

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5. The electron gain ethalpy of chlorine is -$349kJmol^{-1}$. Calculate the energy released when 5.5g of chlorine is converted into Cl^{-} ions in the gaseous state.

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6. Calculate the N-O bond distance if covalent radii of nitrogen and oxygen atoms are respectively, 0.75 A° and 0.74 A° and the electronegativities are 3.0 and 3.5.

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7. What is the effective nuclear charge, felt by a 1s electron of the helium atom ?

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8. Calculate the Z_{eff} felt by a 2p electron of the nitrogen atom.

Watch Video Solution

9. Calculate the Z_{eff} at the periphery of the chromium atom.

Watch Video Solution

10. Calculate the electronegativity of carbon from the following data:

$E_{H-H} = 104.2 kcal mol^{-1}$, $E_{C-C} = 83.1 kcal mol^{-1}$, $E_{C-H} = 98.8 kcal mol$

$X_H = 2.1$

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11. Calculate the electronegativity of silicon (covalent radius= 1.175 Å)

Watch Video Solution

Level I

1. Which pair of atomic numbers represents s-block elements?

A. 7,15

B. 6,12

C. 9,17

D. 3,12

Answer: D

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2. The atomic radius increases as we move down a group because

A. effective nuclear charge increases

B. atomic mass increases

C. added electrons are accommodated in new electron level

D. atomic number increases

Answer: C

Watch Video Solution

3. Which one of the following ions has the smallest radius?

A. Cl^-

B. S^{2-}

C. K^+

D. Ca^{2+}

Answer: D

Watch Video Solution

4. Consider the ions: 'K^+, S^(2-), Cl^-' and 'Ca^(2+) .' The radii of these ionic species follow the order:

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

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

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

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

Answer: C

Watch Video Solution

5. The radius of Cr is minimum in which of the following compounds?

A. K_2CrO_4

B. CrF_3

C. CrO_2

D. $CrCl_3$

Answer: A

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6. The set representing the correct order of first ionization potential is

A. $K > Na > Li$

B. $Be > Mg > Ca$

C. $B > C > N$

D. $Ge > Si > C$

Answer: B

Watch Video Solution

7. Which of the following has least electron affinity?

A. Oxygen

B. Argon

C. Nitrogen

D. Boron

Answer: B

Watch Video Solution

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

A. Atomic size decreases

B. Ionization energy increases

C. Metallic character decreases

D. Stability of +2 oxidation state increases

Answer: D

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9. The element with the electronic configurations as $(Ar)3d^{10}4s^24p^3$ represents

A. Metal

B. Non-metal

C. Metalloid

D. Transition metal

Answer: C

Watch Video Solution

10. The law of triads is not applicable with

A. Cl, Br, I

B. Na, K, Rb

C. S, Se, Te

D. Ca, Sr, Ba

Answer: B

Watch Video Solution

11. If Aufbau rule is not followed, K-19 will be placed in..... block.

A. s

B. p

C. d

D. f

Answer: C

Watch Video Solution

12. Following triads have approximately equal size

A. Na^+, Mg^{2+}, Al^{3+} (iso-electronic)

B. F^-, Ne, O^{2-} (iso-electronic)

C. Fe, Co, Ni

D. Mn^+, Fe^{2+}, Cr (iso-electronic)

Answer: C

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13. Which pair is different from the others?

A. Li-Mg

B. Na - K

C. Ca - Mg

D. B-Al

Answer: A

Watch Video Solution

14. Which is/are amphoteric oxides?

A. BeO

B. SnO

C. ZnO

D. All of these

Answer: D

Watch Video Solution

15. Second electron affinity of an element

A. is always negative

B. is always positive

C. can be positive or negative

D. is always zero

Answer: B

Watch Video Solution

16. Ionisation energy of $F^{\ominus}$ is $320kJmol^{-1}$. The electron gain enthalpy of fluorine would be

A. $-320kJmol^{-1}$

B. $-160kJmol^{-1}$

C. $+320kJmol^{-1}$

D. $+160kJmol^{-1}$

Answer: A

Watch Video Solution

17. Which of the following element has the highest EN?

A. As

B. Sb

C. P

D. S

Answer: D

Watch Video Solution

18. Which of the following oxides is most basic?

A. Na_2O

B. MgO

C. Al_2O_3

D. CuO

Answer: A

Watch Video Solution

19. The IUPAC name for the element with atomic number, Z=119 is.

A. Unp

B. Uns

C. Uno

D. Uue

Answer: D

Watch Video Solution

20. An element which lies in the same group of the periodic table as mercury is

A. Gold

B. Tin

C. Thalium

D. Cadmium

Answer: D

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21. Eka-aluminium and Eka-silicon are

A. Gallium and germanium

B. Aluminium and silicon

C. Iron and sulphur

D. Carbon and silicon

Answer: A

Watch Video Solution

22. Considering the elements from left to right in the third period of the periodic table, the atomic volume of the elements:

A. first decreases then increases

B. decreases

C. increases at constant rate

D. remains unchanged

Answer: A

Watch Video Solution

23. Which of the following ions has the largest heat of hydration?

A. Na^+

B. Al^{3+}

C. F^-

D. Sr^{2+}

Answer: B

Watch Video Solution

24. According to Moseley, a straight line graph is obtained on plotting.

A. v vs. Z

B. v^2 vs. Z

C. $\sqrt{v}$ vs. Z

D. $\frac{1}{v}$ vs. Z

Answer: C

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25. An element having electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$ forms:

A. Acidic oxide

B. Basic oxide

C. Amphoteric oxide

D. Neutral oxide

Answer: B

Watch Video Solution

26. 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

Watch Video Solution

27. The pair of elements violating the law of octaves among the following are

A. Li & Na

B. Mg & Ca

C. P& As

D. F & Cl

Answer: C

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28. Diagonal relationship is due to

A. Identical valency.

B. Identical oxidation state

C. Identical maximum covalency

D. Compensation of change in electronegativity across a period by that in a group.

Answer: D

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29. The atom having the valence shell electronic configuration $4s^2 4p^2$ would be in:

A. Group 2 and period 3

B. Group 2 and period 4

C. Group 14 and period 4

D. Group 14 and period 3

Answer: C

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30. The general electronic configuration of transition elements is:

A. $(n-1)d^{1-10}ns^{1-2}$

B. $ns^2(n-1)d^{10}$

C. $(n-1)d^{10}ns^2$

D. ns^2np^5

Answer: A

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31. The ionic radii of isoelectronic species 'N^(3-), O^(2-)' and 'F^-' in 'A^0' are in the order

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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32. Which of the following is not isoelectronic series:

A. Cl^-, P^{3-}, Ar

B. N^{3-}, Ne, Mg^{+2}

C. B^{+3}, He, Li^+

D. N^{3-}, S^{2-}, Cl

Answer: D

Watch Video Solution

33. The radius of isoelectronic series

A. Decreases with decreasing nuclear charge

B. Decreases with increasing effective nuclear charge

C. Same for all

D. First increases then decreases

Answer: B

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34. In a period, the elements having least melting point are:

A. Noble gas

B. Alkali metals

C. Chalcogens

D. Pnicogens

Answer: A

Watch Video Solution

35. Which of the following represents a correct sequence of electronegativity values?

A. $F > N > O > C$

B. $F > N < O > C$

C. $F > N > C > O$

D. $F < N < O < C$

Answer: B

Watch Video Solution

36. Which of the following order of atomic/ionic radius is not correct

A. $I^- > I > I^+$

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

C. $Cr^{3+} < Cr^{2+}$

D. $Li > Be > B$

Answer: B

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37. The best reason to account for the general tendency of atomic diameters to decrease as the atomic number increase within a period of the periodic table is the fact that

A. Outer electrons repel inner electrons

B. Closer packing among the nuclear particles is achieve

C. The number of neutrons increases

D. The increasing nuclear charge exerts a greater attractive force on the electrons

Answer: D

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38. In which of the following pairs, the ionisation energy of the first species is less than that of the second

A. O^-, O^{2-}

B. S, P

C. N, P

D. Be^+, Be

Answer: B

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39. The correct order of stability of Al^+, Al^{+2}, Al^{+3} is

A. $Al^{+3} > Al^{+2} > Al^+$

B. $Al^{+2} > Al^{+3} > Al^+$

C. $Al^{+2} < Al^+ > Al^{+3}$

D. $Al^{+3} > Al^+ > Al^{+2}$

Answer: D

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

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

B. $M_{(g)} \rightarrow M_{(g)}^{+}$

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

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

Answer: D

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41. Which order is wrong:

