CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

PERIODIC CLASSIFICATION

Problems

1. What is called 'a chemical family'?

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2. What would be the group and period of the element with atomic number 80 ?

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3. How would you justify the presence of 18 elements in the 5th period of the periodic table.

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4. The element Z=117 has not been discovered. In which group would you place these element and

also give the electronic configuration.

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5. What would be the IUPAC name and symbol for the element with atomic number 120 ?

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6. Which is the longest group of the long form of the periodic table? How many elements are present in it?

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7. Why there is a break in the thirdperiod elements of the long form of the periodic table?

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8. Elements of group 10 is called pseudo-inert group, Why?

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9. Is there any liquid transition element? If so name it.

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10. Mention the metallic nature of elements in the carbon family.

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11. Classify the element bromine, in different methods.

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12. Compare the radii of H atom, H^+ ion and H^- ion.

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13. Which is a bigger ion among Na^+, F^-, O^{2-} and Mg^{2+}? Why?

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14. Zr is in 4d-series, Hf is in 5d-series. But their atomic radii is same. Why?

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15. The successive ionisation enthalpies of an element M are $5.98, 18.82, 28.44, 119.96, 153.77, \ldots\ldots eV$ atom What is the formula of chloride of M?

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16. The ionisation enthalpy of sodium is 5.14 eV. How many k cal of energy is required to ionise all atoms present in one gram of gaseous Na atoms?

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17. Why I_1 of Al is less than that of Mg?

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18. Write the descending order of electron affinity values of chalcogens.

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19. Among the reactions,

$F_{2(g)} + 2e^- \rightarrow 2F^-_{(g)}$ and

$Cl_{2(g)} + 2e^- \rightarrow 2Cl^-_{(g)}$ which is more feasible ? Give the reason.

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20. How is the nature of covalent bond between two atoms predicted ?

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21. Bond energies of H_2, Cl_2 and HCl are respectively $104, 58 \text{ and } 103 \text{ k cal mol}^{-1}$. Calculate Pauling's electronegativity of chlorine.

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22. Are the oxidation state and covalency of Al in $\left[AICI(H_2O)_5\right]^{2+}$ same?

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23. Using the periodic table , predict the formula of compound formed between element x group 13 and another element Y of group 16 .

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24. What is the valency and oxidation number of nitrogen in nitrogen pentoxide ?

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25. Write the minimum and maximum valencies of elements.

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26. How does the electropositivity vary down the group of halogens?

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27. Is hydrogen electropositive?

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28. Predict the metallic nature of the elements with atomic numbers 34, 35, 36 and 37.

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29. In aqueous solutions lithium is best reductant. Why?

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30. Considering the elements B,C,N,F and Si, the correct order of their non-metalllic character is

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31. Name the elements of the second period

(a) which forms a strongly basic oxide and (b)

which forms a strongly acidic oxide.

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32. Considering the elements B,Al, Mg and K, the correct order of their metallic character is

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33. List out the properties of elements which increase in a group from top to bottom as well as in a period from left to right.

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34. Considering the elements F, CI, O and N, the correct order of their chemical reactivity in terms of oxidizing property is

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35. Compare the oxidation ability of sulphur and chlorine.

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36. Oxygen is divalent in its compounds, but sulphur is even hexavalent. Why?

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37. Compar the acidic nature :

(a) H_2O and H_2O_2 and (b) Co and CO_2

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Subjective Exercise 1 Long Answer Questions

1. Discuss in detail about the classification of elements by Mendeleeff,

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2. From a study of the properties of the neighbouring elements, the properties of an unknown element can be predicted. Justify with an example.

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3. What are the limitations of Mendeleeff's periodic law ? Give any four of them.

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4. Define the mordern periodic law . Discuss the construction of the long form of the periodic table .

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5. The number of periods present in the long form of the periodic table

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6. Discuss the relation between the number of electron filled into the sub energy levels of an orbit and the maximum number of elements present in a period.