A. Electronegativity -$P < N < O < F$

B. ionisation potential -$B < Be < O < N$

C. Basic property - $MgO > CaO > FeO > Fe_2O_3$

D. Reactivity-$Be < Li < K < Cs$

Answer: C

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42. Decreasing order of size of ions is:

A. $Br^- > S^{-2} > Cl^- > N^{-3}$

B. $N^{3-} > S^{-2} > Cl^- > Br^-$

C. $Br^- > Cl^- > S^{-2} > N^{-3}$

D. $N^{-3} > Cl^- > S^{-2} > Br^-$

Answer: A

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43. Zinc does not show the variable valency as elements of d-block, because:

A. This is soft metal

B. completely filled 3d-level

C. Its melting point is low

D. Volatile Metal

Answer: B

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44. The correct order of ionization energies of F^-, Cl^-, F and Cl is

A. $Cl < F < Cl^- < F^-$

B. $Cl^- < F^- < Cl < F$

C. $F^- < Cl^- < Cl < F$

D. $Cl^- < Cl < F^- < F$

Answer: C

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45. Lanthanoid contraction is caused due to:

A. the same effective nuclear charge from Ce to Lu

B. the imperfect shielding on outer electrons by 4f electrons from the nuclear charge

C. the appreciable shielding on outer electrons by 4f electrons from the nuclear charge

D. the appreciable shielding on outer electrons by 5d electrons from the nuclear charge

Answer: B

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46. Which of the following statements 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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47. The elements which occupy the peaks of ionization 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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48. Ionic radii of

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

B. $^{35}Cl^{-} > {}^{37}Cl^{-}$

C. $K^{+} > Cl^{-}$

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

Answer: D

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49. In which block, 106th element belongs

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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50. Similarity in chemical properties of the atoms of elements in a group of the periodic table is most closely related to

A. atomic numbers

B. atomic masses

C. number of principal energy levels

D. number of valence electrons

Answer: D

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Level Ii

1. The statement that is not correct for the periodic classification of elements is

A. The properties of elements are a periodic function of their atomic numbers

B. Non-metallic elements are less 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-subshells are filled with electrons monotonically with increase in atomic number

Answer: D

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2. Amongst the following elements (where electronic configurations are given below), the one having the highest ionisation enthaipy is 'therefore'

[Ne]$3s^2 3p^1$, [Ne]$3s^2 3p^3$, [Ne] $3s^2 3p^2$, [Ne] $3d^{10} 4s^2 4p^2$

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

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

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

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

Answer: B

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3. The electron affinities of halogens are: F=332, CI =439, Br=324, I=295 kJ mol^{-1}. The higher value for Cl as compared to that of F is due to

A. Higher atomic radius of F

B. Smaller electronegativity of F

C. Weaker electron-electron repulsion in Cl

D. More vacant p-subshell in Cl

Answer: C

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4. The IP_1, IP_2, IP_3, IP_4, and IP_5, of an element are 7.1, 14.3, 34.5, 46.8, 162.2eV respectively. The element is likely to be

A. Na

B. Si

C. F

D. Ca

Answer: B

Watch Video Solution

5. Calculate the energy needed to convert three moles of sodium atoms in the gaseous state to sodium ions, The ionization energy of sodium is

$495kJmol^{-1}$

A. 1485 kJ

B. 495 kJ

C. 148.5 kJ

D. None

Answer: A

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6. Which is correct in the following?

A. Radius of Cl atom is 0.99 Å, while that of Cl^+ ion is 1.54 Å

B. Radius of Cl atom is 0.99 Å,, while that of Na atom is 1.86 Å,

C. Radius of Cl atom is 0.95 Å while that of Cl^- ion is 0.81Å

D. Radius of Na atom is 0.95Å, while that of Na^+ ion is 1.86Å

Answer: B

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7. 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 : oxygen is more electronegative, oxygen has high electron affinity, O^- ion will tend to resist the addition of another electron , O^- ion has comparatively larger size than oxygen atom

A. oxygen is more electronegative

B. oxygen has high electron affinity

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

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

Answer: C

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8. The correct order of increasing ionic character is

A. $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$

B. $BeCl_2 < CaCl_2 < MgCl_2 < BaCl_2$

C. $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$

D. $MgCl_2 < CaCl_2 < BeCl_2 < BaCl_2$

Answer: A

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9. Ionisation potential and electron affinity of fluorine are 17.42 and 3.45 eV respectively. Calculate the electronegativity of fluorine.

A. 3.726

B. 2.726

C. 1.726

D. 5.726

Answer: A

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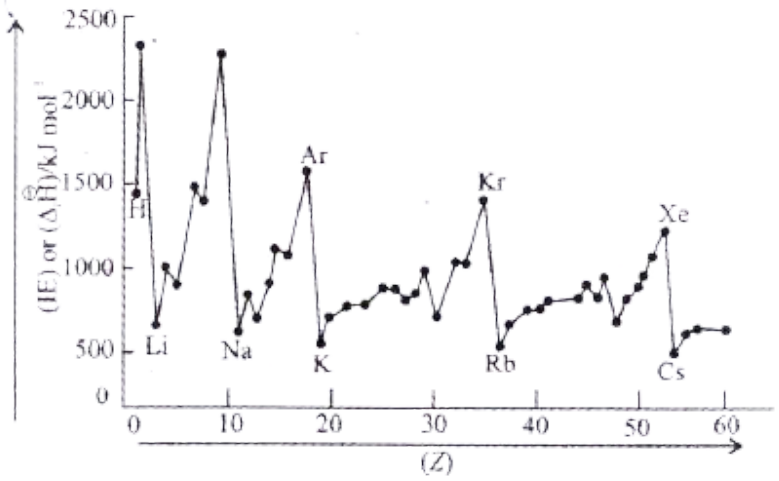
10. The graph of IE_1 or $\Delta H_1\Theta$ versus atomic number (Z) is given below:



Which of the following statement is correct?

A. Alkali metals are at the maxima and noble gases at the minima.

B. Noble gases are at the maxima and alkali metals at the minima.

C. Transition elements are the maxima

D. Minima and maxima do not show any regular behaviour.

Answer: B

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11. Elements a, b, c, d and e have the following electronic configuration

(a) $1s^2 2s^2 2p^1$ (b) $1s^2 2s^2 2p^6 3s^2 3p^1$ (c) $1s^2 2s^2 2p^6 3s^2 3p^3$ (d) $1s^2 2s^2 2p^6 3s^2 3p^5$ (e) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

Which among these will belong to the same group in the periodic table ?

a & d, b&c, a & b, a & e

A. a & d

B. b&c

C. a & b

D. a & e

Answer: C

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12. Which of the following order is wrong?

A. $NH_3 < PH_3 < AsH_3$ -Acidic character

B. $Li^+ < Na^+ < K^+ < Cs^+$ -Ionic radius in gaseous state

C. $Li < Be < B < C - IE,$

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

Answer: C

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13. General electronic configuration of outermost and penultimate shell of an atom is $[Ne](n-1)s^2(n-1)p^6(n-1)d^x ns^2$ If n= 4 and x=5, then number of protons in the nucleus will be:

A. 26

B. 24

C. 25

D. 30

Answer: C

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14. An element X belongs to fourth period and 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-orbital

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-orbital

Answer: C

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15. The correct order of decreasing first ionization energy is:

A. $Si > Al > Mg > Na$

B. $Si > Mg > Al > Na$

C. $Al > Si > Mg > Na$

D. $Mg > Li > Al > Si$

Answer: B

Watch Video Solution

16. Similarity in chemical properties of the atoms of elements in a group of the periodic table is most closely related to

A. atomic numbers

B. atomic masses

C. number of principal energy levels

D. number of valence electrons

Answer: D

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17. In the long form of the periodic table, the valence shell electronic configuration of $5s^2 5p^4$ corresponds to the element present in:

A. Group 16 and period 6

B. Group 17 and period 5

C. Group 16 and period 5

D. Group 17 and period 6

Answer: C

Watch Video Solution

18. In which of the following sets of atomic numbers, all the elements do not belong to the same group?

A. 3, 11,37

B. 12, 38, 56

C. 10, 16, 24

D. 10, 18, 54

Answer: C

Watch Video Solution

19. Which of the following element is just below in the E.C. of $[Ne]3s^2 3p^6 4s^2 3d^{10} 4p^3$

A. As

B. Ge

C. Sb

D. Sn

Answer: C

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20. Chloride of an element A gives neutral solution in water. In the periodic table, the element A belongs to

A. first group

B. third group

C. fifth group

D. first transition series

Answer: A

Watch Video Solution

21. Write the period number, group number and block of the element having atomic number 42

A. 5, 5, d

B. 5, 6, d

C. 5, 2, d

D. 5, 15, p

Answer: B

Watch Video Solution

22. Among the elements with the following atomic numbers, which are d-block elements?

I) 29 II) 81 III) 46 IV) 58

A. I,IV

B. IV, II

C. I, III

D. II, III

Answer: C

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23. If the atomic number of an inert gas element is Z, then an element with which of the following electronic configurations will have the highest electronegativity (according to Pauling scale)?

A. Z-1

B. Z-2

C. Z+1

D. Z+2

Answer: A

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24. The process requiring 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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25. Which of the following is correct regarding the variation of properties in a group of the periodic table?

A. ${}_{3}Li \rightarrow {}_{19}K$: ionization enthalpy increases.

B. ${}_{9}F \rightarrow {}_{35}Br$ Electron gain enthalpy with negative sign increases.

C. ${}_{6}C \rightarrow {}_{32}Ge$ Atomic radii increases.

D. ${}_{18}Ar \rightarrow {}_{54}Xe$: Noble character increases.

Answer: C

Watch Video Solution

26. The electronegativity of H, O and X are 2.1, 3.5 and 0.7 respectively. The correct nature of compound X-O-H is

A. acidic

B. basic

C. amphoteric

D. cannot be predicated

Answer: B

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27. ns^2np^4 (n-outermost orbit) represents the valence electrons. The corresponding group elements would be

A. F, Cl, Br

B. N, P, As

C. O, S, Se

D. C, Si, Ge

Answer: C

Watch Video Solution

28. The statement that is not correct for the periodic classification of elements is

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

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

Electronegativity of the elements along the period from left to right increases in a regular manner.

For transition elements the d-subshells are filled with the electrons monotonically with increase in atomic number.

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

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

C. Electronegativity of the elements along the period from left to right increases in a regular manner.

D. For transition elements the d-subshells are filled with the electrons monotonically with increase in atomic number.

Answer: D

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29. Ionization potential of phosphorus is greater than that of sulphur because

A. of its smaller size.

B. of more penetrating power of p-orbitals.

C. its nuclear force of attraction on electrons.

D. half-filled orbitals are more stable,

Answer: D

Watch Video Solution

30. 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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31. The electron affinity of nitrogen is lower than that of carbon because

A. atomic radius of nitrogen is lower than that of carbon

B. effective nuclear charge in carbon is greater

C. addition of an electron in N gives $2p^4$ configuration

D. nitrogen is gaseous element

Answer: C

Watch Video Solution

32. The decreasing order of second ionisation potential of K, Ca and Ba is:

A. $K > Ca > Ba$

B. $Ca > Ba > K$

C. $Ba > K > Ca$

D. $K > Ba > Ca$

Answer: A

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33. The incorrect statement among the following is:

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 potential of Mg is greater than the third ionization potential of Al.

Answer: B

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34. Increasing order of atomic radii is:

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

B. $Na^{+} < Mg^{2+} < Ne < F^{-} < O^{2-}$

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

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

Answer: A

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35. The sucessive ionisation energy values for an element X are given below:

a) 1st ionisation energy=$410 kJmol^{-1}$ b)2nd ionisation energy= $820 kJmol^{-1}$

c) 3rd ionisation energy = $1100 kJmol^{-1}$ d) 4th ionisation energy = 1500 $kJmol^{-1}$

5th ionisation energy=$3200 kJmol^{-1}$

Find out the number of valence electron for the atom, X:

A. 4

B. 3

C. 5

D. 2

Answer: A

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36. 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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37. Choose the incorrect statement. : Chemical reactivity tends to be high in group 1 metals, lower in elements in middle and increases to maximum in the group 17., Halogens have very high negative electron gain enthalpy., Noble gases have large positive electron gain enthalpy., Decrease in electronegativities across a period is accompanied by an increase in non-metallic properties.

A. Chemical reactivity tends to be high in group 1 metals, lower in elements in middle and increases to maximum in the group 17.

B. Halogens have very high negative electron gain enthalpy.

C. Noble gases have large positive electron gain enthalpy.

D. Decrease in electronegativities across a period is accompanied by an increase in non-metallic properties.

Answer: D

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38. In which of the following arrangements, the order is not correct according to the property indicated against it?

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

B. Increasing $IE_1 : B < C < N < O$

C. Increasing $EA_1 : I < Br < F < Cl$

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

Answer: B

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39. Sodium cannot exhibit +2 oxidation state because its:

A. IP_2 value is less than IP_1 , value

B. IP_2 , value is higher than IP_1 value

C. IP_2 and IP_1 values are equal

D. IP_2 value is zero

Answer: B

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40. Consider the electronic configurations, (i) $1s^2 2s^2 2p^6 3s^1 (ii) 1s^2 2s^2 2p^6 3s^0$

Which of the following statements is not true?

(a)Energy is required to change (i) to (ii)

(b) (i)represents electronic configuration of Na-atom

(c) (i) and (ii) may represent ground state electronic configuration of different or same elements

(d) Less energy is required to remove one electron from (ii) than from (i)

A. Energy is required to change (i) to (ii)

B. (i)represents electronic configuration of Na-atom

C. (i) and (ii) may represent ground state electronic configuration of different or same elements

D. Less energy is required to remove one electron from (ii) than from (i)

Answer: C

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41. IP_1 and IP_2 of Mg are 178 and 348 kcal mol^{-1}. The energy required for the reaction, $Mg \rightarrow Mg^{2+} + 2e^-$ is:

A. +170 kcal

B. +526 kcal

C. -170 kcal

D. -526 kcal

Answer: B

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42. The IP_1, IP_2, IP_3, IP_4, and IP_5, of an element are 7.1, 14.3, 34.5, 46.8, 162.2eV respectively. The element is likely to be

A. Na

B. Si

C. F

D. Ca

Answer: B

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43. The electronic configuration corresponding to most metallic element is:

A. 2, 8,3

B. 2, 8, 8

C. 2, 8, 8, 1

D. 2, 8, 8,7

Answer: C

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44. The valence shell of element A contains 3 electrons while the valency shell of element B contains 6 electrons. IfA combines with B, the probable formula of the compound formed will be:

A. AB_2

B. A_2B

C. A_2B_3

D. A_3B_2

Answer: C

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45. What is the atomic number of last member of the seventh period of the extended form of periodic table?

A. 116

B. 118

C. 120

D. 122

Answer: B

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46. The electronic configuration of four elements are:

1. $[Xe]6s^1$ 2) $[Xe]4f^{14}, 5d^1, 6s^2$ 3) $[Ar]4s^2, 3d^{10}, 4p^5$ 4) $[Ar]3d^7, 4s^1$

Which one of the following statements about these elements is not correct?

A. 1 is a strong reducing agent

B. 2 is a d-block element

C. 3 has high electron affinity

D. 4 shows variable oxidation state

Answer: B

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47. Beryllium and aluminium exhibit many properties which are similar. But the two elements differ in:

A. exhibiting amphoteric nature in their oxides

B. forming polymeric hydrides

C. forming covalent halides

D. exhibiting maximum covalence in compounds

Answer: D

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48. Which among the following statements is not 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 to 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: B

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49. Which of the following order is wrong?

A. $O > F > N > C - II^{nd} I. P$

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

C. $N > C > P > Si - E.N$

D. $F > Na > Ne - 1^{st}I.P$

Answer: D

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50. Which one of the following statements is correct?

A. The elements like F, Cl, Br, O etc. having high values of electron affinity act as strong oxidising agent

B. The elements having low values of ionisation energies acts as strong reducing agent

C. The formation of S^{2-} is an endothermic process

D. All of these

Answer: D

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Level Ii Assertion Reason Type

1. Assertion : The 1^{st} IP of Be is greater than that of B

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

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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2. Assertion : Nitrogen has higher first ionization energy than that of oxygen.

Reason : Nitrogen gas has smaller atomic size than that of oxygen.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

Watch Video Solution

3. Assertion: Ionization potential of K is numerically the same as electron affinity K^+

Reason : I.E. and E.A. both depends on screeing effect.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

Watch Video Solution

4. Assertion Both N_2 and NO^+ are diamagnetic substances.

Reason : NO^+ is isoelectronic with N_2 .

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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5. Assertion : SO_4^{2-} is estimated as $BaSO_4$, but not as $MgSO_4$

Reason : Ionic radius of Mg^{2+} is smaller than that of Ba^{2+}

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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6. Assertion: The lattice energies depend upon the reciprocals of the distance between the ions $\frac{1}{r_0}$,

Reason : For the given positive ion, the lattice energy increases as the size of the anion increases.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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7. Assertion: Of all the elements, helium has the highest value of first ionization enthalpy.