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7. Write an essay on the division of elements into s, p, d and f - blocks.

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8. Relate the electronic configurations of elements and their properties in the classification of the elements.

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9. Explain how the elements are classified into s,p,d, and f - block elements in the periodic table and give the advantages of this kind of classification

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10. Classify the elements into metals, non metals and metalloids.

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Subjective Exercise 1 Short Answer Questions

1. What is the need to classify elements ?

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2. Atomic number is equal to the

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3. Define Modern periodic law? Why many groups and periods are present in the long form

of the periodic table?

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4. Why f-block elements are placed below the main table.

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5. Mention the number of elements present in each of the periods in the long form of table?

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6. Write the general electronic configuration of transition elements.

7. Write a short notes on representative elements.

8. Give any five of the characteristic properties of transition elements.

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9. Justify the position of f-block elements in the periodic table.

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Subjective Exercise 1 Very Short Answer Questions

1. What are representative elements? Give their valence shell configuration

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2. Justify the position of f-block elements in the periodic table.

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3. An element X' has atomic number 34. Give its position in the periodic table.

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4. Write the anomalous electronic configuration of elements.

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5. Write the electronic configuration of chromium. What is its importance?

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6. Write the IUPAC nomenclature of the elements with atomic number greater than 103.

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7. What are representative elements? Give their valence shell configuration

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8. What are "rare earths" and "trans-uranic" elements?

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9. Name the catalysts used in Haber's synthesis of ammonia and hydrogenation of oils.

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10. What are Inert gases ? Name them.

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11. What is the magentic moment of Ferrous & Ferric ions.

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12. Which element was misplaced in p-block ?

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Subjective Exercise 2 Long Answer Questions

1. Discuss the following trends in halogens.

(a) atomic radius

(b) ionisation potential

(c) electron affinity and

(d) electronegativity.

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2. Write a note on the following

a) Crystal radius

b) Van der Waals radius and

c) Covalent radius of elements

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3. Define first and second ionization potentials. greater than the first ionization potential? Discuss three factors affecting IP values of elements

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4. Write the relation between the magnitude of screening effect and the ionization enthalpy

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5. Ionization enthalpy of elements is a periodic property. Explain ?

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Subjective Exercise 2 Short Answer Questions

1. As atomic number increases, atomic size increases in a group and decreases along a period . Give reasons for this behaviour.

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2. What are atomic and ionic radii? How do they vary in a period and in a group

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3. How does the atomic radius vary in a period of elements?

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4. The atomic radii of transition elements decreases slowly as the atomic number increases in a period. Account for it

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5. Among the groups of transition elements, the ionic radius increases with an increases in atomic number. Justify.

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6. What are transition elements? Give any two special properties of these elements.

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7. Arrange the elements B, N, Be and in the increasing order of their ionization potentials.

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8. Which element of the III period has highest IE ? Explain the variation of IE in this period.

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9. Write short note on electron affinity.

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10. As atomic number increases, atomic size increases in a group and decreases along a period . Give reasons for this behaviour.

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11. What is lanthanide contraction? What are its consequences?

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12. Both ionisation enthalpy and electron gain enthalpy have some irregular trends in the third period. Explain.

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13. What is lanthanide contraction? Give one of its consequences.

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Subjective Exercise 2 Very Short Answer Questions

1. Mention a few properties that show periodicity

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2. The atomic radius of an inert gas atom appears to be the highest amongst the p-block elements. Why?

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3. Write the relation between the magnitude of screening effect and the ionization enthalpy

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4. What is meant by penetration of orbitals. Write the sequence of the penetrations of the atomic orbitals.

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5. Define cationic radius and anionic radius. How radius changes upon ion formation?

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6. Which is a bigger ion among Na^+, F^-, O^{2-} and Mg^{2+}? Why?

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7. What is screening effect? How is it related to IE?

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8. 'B' has a lesser ionisation potential than 'Be'. Why?