Reason: Helium has the most positive electron gain enthalpy of all the elements.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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8. Assertion: Na^+ and Al^{3+} are isoelectronic but the magnitude of the ionic radius of Al^{3+} is less than that of Na^+

Reason: The magnitude of effective nuclear charge of the outer shell electrons in Al^{3+} is greater than in Na^+

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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9. Assertion : F atom has a less negative election gain enthalpy than Cl atom.

Reason : Additional electrons are repelled more effectively by 3p electrons in Cl atom than by 2p electrons in F-atom.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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10. Assertion : Noble gases have positive electron gain enthalpy.

Reason : Noble gases have stable closed shell electronic configuration.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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11. Assertion: The highest oxidation state of Os is +8.

Reason: Osmium is a 5d-block element.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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12. Assertion : The atomic size generally increases across a period and decreases down the group.

Reason: Atomic size depends upon valence shell electronic configuration.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: D

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13. Assertion: Among isoelectronic species, the cation with the greater positive charge will have a smaller radius.

Reason :Greater is the attraction of the electrons to the nucleus, smaller is the size of atom/ion.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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14. Assertion: On moving down the group, ionization enthalpy decreases.

Reason: With decrease in size of the atom, the force of attraction between the nucleus and valence electrons decreases.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: C

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

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

A. If both (A) and (R) are correct, but (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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16. Assertion: Na_2O is basic oxide whereas Cl_2O_7 is acidic oxide.

Reason: Elements on extreme left of the periodic table from basic oxides whereas elements on extreme right form acidic oxides.

A. If both (A) and (R) are correct, but (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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17. Assertion: The ionization of s-electrons requires more energy than that for the ionization of p-electrons in the same shell.

Reason: s-electrons are closer to the nucleus than p-electrons and hence are more strongly attracted by nucleus.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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18. Assertion: The ionic size of O^{2-} is bigger than that of F^{-} ion.

Reason: The O^{2-} and F^{-} are isoelectronic ions.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: B

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19. Assertion: When the atoms of first transition series ionize, the 4s-orbital electrons are ionized before 3d-orbital electrons.

Reason: The energy of 3d-orbital electron is lower than that of 4s-orbital electrons.

A. If both (A) and (R) are correct, but (R) is the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

Watch Video Solution

20. Assertion: The ionization of s-electrons requires more energy than that for the ionization of p-electrons in the same shell.

Reason: s-electrons are closer to the nucleus than p-electrons and hence are more strongly attracted by nucleus.

A. If both (A) and (R) are correct, but (R) is not the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is not the correct explanation of (A)

C. If (A) is correct, but (R) is incorrect.

D. If both (A) and (R) are incorrect.

Answer: A

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Questions

1. Find the blocks to which elements having atomic numbers 34, 37, 42 , 63 belong.

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2. Predict the period, group and block to which elements with atomic numbers 9, 22, 35, 47 belong.

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3. Name the element with atomic number 119.

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4. The electronegativities of carbon and chlorine are 2.5 and 3.00 respectively. Calculate the C-Cl bond length if C-C and Cl-Cl bond distances are 1.54A° and 1.0A°

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5. The electron gain ethalpy of chlorine is -$349kJmol^{-1}$. Calculate the energy released when 5.5g of chlorine is converted into Cl^{-} ions in the gaseous state.

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6. Calculate the N-O bond distance if covalent radii of nitrogen and oxygen atoms are respectively, 0.75 A° and 0.74 A° and the electronegativities are 3.0 and 3.5.

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7. What is the effective nuclear charge, felt by a 1s electron of the helium atom ?

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8. Calculate the Z_{eff} felt by a 2p electron of the nitrogen atom.

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9. Calculate the Z_{eff} at the periphery of the chromium atom.

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10. Calculate the electronegativity of carbon from the following data:

$E_{H-H} = 104.2 kcal mol^{-1}$, $E_{C-C} = 83.1 kcal mol^{-1}$, $E_{C-H} = 98.8 kcal mol$

$X_H = 2.1$

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11. Calculate the electronegativity of silicon (covalent radius= 1.175 Å)

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Questions Level I

1. Which pair of atomic numbers represents s-block elements?

A. 7,15

B. 6, 12

C. 9,17

D. 3, 12

Answer: D

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2. The atomic radius increases as we move down a group because

A. effective nuclear charge increases

B. atomic mass increases

C. added electrons are accommodated in new electron level

D. atomic number increases

Answer: C

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3. Which one of the following ions has the smallest radius?

A. Cl^-

B. S^{2-}

C. K^+

D. Ca^{2+}

Answer: D

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4. Consider the ions: 'K^+, S^(2-), Cl^-' and 'Ca^(2+) .' The radii of these ionic species follow the order:

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

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

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

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

Answer: C

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5. The radius of Cr is minimum in which of the following compounds?

A. K_2CrO_4

B. CrF_3

C. CrO_2

D. $CrCl_3$

Answer: A

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6. The set representing the correct order of first ionization potential is

A. $K > Na > Li$

B. $Be > Mg > Ca$

C. $B > C > N$

D. $Ge > Si > C$

Answer: B

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7. Which of the following has least electron affinity?

A. Oxygen

B. Argon

C. Nitrogen

D. Boron

Answer: B

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

A. Atomic size decreases

B. Ionization energy increases

C. Metallic character decreases

D. Stability of+2 oxidation state increases

Answer: D

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9. The element with the electronic configurations as $(Ar)3d^{10}4s^24p^3$ represents

A. Metal

B. Non-metal

C. Metalloid

D. Transition metal

Answer: C

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10. The law of triads is not applicable with

A. Cl, Br, I

B. Na, K, Rb

C. S, Se, Te

D. Ca, Sr, Ba

Answer: B

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11. If Aufbau rule is not followed, K-19 will be placed in..... block.

A. s

B. p

C. d

D. f

Answer: C

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12. Following triads have approximately equal size

A. Na^+, Mg^{2+}, Al^{3+} (iso-electronic)

B. F^-, Ne, O^{2-} (iso-electronic)

C. Fe,Co,Ni

D. Mn, Fe^{2+}, Cr (iso-electronic)

Answer: C

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13. Which pair is different from the others?

A. Li-Mg

B. Na-K

C. Ca-Mg

D. B-Al

Answer: A

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14. Which is/are amphoteric oxides?

A. BeO

B. SnO

C. ZnO

D. All of these

Answer: D

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15. Second electron affinity of an element

A. is always negative

B. is always positive

C. can be positive or negative

D. is always zero

Answer: B

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16. Ionisation energy of $F^{\ominus}$ is $320kJmol^{-1}$. The electron gain enthalpy of fluorine would be

A. $-320kJ\text{mol}^{-1}$

B. $-160kJ\text{mol}^{-1}$

C. $+320kJ\text{mol}^{-1}$

D. $+160kJ\text{mol}^{-1}$

Answer: A

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17. Which of the following element has the highest EN?

A. As

B. Sb

C. P

D. S

Answer: D

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18. Which of the following oxides is most basic?

A. Na_2O

B. MgO

C. Al_2O_3

D. CuO

Answer: A

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19. The IUPAC name for the element with atomic number, Z=119 is.

A. Unp

B. UnsC

C. Uno

D. Uue

Answer: D

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20. An element which lies in the same group of the periodic table as mercury is

A. Gold

B. Tin

C. Thalium

D. Cadmium

Answer: D

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21. Eka-aluminium and Eka-silicon are

A. Gallium and germanium

B. Aluminium and silicon

C. Iron and sulphur

D. Carbon and silicon

Answer: A

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22. Considering the elements from left to right in the third period of the periodic table, the atomic volume of the elements:

A. first decreases then increases

B. decreases

C. increases at constant rate

D. remains unchanged

Answer: A

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23. Which of the following ions has the largest heat of hydration?

A. Na^+

B. Al^{3+}

C. F^-

D. Sr^{2+}

Answer: B

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24. According to Moseley, a straight line graph is obtained on plotting.

A. v vs. Z

B. v^2 vs. Z

C. $\sqrt{v} vs.\ Z$

D. $\frac{1}{V} vs.\ Z$

Answer: C

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25. An element having electronic configuration $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$ forms:

A. Acidic oxide

B. Basic oxide

C. Amphoteric oxide

D. Neutral oxide

Answer: B

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26. 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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27. The pair of elements violating the law of octaves among the following are

A. Li & Na

B. Mg & Ca

C. QP & As

D. F & C

Answer: C

Watch Video Solution

28. Diagonal relationship is due to

A. Identical valency

B. Identical oxidation state

C. Identical maximum covalency

D. Compensation of change in electronegativity across a period by that in a group.

Answer: D

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29. The atom having the valence shell electronic configuration $4s^2 4p^2$ would be in:

A. Group 2 and period 3

B. Group 2 and period 4

C. Group 14 and period 4

D. Group 14 and period 3

Answer: C

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30. The general electronic configuration of transition elements is:

A. $ns^{1-2}(n-1)d^{1-10}$

B. $ns^2(n-1)d^{10}$

C. $(n-1)d^{10}s^2$

D. ns^2np^5

Answer: A

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31. The ionic radii of isoelectronic species 'N^(3-), O^(2-)' and 'F^-' in 'A^0' are in the order

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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32. Which of the following is isoelectronic series:

A. $Cl^-, P^{2-} Ar$

B. N^{2-}, Ne, Mg^{+2}

C. B^{+3}, He, Li^+

D. N^{2-}, S^{2-}, Cl

Answer: D

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33. The radius of isoelectronic series

A. Decreases with decreasing nuclear charge

B. Decreases with increasing effective nuclear charge

C. Same for all

D. First increases then decreases

Answer: B

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34. In a period, the elements having least melting point are:

A. Noble gas

B. Alkali metals

C. Chalcogens

D. Pnicogens

Answer: A

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35. Which of the following represents a correct sequence of electronegativity values?

A. $F > N > O > C$

B. $F > N < O > C$

C. $F > N > C > O$

D. $F < N < O < C$

Answer: B

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36. Which of the following order of atomic/ionic radius is not correct

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

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

C. $Cr^{3+} < Cr^{2+}$

D. $Li > Be > B$

Answer: B

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37. The best reason to account for the general tendency of atomic diameters to decrease as the atomic number increase within a period of the periodic table is the fact that

A. Outer electrons repel inner electrons

B. Closer packing among the nuclear particles is achieved

C. The number of neutrons increases

D. The increasing nuclear charge exerts a greater attractive force on the electrons

Answer: D

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38. In which of the following pairs, the ionisation energy of the first species is less than that of the second

A. O^-, O^{2-}

B. S,P

C. N,P

D. Be^+, Be

Answer: B

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39. Which of the following is the correct order of stability of Al^+, Al^{+2}, Al^{+3} is

A. $Al^{+3} > Al^{+2} > Al^+$

B. $Al^{+2} > Al^{+3} > Al^+$

C. $Al^{+2} < Al^+ > Al^{+2}$

D. $Al^{+3} > Al^+ > Al^{+2}$

Answer: D

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

Answer: D

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41. Which order is wrong:

A. Electronegativity - P lt N lt O lt F

B. Ist ionisation potential - B lt Be lt O lt N

C. Basic property - MgO gt CaO gt FeO gt Fe_2O_3

D. Reactivity - Be lt Li lt K lt Cs

Answer: C

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42. Decreasing order of size of ions is : $Br^- > S^{-2} > Cl^- > N^{-3}$,

$N^{3-} > S^{-2} > Cl^- > Br^-$, $Br^- > Cl^- > S^{-2} > N^{-3}$,

$N^{-3} > Cl^- > S^{-2} > Br^-$

A. $Br^- > S^{-2} > Cl^- > N^{-3}$

B. $N^{3-} > S^{-2} > Cl^- > Br^-$

C. $Br^- > Cl^- > S^{-2} > N^{-3}$

D. $N^{-3} > Cl^- > S^{-2} > Br^-$

Answer: A

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43. Which of the following reason best explains that Zinc does not show the variable valency as elements of d-block:

A. This is soft metal

B. completely filled 3d-level

C. Its melting point is low

D. Volatile Metal

Answer: B

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44. The correct order of ionization energies of F^-, Cl^-, F and Cl is

A. $Cl < D < Cl^- < F^-$

B. $Cl^- < F^- < Cl < F$

C. $F^- < Cl^- < Cl < F$

D. $Cl^- < Cl < F^- < F$

Answer: C

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45. Lanthanoid contraction is caused due to:

A. the same effective nuclear charge from Ce to Lu

B. the imperfect shielding on outer electrons by 4f electrons from the nuclear charge

C. the appreciable shielding on outer electrons by 4f electrons from the nuclear charge

D. the appreciable shielding on outer electrons by 5d electrons from the nuclear charge

Answer: B

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46. Among the following statement which one is correct with respect to the property of element with an increase in atomic number in the carbon family (group 14)

A. Atomic size decreases

B. Ionisation energy increase

C. Metallic character decrease

D. Stability of+2 oxidation state increase

Answer: D

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47. The elements which occupy the peaks of ionization 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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48. Ionic radii of

A. $Ti^{4+} < Mn^{2+}$

B. $^{35}Cl^{-} > ^{37}Cl^{-}$

C. $K^{+} > Cl^{-}$

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

Answer: D

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49. In which block, 106th element belongs

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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50. Similarity in chemical properties of the atoms of elements in a group of the periodic table is most closely related to

A. atomic numbers

B. atomic masses

C. number of principal energy levels

D. number of valence electrons

Answer: D

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Questions Level Ii

1. The statement that is not correct for the periodic classification of elements is

A. The properties of elements are a periodic function of their atomic numbers

B. Non-metallic elements are less 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-subshells are filled with electrons monotonically with increase in atomic number

Answer: D

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2. Amongst the following elements (where electronic configurations are given below), the one having the highest ionisation enthaipy is 'therefore' [Ne]$3s^2 3p^1$, [Ne]$3s^2 3p^3$, [Ne] $3s^2 3p^2$, [Ne] $3d^{10} 4s^2 4p^2$

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

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

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

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

Answer: B

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3. The electron affinities of halogens are: F=332, CI =439, Br=324, I=295 kJ mol^{-1}. The higher value for Cl as compared to that of F is due to

A. Higher atomic radius of F

B. Smaller electronegativity off

C. Weaker electron-electron repulsion in Cl

D. More vacant p-subshell in Cl

Answer: C

Watch Video Solution

4. The IP_1, IP_2, IP_3, IP_4, and IP_5, of an element are 7.1, 14.3, 34.5, 46.8, 162.2eV respectively. The element is likely to be

A. Na

B. Si

C. F

D. Cs

Answer: B

Watch Video Solution

5. Calculate the energy needed to convert three moles of sodium atoms in the gaseous state to sodium ions, The ionization energy of sodium is $495kJmol^{-1}$

A. 1485 kJ

B. 495 kJ

C. 148.5 kJ

D. None

Answer: A

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6. Which is correct in the following?

A. Radius of Cl atom is 0.99 Å, while that of Cl^{+} ion is 1.54 Å

B. Radius of Cl atom is 0.99 Å, while that of Na atom is 1.86 Å

C. Radius of Cl atom is 0.95 Å, while that of Cl^- ion is 0.81Å

D. Radius of Na atom is 0.95 Å, while that of Na^+ ion is 1.86Å

Answer: B

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7. 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 : oxygen is more electronegative, oxygen has high electron affinity, O^- ion will tend to resist the addition of another electron , O^- ion has comparatively larger size than oxygen atom

A. oxygen is more electronegative

B. oxygen has high electron affinity

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

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

Answer: C

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8. The correct order of increasing ionic character is

A. $BeCl_2 < MgCl_2 < CaCl_2 < BaCl_2$

B. $BeCl_2 < BaCl_2 < MgCl_2 < BaCl_2$

C. $BaCl_2 < CaCl_2 < MgCl_2 < BeCl_2$

D. $MgCl_2 < CaCl_2 < BaCl_2 < BaCl_2$

Answer: A

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9. Ionisation potential and electron affinity of fluorine are 17.42 and 3.45 eV respectively. Calculate the electronegativity of fluorine.

A. 3.726

B. 2.726

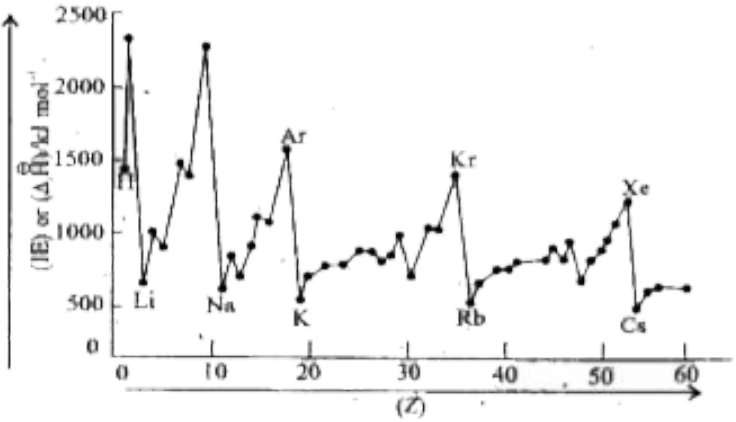
C. 1.726

D. 5.726

Answer: A

Watch Video Solution

10. The graph of IE_1 or $\Delta_i H_1^{\Theta}$ versus atomic number (Z) is given below:



Which of the following statement is correct? : Alkali metals are at the maxima and noble gases at the minima, Noble gases are at the maxima and alkali metals at the minima, Transition elements are the maxima. , Minima and maxima do not show any regular behaviour.