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9. 'N' has higher ionisation potential than 'O'. Why?

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10. Define first and second ionization potentials. greater than the first ionization potential? Discuss three factors affecting IP values of elements

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11. Which of the following order is correct for the size of Fe^{3+}, Fe and Fe^{2+} ?

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12. I_1 and I_2 of an element are 700 and 1200 $kJmol^{-1}$ If $1000kJmol^{-1}$ energy is supplied to the gaseous atomic element and the ionisations occur in succession, find the ratio of monovalent and divalent cations.

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13. Electron affinity of Fluorine is less than that of Chlorine because

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14. The energy required for the following process is $1.96 \times 10^4 kJmol^{-1}$

$Li_g \rightarrow 3e^- + Li^{3+}_{(g)}$

If the first ionisation energy of lithium is

$520 kJ mol^{-1}$, what is the second ionisation energy?

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15. Ionisation enthalpy of chlorine is $13\ \mathrm{eV\ atom^{-1}}$ Electron gain enthalpy of chlorine is $-348 \mathrm{kJ mol^{-1}}$ and if this energy is used for the conversion of $Cl(g) \rightarrow Cl^{+}(g)$, how many ions can be obtained?

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Subjective Exercise 3 Long Answer Questions

1. What is electronegativity? How is this useful in understanding the nature of elements?

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2. Write the trends in atomic radius, ionisation potential and metallic nature of group VIA elements.

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Subjective Exercise 3 Short Answer Questions

1. Classify the elements on the basis of their oxides.

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2. Write the trends in atomic radius, metallic nature and ionisation potential of group VA elements.

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3. What is electropositive nature ? Explain its variation in a group and along a period.

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4. What is valency? How is it related to the reference elements?

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5. Inert pair effect is exhibited by

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6. What is diagonal relation? Give one pair of elements, that have this relation.

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7. What elements show diagonal relationship? Give an example

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8. How does the nature of oxides vary in the third period?

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9. Mention the most electronegative element in the periodic table. What is the electronegativity value of fluorine ?

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Subjective Exercise 3 Very Short Answer Questions

1. How many types of oxides are noticed broadly in the periodic table for classification of elements ? What are they ?

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2. What is electronegativity? How is this useful in understanding the nature of elements?

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3. What is the valency possible to Arsenic with respect to oxygen and hydrogen?

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4. What is an amphoteric oxide? Give the formula of an amphoteric oxide formed by an element of group-13.

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5. Name the most electronegative element. Is it also having the highest electron gain enthalpy? or Why not?

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6. What elements show diagonal relationship? Give an example

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7. How does the nature change from Na_2O to CI_2O_7 in the period ?

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8. ZnO is amphoteric. Write two supporting equality.

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9. Define electronegativity of an element on Mulliken scale.

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10. Define first and second ionization potentials. greater than the first ionization potential? Discuss three factors affecting IP values of elements

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11. Bond energies of H_2, F_2 and HF are respec tively 104.2, 36.6 and $134.6 kcal \text{mol}^{-1}$. If the

electronegativity value of hydrogen is 2.1, calculate the electro-negativity value of fluorine.

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Objective Exercise 1 Introductions

1. The total number of gaseous elements are

A. 5

B. 11

C. 12

D. 15

Answer: B

2. Which of the following is Dobereiner triad

A. Li, Na, K

B. Fe, Co, Ni

C. Ru, Rh, Pd

D. Os, Ir, Pt

Answer: A

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3. Number of short periods in the long form of periodic table

A. 1

B. 2

C. 4

D. 6

Answer: A

4. Considering the chemical properties, atomic weight of the element 'Be' was corrected based on

A. Valency

B. Configuration

C. Density

D. Atomic volume

Answer: A

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5. Eka silicon is now known as

A. Scandium

B. Gallium

C. Germanium

D. Boron

Answer: C

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6. The element 'Sc' is known long back as

A. eka-aluminium

B. eka-boron

C. eka-silicon

D. eka-mercury

Answer: B

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7. (A): Modern periodic table is called Bohr's periodic table.