A. Alkali metals are at the maxima and noble gases at the minima

B. Noble gases are at the maxima and alkali metals at the minima.

C. Transition elements are the maxima.

D. Minima and maxima do not show any regular behaviour.

Answer: B

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11. Elements a, b, c, d and e have the following electronic configuration

(a) $1s^2 2s^2 2p^1$ (b) $1s^2 2s^2 2p^6 3s^2 3p^1$ (c) $1s^2 2s^2 2p^6 3s^2 3p^3$ (d) $1s^2 2s^2 2p^6 3s^2 3p^5$ (e) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$

Which among these will belong to the same group in the periodic table ?

a & d, b&c, a & b, a & e

A. a&d

B. b&c

C. a&b

D. a&e

Answer: C

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12. Which of the following order is wrong?

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

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

C. $Li < Be < B < C - IE_1$

D. $Li < Na < K < Rb$ - increasing metallic radius

Answer: C

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13. General electronic configuration of outermost and penultimate shell of an atom is $[Ne](n-1)s^2(n-1)p^6(n-1)d^x ns^2$ If n= 4 and x=5, then number of protons in the nucleus will be:

A. 26

B. 24

C. 25

D. 30

Answer: C

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14. An element X belongs to fourth period and 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-orbital

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-orbital

Answer: C

Watch Video Solution

15. The correct order of decreasing first ionization energy is:

A. $Si > Al > Mg > Na$

B. $Si > Mg > Al > Na$

C. $Al > Si > Mg > Na$

D. $Mg > Li > Al > Si$

Answer: B

Watch Video Solution

16. Similarity in chemical properties of the atoms of elements in a group of the periodic table is most closely related to

A. atomic numbers

B. atomic masses

C. number of principal energy levels

D. number of valence electrons

Answer: D

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17. In the long form of the periodic table, the valence shell electronic configuration of $5s^2 5p^4$ corresponds to the element present in:

A. Group 16 and period 6

B. Group 17 and period 5

C. Group 16 and period 5

D. Group 17 and period 6

Answer: C

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18. In which of the following sets of atomic numbers, all the elements do not belong to the same group?

A. 3, 11, 37

B. 12,38,56

C. 10, 16, 24

D. 10,18,54

Answer: C

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19. Which of the following element is just below in the E.C. of $[Ne]3s^2 3p^6 4s^2 3d^{10} 4p^3$

A. As

B. Ge

C. Sb

D. Sn

Answer: C

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20. Chloride of an element A gives neutral solution in water. In the periodic table, the element A belongs to

A. first group

B. third group

C. fifth group

D. first transition series

Answer: A

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21. Write the period number, group number and block of the element having atomic number 42

A. 5,5, d

B. 5,6,d

C. 5,2,d

D. 5, 15, p

Answer: B

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22. Among the elements with the following atomic numbers, which are d-block elements?

I) 29 II) 81 III) 46 IV) 58

A. I, IV

B. IV, II

C. I, III

D. II, III

Answer: C

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23. If the atomic number of an inert gas element is Z, then an element with which of the following electronic configurations will have the highest electronegativity (according to Pauling scale)?

A. Z-1

B. Z-2

C. Z+1

D. Z+2

Answer: A

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24. The process requiring absorption of energy is

A. $F \rightarrow F^-$

B. $Cl \rightarrow Cl^-$

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

D. $H \rightarrow H^{-}$

Answer: C

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25. Which of the following is correct regarding the variation of properties in a group of the periodic table?

A. ${}_{3}Li \rightarrow {}_{19}K$: Ionization enthalpy increases

B. ${}_{9}F \rightarrow {}_{35}Br$: Electron gain enthalpy with negative sign increases

C. ${}_{6}C \rightarrow {}_{32}Ge$: Atomic radii increases.

D. ${}_{18}Ar \rightarrow {}_{54}Xe$: Noble character increases.

Answer: C

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26. The electronegativity of H, O and X are 2.1, 3.5 and 0.7 respectively. The correct nature of compound X-O-H is

A. acidic

B. basic

C. amphoteric

D. cannot be predicated

Answer: B

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27. ns^2np^4 (n-outermost orbit) represents the valence electrons. The corresponding group elements would be

A. F, Cl, Br

B. N, P, As

C. O, S, Se

D. C, Si, Ge

Answer: C

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28. The statement that is not correct for the periodic classification of elements is

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

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

C. Electronegativity of the elements along the period from left to right increases in a regular manner.

D. For transition elements the d-subshells are filled with the electrons monotonically with increase in atomic number.

Answer: D

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29. Ionization potential of phosphorus is greater than that of sulphur because

A. of its smaller size

B. of more penetrating power of p-orbitals.

C. its nuclear force of attraction on electrons.

D. half-filled orbitals are more stable.

Answer: D

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30. 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. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^6$

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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31. The electron affinity of nitrogen is lower than that of carbon because

A. atomic radius of nitrogen is lower than that of carbon

B. effective nuclear charge in carbon is greater

C. addition of an electron in N gives $2p^4$ configuration

D. nitrogen is gaseous element

Answer: C

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32. The decreasing order of second ionisation potential of K, Ca and Ba is:

A. $K > Ca > Ba$

B. $Ca > Ba > K$

C. $Ba > K > Ca$

D. $K > Ba > Ca$

Answer: A

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33. The incorrect statement among the following is:

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 potential of Mg is greater than the third ionization potential of Al.

Answer: B

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34. Increasing order of atomic radii is:

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

B. $Na^{+} < Mg^{2+} < Ne < F^{-} < O^{2-}$

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

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

Answer: A

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35. The sucessive ionisation energy values for an element X are given below:

a) 1st ionisation energy=$410kJmol^{-1}$ b)2nd ionisation energy= $820kJmol^{-1}$

c) 3rd ionisation energy = $1100kJmol^{-1}$ d) 4th ionisation energy = 1500 $kJmol^{-1}$

5th ionisation energy=$3200kJmol^{-1}$

Find out the number of valence electron for the atom, X:

A. 4

B. 3

C. 5

D. 2

Answer: A

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36. 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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37. Choose the incorrect statement.

A. Chemical reactivity tends to be high in group 1 metals, lower in elements in middle and increases to maximum in the group 17.

B. Halogens have very high negative electron gain enthalpy.

C. Noble gases have large positive electron gain enthalpy.

D. Decrease in electronegativities across a period is accompanied by an increase in non-metallic properties.

Answer: D

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38. In which of the following arrangements, the order is not correct according to the property indicated against it?

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

B. Increasing size $IE_1 : B < C < N < O$

C. Increasing size $EA_1 : I < Br < F < Cl$

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

Answer: B

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39. Sodium cannot exhibit +2 oxidation state because its:

A. IP_2 value is less than IP_1 value

B. IP_2 value is higher than IP_1 value

C. IP_2 and IP_1 values are equal

D. IP_2 value is zero

Answer: B

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40. Consider the electronic configurations, (i) $1s^2 2s^2 2p^6 3s^1 (ii) 1s^2 2s^2 2p^6 3s^0$

Which of the following statements is not true?

A. Energy is required to change (i) to (ii)

B. (i) represents electronic configuration of Na-atom

C. (i) and (ii) may represent ground state electronic configuration of different or same elements

D. Less energy is required to remove one electron from (ii) than from (i)

Answer: C

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41. IP_1 and IP_2 of Mg are 178 and 348 kcal mol^{-1}. The energy required for the reaction, $Mg \rightarrow Mg^{2+} + 2e^-$ is:

A. +170 kcal

B. +526 kcal

C. -170 kcal

D. -526 kcal

Answer: B

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42. The IP_1, IP_2, IP_3, IP_4, and IP_5, of an element are 7.1, 14.3, 34.5, 46.8, 162.2eV respectively. The element is likely to be

A. Na

B. Si

C. F

D. Ca

Answer: B

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43. The electronic configuration corresponding to most metallic element is:

A. 2,8,3

B. 2,8,8

C. 2,8,8,1

D. 2, 8, 8,7

Answer: C

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44. The valence shell of element A contains 3 electrons while the valency shell of element B contains 6 electrons. IfA combines with B, the probable formula of the compound formed will be:

A. AB_2

B. A_2B

C. A_2B_3

D. A_3B_2

Answer: C

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45. What is the atomic number of last member of the seventh period of the extended form of periodic table?