(R) : Modern periodic table is the graphical representation of Aufbau priniciple

A. Both (A) and (R) are true and (R) is the proper explanation of (A)

B. Both (A) and (R) are true but (R) is not the proper explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: B

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8. Anamolous pair among the following are

A. Boron - Silicon

B. Beryllium - Indium

C. Aluminium - Gallium

D. Cobalt - Nickel Long form of periodic table

Answer: D

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Objective Exercise 1 Long Form Of Periodic Table

1. The basis of modern periodic law is

A. atomic number

B. atomic size

C. atomic volume

D. atomic mass

Answer: A

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2. The number ofelements present in 2nd, 3rd, 4th and 5th IJeriods of modern periodic table respectively are

A. 2, 8, 8 & 18

B. 8, 8, 18 & 32

C. 8, 8, 18 & 18

D. 8, 18, 18 & 32

Answer: C

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3. Which of the following pair of elements are from the same group of the periodic table

A. Mg, Cs

B. Mg, Sr

C. Mg, Cl

D. Na, Cl

Answer: B

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4. Elements of a vertical group have

A. Same atomic number

B. Same electronic configuration

C. Same number of valency electrons

D. Same number of core electrons

Answer: C

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5. The general electronic configuration of elements of carbon family

A. ns^2np^4

B. ns^2np^3

C. ns^2np^1

D. ns^2np^2

Answer: D

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6. Outer shell 'octet' configuration is observed for the elements of the group

A. 2

B. 8

C. 18

D. 32

Answer: C

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7. The starting element of fifth period is

A. K

B. Rb

C. Kr

D. Xe

Answer: B

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8. Element with atomic number 15 and mass number 31 is present in

A. group 5 and period 4

B. group 5 and period 3

C. group 15 and period 3

D. group 15 and period 4

Answer: C

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9. In the periodic table, the elements are arranged in the periods following the

A. Hund's rule of maximum multiplicity

B. Pauli's exclusion principle

C. Aufbau principle

D. Both (1) and (2)

Answer: C

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10. Which of the following pairs of atomic numbers represents elements belonging to the same group?

A. 11, 20

B. 12, 30

C. 13, 31

D. 14, 33

Answer: C

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11. As per the modern periodic law, the physical and chemical properties of elements are periodic functions of their

A. atomic number

B. electronic configuration

C. atomic weight

D. atomic size

Answer: B

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12. An element with atomic number 20 will be placed in which period of the periodic table?

A. 4

B. 3

C. 2

D. 1

Answer: A

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13. If the atomic number of an element is 33, it will be placed in the periodic table in the

A. First group

B. Third group

C. Fifth group

D. Seventh group

Answer: C

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14. The number of periods present in the long form of the periodic table

A. 6

B. 7

C. 8

D. 18

Answer: B

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15. The electronic configuration of group III elements is

A. ns^2np^3

B. ns^2np^5

C. ns^2np^1

D. ns^2np^2

Answer: C

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16. The total number of gaseous elements are

A. 8

B. 9

C. 10

D. 11

Answer: D

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

A. Decreasing charges in the nucleus

B. Increasing charges in the nucleus

C. Constant charges in the nucleus

D. Equal charges in the nucleus

Answer: B

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Objective Exercise 1 Block And Types Of Elements

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

A. s

B. p

C. d

D. f

Answer: C

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2. Which of the following atomic number is named as Ununtrium.

A. 103

B. 104

C. 110

D. 113

Answer: D

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3. The IUPAC name of $_{104}Rf$ is

A. Unnil hexium

B. Unnil quadrium

C. Unun quadrium

D. Unun pentium

Answer: B

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4. Which of the following have the same number of electrons in outermost shell?

A. Elements with atomic numbers 30, 48, 80

B. Elements with atomic numbers 14, 15, 16

C. Elements with atomic numbers 20, 30, 50

D. Elements with atomic numbers 10, 18, 26

Answer: A

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5. Identify the element that has the following electronic configuration

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

A. Ba

B. At

C. Ce

D. Pr

Answer: C

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6. Electronic configuration of an element is $1s^2\ 2s^2 2p^6 3s^2 3p^6 3d^5 4s^1$. It belongs to

A. s-block

B. p-block

C. f-block

D. d-block

Answer: D

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7. Configuration of a reactive metal

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

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

C. $4s^2 3d^{10}$

D. $5s^1$

Answer: D

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8. Select from the following lists, the elemens belonging to same group

A. Z = 12, 38, 4, 88

B. Z = 9, 16, 3, 35

C. Z = 5, 11, 27, 19

D. Z = 24, 47, 42, 55

Answer: A

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9. Metalloid elements are placed in

A. S - Block

B. p - Block

C. d - Block

D. f - Block

Answer: B

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10. Rare earths are generally

A. Actinides.

B. f-block elements

C. Inner transition elements

D. Lanthanides

Answer: D

11. Lanthanum belongs to

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

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12. In the periodic table transition elements begin with

A. Scandium

B. Zinc

C. Copper

D. Mercury

Answer: A

13. Inert gas element which has a different valence shell configuration

A. Xe

B. Ne

C. Kr

D. He

Answer: D

14. Atomic numbers of actinides are

A. 57 to 71

B. 80 to 103

C. 58 to 71

D. 90 to 103

Answer: D

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15. Most of the non-metals are present in the long form of the periodic table in

A. p-block

B. f-block

C. d-block

D. s-block

Answer: A

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16. Metal used as catalyst in the hydrogenation of vegetable oils

A. Iron

B. Molybdenum

C. Nickel

D. Sodium

Answer: C

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17. The 4 F level is successively filled up in

A. Rare earths

B. Rare gases

C. Transition metals

D. Alkaline earth metals

Answer: A

18. The role of 'Molybdenum' in Uaber's synthesis is

A. A positive catalyst

B. A negative catalyst

C. Poison for catalyst

D. Promoter for catalyst

Answer: D

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19. The period in which s-block, p-block and d-block elements are present

A. period 1

B. period 6

C. period 7

D. period 3

Answer: B

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20. Elements of p-block are

A. Only non-metals

B. Only metalloids

C. Metalloids and non-metals

D. Metalloids, non-metals and metals

Answer: D

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21. The following ion is colourless in aqueous solution ?

A. Ca^{2+}

B. Sc^{3+}

C. Zn^{2+}

D. all the above

Answer: D

22. Which of the following electronic configuration corresponds to an inert gas ?

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

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

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

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

Answer: B

23. The rare gas that is most abundant in the atmosphere is

A. He

B. Ne

C. Ar

D. Kr

Answer: C

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24. In lanthanides, the differentiating electron enters into

A. d-subshell

B. f-subshell

C. p-subshell

D. s-subshell

Answer: B

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25. Which is not a transition metal?

A. Ag

B. Pb

C. Cr

D. Pt

Answer: B

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26. (A): Zinc is not considered as a transition element

(R): Zn or Zn^{+2} does not contain unpaired d-electon

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A

C. A is true and R is false

D. R is true and A is false

Answer: A

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27. The general electronic configuration $(n-1)d^3ns^2$? indicates that the particular element belong to the group

A. VB

B. VA

C. IVB

D. IIB

Answer: A

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28. Which one of the following pairs of ions have the same electronic configuration

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

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

C. Fe^{3+}, CO^{3+}

D. Sc^{3+}, Cr^{3+}

Answer: B

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29. The electronic configuration $1s^2 2s^6 2p^6 3s^2 3p^4$ represents

A. Oxygen

B. Magnesium

C. Calcium

D. Sulphur

Answer: D

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30. What is wrong about transition metals?