A. 116

B. 118

C. 120

D. 122

Answer: B

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46. The electronic configuration of four elements are:

1. $[Xe]6s^1$ 2) $[Xe]4f^{14}, 5d^1, 6s^2$ 3) $[Ar]4s^2, 3d^{10}, 4p^5$ 4) $[Ar]3d^7, 4s^1$

Which one of the following statements about these elements is not correct?

A. $[Xe]6s^1$

B. $[Xe]4f^{14}, 5d^1, 6s^2$

C. $[Ar]4s^2, 3d^{10}, 4p^5$

D. $[Ar]3d^7, 4s^2$

Answer: B

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47. The electronic configuration of four elements are:

1. $[Xe]6s^1$ 2) $[Xe]4f^{14}, 5d^1, 6s^2$ 3) $[Ar]4s^2, 3d^{10}, 4p^5$ 4) $[Ar]3d^7, 4s^1$

Which one of the following statements about these elements is not correct?

A. 1 is a strong reducing agent

B. 2 is a d-block element

C. 3 has high electron affinity.

D. 4 shows variable oxidation state

Answer: D

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48. Beryllium and aluminium exhibit many properties which are similar. But the two elements differ in:

A. exhibiting amphoteric nature in their oxides

B. forming polymeric hydrides

C. forming covalent halides

D. exhibiting maximum covalence in compounds

Answer: B

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49. Which among the following statements is not true for the long form of the periodic table?

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

B. It helps to 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: D

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50. Which of the following order is wrong?

A. $O > F > N > C - I \in dI.P$

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

C. $N > C > P > Si - E.N$

D. $F > Na > Ne - IstI. P$

Answer: D

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51. Which one of the following statements is correct?

A. The elements like F, CI, Br, O etc. having high values of electron affinity act as strong oxidising agent

B. The elements having low values of ionisation energies acts as strong reducing agent

C. The formation of S^{2-} is an endothermic process

D. All of these

Answer: D

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Questions Level Iii Single Correct Answer Type

1. First and second ionisation energies of magnesium are 7.646 and 15.035 eV respectively. The amount of energy in kJ needed to convert all the atoms of magnesium into Mg^{2+} ions present in 12 mg of magnesium vapours is: 1.1, 1.5, 2, 0.5

A. 1.1

B. 1.5

C. 2

D. 0.5

Answer: A

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2. Following statements regarding the periodic trends of chemical reactivity of the alkali metals and the halogens are given. Which of these

statements give 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 the alkali metals and the halogens, the chemical reactivity decreases with increase in atomic number down the group

C. Chemical reactivity increases 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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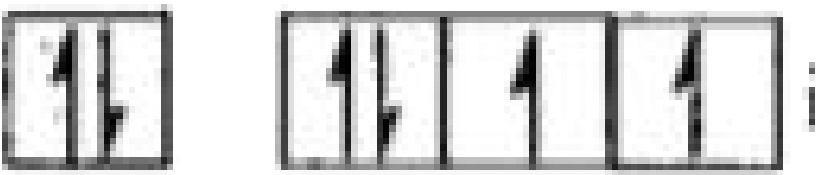
3. The outer electronic configuration



is that of

A. S

B. Cl^-

C. P

D. O^{3-}

Answer: A

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4. Which of the following statements is correct for the addition of an electron to an isolated and gases uni-negatively charged oxygen O-ion?

A. the addition of electron cannot occur

B. the addition of electron occurs with evolution of energy

C. the addition of electron occurs with absorption of energy

D. none of these

Answer: C

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5. The transformation, $Na(s) \rightarrow Na^{+}(g)$ involves

A. ionization energy

B. sublimation energy

C. ionization energy and sublimation energy both

D. vapourisation energy

Answer: C

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6. In which of the following arrangements, the sequence is not strictly according to the property given again

A. $CO_2 < SiO_2 < SnO_2 < PbO_2$ increasing oxidizing power.

B. $HF < HCl < HBr < HI$: increasing acid strength.

C. $NH_3 < PH_3 < AsH_3 < SbH_3$: increasing basic strength.

D. $B < C < O < N$: increasing first ionization enthalpy.

Answer: C

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7. The cyanide CN^- & N_2 are isoelectronic. But in contrast to CN^-, N_2 is chemically inert because of

A. Low bond energy

B. Absence of bond polarity

C. Unsymmetrical electron distribution

D. Presence of more number of electrons in bonding orbital

Answer: B

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8. Which of the following statement is incorrect?

A. Mendeleev's periodic law was based on atomic numbers of the element.

B. Zero group was not present in the periodic table when Mendeleev presented it.

C. The effective nuclear charge $\left(Z_{eff}\right)$ is the atomic number minus shielding effect.

D. There are four transition series in the periodic table each one consists of 10 elements.

Answer: A

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Questions Level Iii Multiple Correct Answers Type

1. Choose the correct statements

A. Element with lowest electronegativity is Cs

B. Element with highest electronegativity is F

C. Element with highest first ionisation potential is He

D. Element with lowest first ionisation potential is I.

Answer: A::B::C

Watch Video Solution

2. Choose the correct order of radius

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

B. $Li < Na < K < Rb < Cs$

C. $Mn > Mn^{+2} > Mn^{+2} > Mn^{+3} > Mn^{+4}$

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

Answer: A::B::C

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3. Which of the following are the correct statements?

A. All the actinide elements are radioactive

B. Alkali and alkaline earth metals are s-block element

C. Chalcogens and halogens are p-block elements

D. The first member of the lanthanide series is lanthanum

Answer: A::B::C

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4. Which of the following are the incorrect statements?

A. The second ionisation potential of an atom is always less than the first ionisation potential

B. The addition of an electron to a neutral atom is an endothermic process

C. Fluorine has the maximum electronegativity

D. The size of the cation is always less than the size of the neutral atom

Answer: A::B::D

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5. Which of the following statements are correct?

A. The last member of the 7th period of the periodic table has atomic number 118.

B. All the transition elements are metals and paramagnetic.

C. The maximum number of elements are present in the 5th period of the periodic table is 15

D. Every period of the periodic table starts with a member of alkali group.

Answer: A::B

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6. Which of the following is correct in order of increasing size?

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

B. $Fe < Fe^{2+} < Fe^{3+}$

C. $Fe^{3+} < Fe^{2+} < Fe$

D. $I^- < I < I^+$

Answer: A::C

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7. Which of the following statements are correct?

A. An anion is larger than a cation if they are isoelectronic

B. Out of Na^+ and Al^{3+}, Na^+ has the largest size.

C. The ionic radii of trivalent lanthanides decreases with increasing atomic number.

D. Out of P^{3-}, S^{2-}, and Cl^-, Cl^- ion has the largest size.

Answer: A::B::C

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8. Which of the following statements are correct?

A. Z_{eff} of elements increases along the period ($\rightarrow$)

B. Z_{eff} of elements increases down the group ($\downarrow$)

C. Isoelectronic species have the same nuclear charge

D. Screening constant (σ) increases down the group ($\downarrow$)

Answer: A::D

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9. The first eight ionisation energies for a particular neutral atom is as given below. Which oxidation states are not possible of the atom?

IE_1	IE_2	IE_3	IE_4	IE_5	IE_6	IE_7	IE_8
1000 $kJmol^{-1}$	2252 $kJmol^{-1}$	3363 $kJmol^{-1}$	4556 $kJmol^{-1}$	7004 $kJmol^{-1}$	8496 $kJmol^{-1}$	27108 $kJmol^{-1}$	31724 $kJmol^{-1}$

A. -2

B. -3

C. -6

D. $+6$

Answer: B::C

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10. Which of the following pairs of elements have same number of electron in their outermost shell:

A. Na, Sr

B. Se, Te

C. Mn, Fe

D. As, Bi

Answer: B::D

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11. Which of the following characteristics regarding halogens are correct?

A. Ionization energy decreases with increase in atomic number

B. Electronegativity decreases with increase in atomic number

C. Electron affinity decreases with increase in atomic number

D. Enthalpy of fusion increases with increase in atomic number

Answer: A::B::D

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12. Which of the following statements are not correct?

A. I.P. increases down the group

B. IP of s-block elements is less than corresponding d-block element

C. If Δ IP gt 16 eV higher oxidation state is more stable

D. IP of halogen is maximum in their respective period

Answer: A::C::D

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13. The properties which are common to the elements belonging to groups 1 and 17 of periodic table are:

A. Electropositive character increases down the group

B. Reactivity decreases from top to bottom

C. Atomic radii increases as atomic number increases

D. Electronegativity decreases on moving down a group

Answer: A::C::D

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14. Ionization energy of an element is:

A. Equal in magnitude but opposite in sign to the electron gain enthalpy of the cation of the element

B. Same as electron affinity of the element .

C. Energy required to remove one valence electron from an isolated gaseous atom in its ground state

D. Equal in magnitude but opposite in sign to the electron gain enthalpy of the anion of the element

Answer: A::C

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15. Which of the following statements are correct?

A. F is the most electronegative and Cs is the most electropositive element

B. The electronegativity of halogens decreases from F to I

C. The electron affinity of Cl is higher than that of F though their electronegativities are in the reverse order

D. The electron gain enthalpy of noble gases are positive

Answer: A::B::C::D

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Questions Level Iii Numerical Type

1. An ionic compound is formed of the type XY from X with electronic configuration ns^1 and Y with valence shell electrons.....

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2. The amount of energy released when 10^6 atoms of iodine in vapour state are converted to l^- ions $4.9 \times 10^{-13} J$. What is the electron affinity of iodine in eV per atom?

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3. The number of elements among the following, which have lower electronegativity than oxygen atom, based Pauling scale, is .....

F, CI, Br, I, H, S, P, K, Ca

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4. The first four sucessive ionization energies for an element are 6.113, 11.871, 50.908 and 67.0 (in eV) respectively. The number of valence shell electrons is .....

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5. The difference in the electronegativity of two atoms, when the percentage ionic character is 19.5%, is .....

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Questions Level Iii Matching Column Type

1.

Column-I	Column-II
A) F	p) Maximum electron-affinity
B) Cl	q) Maximum electronegativity
C) Br	r) Exists as X_2 in liquid state
D) I	s) Exists as X_2 in solid state
	t) X_2 sublimates on heating
	u) X_2 is the best oxidising agent

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2. Match the electronic configuration with the nature/property of the element.

Column-I	Column-II
A) $[Ar]\ 3d^{10}\ 4s^2\ 4p^6\ 5s^1$	p) p-block element.
B) $[Ne]\ 3s^2\ 3p^6\ 4s^2\ 3d^6$	q) Zero group element.
C) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6$	r) d-block element.
D) $[Xe]\ 4f^{14}\ 5d^{10}\ 6s^2\ 6p^3$	s) 4th period element.
	t) Paramagnetic.

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3. Match Column-I(Elements) with Column - II(configuration of elements, and select the correct answer using the codes given below:

Column-I	Column-II
A) The third alkali metal	p) $1s^2\,2s^2\,2p^6\,3s^2\,3p^1$
B) The second transition element	q) $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^{10}\,4s^2\,4p^6$
C) The fourth noble gas element	r) $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,3d^2\,4s^2$
D) The second halogen element	s) $1s^2\,2s^2\,2p^6\,3s^2\,3p^6\,4s^1$

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4. Match Column-I(Elements) with Column - II(configuration of elements, and select the correct answer using the codes given below:

Column-I	Column-II
A) Increasing atomic size	p) Cl < O < F
B) Decreasing atomic radius	q) Li < Be < B
C) Increasing electronegativity	r) Si < Al < Mg
D) Increasing nuclear charge	s) N > O > F

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5. Match Column-I(Elements) with Column - II(configuration of elements, and select the correct answer using the codes given below:

Column-I	Column-II
A) Most electronegative element	p) Chlorine
B) The element having most negative electron gain enthalpy	q) Hydrogen
C) Most abundant element in the universe	r) Nitrogen
D) Most abundant gas in atmosphere	s) Fluorine

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Questions Level Iii Statement Type

1. Assertion: The lattice energies depend upon the reciprocals of the distance between the ions $\frac{1}{r_0}$,

Reason : For the given positive ion, the lattice energy increases as the size of the anion increases.

A. Statement 1 is True, statement 2 is True, Statement 2 is 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 i is False, Statement 2 is True.

Answer: C

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2. Assertion: Na^+ and Al^{3+} are isoelectronic but the magnitude of the ionic radius of Al^{3+} is less than that of Na^+

Reason: The magnitude of effective nuclear charge of the outer shell electrons in Al^{3+} is greater than in Na^+

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 2

C. Statement 1 is True, Statement 2 is False.

D. Statement i is False, Statement 2 is True.

Answer: A

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3. Statement 1 : Ionization enthalpy is the energy released to remove an electron from an isolated gaseous atom in its ground state.

Statement 2 : All elements have a tendency to lose the electron to attain stable configuration.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 3

C. Statement 1 is True, Statement 2 is False.

D. Statement i is False, Statement 2 is True.

Answer: D

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4. Assertion: Na_2O is basic oxide whereas Cl_2O_7 is acidic oxide.

Reason: Elements on extreme left of the periodic table from basic oxides whereas elements on extreme right form acidic oxides.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 4

C. Statement 1 is True, Statement 2 is False.

D. Statement i is False, Statement 2 is True.

Answer: B

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5. Assertion : The ionic radius follows the order $I^- < I < I^+$.

Reason : Smaller the value of Z/e, the larger the size of the species.

A. Statement 1 is True, statement 2 is True, Statement 2 is Correct explanation for Statement 1.

B. Statement 1 is True, Statement 2 is True, Statement 2 is NOT a correct explanation for Statement 5

C. Statement 1 is True, Statement 2 is False.

D. Statement i is False, Statement 2 is True.

Answer: D

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Questions Level Iii Linked Comprehension Type

1. The heats of formation $\left(\Delta H_f^{\circ}\right)$ of the oxides of the third period, sodium to chlorine, are in kJ mol^{-1}

Na_2O	MgO	Al_2O_3	SiO_2	P_4O_{10}	SO_3	Cl_2O_7
-416	-602	-1676	-911	-2984	-395	+250

Based on these data, answer the following questions

Which oxide has maximum negative heat of formation per oxygen atom?

A. P_4O_{10}

B. Al_2O_3

C. Na_2O

D. MgO

Answer: D

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2. The heats of formation $\left(\Delta H_f^{\circ}\right)$ of the oxides of the third period, sodium to chlorine, are in kJ mol^{-1}

Na_2O	MgO	Al_2O_3	SiO_2	P_4O_{10}	SO_3	Cl_2O_7
-416	-602	-1676	-911	-2984	-395	+250

Based on these data, answer the following questions

Most stable and least stable oxides are

A. P_4O_{10}, Cl_2O_7

B. Na_2O, Cl_2O_7

C. MgO, Cl_2O_7

D. Cl_2O_7, MgO

Answer: C

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3. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452	7735
E	2080	4077	6279

Which the element is a noble gas?

A. A

B. E

C. C

D. D

Answer: B

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4. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452	7735
E	2080	4077	6279

Which the element form stable unipositive ion?

A. A

B. B

C. C

D. D

Answer: B

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5. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452	7735
E	2080	4077	6279

The element whose most stable oxidation state is +2, is:

A. A

B. B

C. C

D. D

Answer: C

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6. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452	7735
E	2080	4077	6279

Most reactive metal is :

A. A

B. B

C. C

D. D

Answer: B

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7. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452	7735
E	2080	4077	6279

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

A. BF_3, B_2O_3

B. BF, B_2O

C. BF_2, BO

D. none of these

Answer: B

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8. Ionization energies of five elements, are given below:

Element	IE kJ/mol^{-1}		
	I	II	III
A	1256	2298	3976
B	414	3072	4606
C	493	4566	6915
D	737	1452 .	7735
E	2080	4077	6279

Which of the following pair represents elements of same group?

A. B,C

B. A,B

C. A,D

D. B,D

Answer: A

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9. Identify the least stable ion amongst the following:

A. Li^-

B. Be^-

C. B^-

D. C^-

Answer: B

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10. The first ionization energy of Na, Mg, Al and Si are in the order of:

A. $Na < Al < Mg < Si$

B. $Na > Mg > Al > Si$

C. $Na < Mg < Al > Si$

D. $Na > Mg > Al < Si$

Answer: A

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11. Which one of the following statements is incorrect in relation to ionisation enthalpy?

A. Ionization enthalpy increases for removal of successive electrons.

B. The greatest increase in ionization enthalpy is experienced on removal of electron from core of noble gas configuration.

C. End of valence electrons is marked by a big jump in ionization enthalpy.

D. Removal of electron from orbitals bearing lower n value is easier than from orbital having higher n value.

Answer: D

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12. Considering the elements F, Cl, O and S, the correct order of their electron affinity values is:

A. $F > Cl > O > S$

B. $F > O > Cl > S$

C. $Cl > F > S > O$

D. $O > F > S > Cl$

Answer: C

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