A. They are diamagnetic

B. They are paramagnetic

C. They form complexes

D. They show variable oxidation state

Answer: A

31. Which of the following is a rare earth element?

A. Cadmium

B. Californium

C. Cerium

D. Cesium

Answer: C

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32. Variable valency is exhibited by

A. Normal elements

B. Metallic elements

C. Transitional elements

D. Non-metallic elements

Answer: C

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33. Which one of the following is correct about stability of the given ions

A. $Pb^{2+} > Pb^{4+}$

B. $Pb^{4+} > Pb^{2+}$

C. $Si^{2+} > Si^{4+}$

D. $Ge^{4+} > Ge^{2+}$

Answer: A

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34. The transition element among the following is

A. Cu

B. Sn

C. Pb

D. Zn

Answer: A

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35. In the sixth period, the orbitals being filled with electrons are

A. 5ss, 5p, 5d

B. 6s, 6p , 6d, 6f

C. 6s, 5f , 6d, 6p

D. 6s, 4f, 5d, 6p

Answer: D

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36. The general electronic configuration of d-block elements is

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

B. $ns^2(n-1)d^1(n-2)f^{1-14}$

C. $ns^{1-2}(n-1)d^{1-9}$

D. $ns^{1-2}np^6(n-1)d^{1-10}$

Answer: A

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37. Identify the correctly matched set among the following

A. Scandium -d-block -representative element

B. Lanthanum d-block -inner transition element

C. Cerium - f- block -transition element

D. Actinium-d-block-transition element

Answer: D

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38. The representative elements get the nearest inert gas configuration

A. By losing electrons

B. By gaining electrons

C. By sharing electrons

D. By losing or gaining or sharing electrons

Answer: D

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39. In transition elements, the shells that are incompletely filled

A. Ultimate shell only

B. Penultimate shell only

C. Both ultimate & penultimate shells

D. Outermost three shells

Answer: C

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40. The characteristic properties of transition elements are due to

A. Unpaired electron in d-subshell

B. d-orbital have five fold degeneracy

C. Presence of 2 nodal planes for d-orbital

D. Because they belong to d-block

Answer: A

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Objective Exercise 1 Atomic And Ionic Radius

1. (A) : Mg^{2+} and Al^{3+} are isolectronic but the magnitude of ionic radius of Al^{3+} is less than that in Mg^{2+}.

(R) : The effective nuclear charge on the outermost electrons in Al^{3+} is greater than that in Mg^{2+}.

A. Both A and R are correct. R is the correct explanation of A.

B. Both A and R are correct, R is not the correct explanation of A.

C. A is true and R is false

D. A is false , but R true

Answer: A

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2. The correct order of Vander Waals radius of F, Cl and Br is :

A. F gt Br gt Cl

B. Br gt Cl gt F

C. F gt Cl gt Br

D. Br gt F gt Cl

Answer: B

3. The correct arrangenment of O, P and N in order of increasing radii is

A. O < N < P

B. P lt O lt N

C. O lt P lt N

D. N lt O lt P

Answer: A

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4. Atomic radius is measured by

A. Mulliken oil drop method

B. Rutherford's a ray scattering experiment

C. X-ray diffraction tenchnique

D. Electric discharge tube experiment

Answer: C

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5. Atomic radius depends upon

(i) Number of bonds formed by the atom

(ii) Nature of the bonding

(iii) Oxidation state of the atom

A. A,B

B. B,C

C. A,C

D. A,B,C

Answer: D

6. Covalent bond length of chlorine molecule is 1.98Å. Then covalent radius of chlorine is

A. 1.98 Å

B. 1.7 Å

C. 2.05 Å

D. 0.99 Å

Answer: D

7. Van der waal's radius is measured for

A. Molecular substances in gaseous state only

B. Molecular substances in solid state only

C. Molecular substances in liquid state only

D. Molecular substances in any state

Answer: B

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8. If the atomic radius of non-metal bromine is 1.14 Å, its covalent radius is

A. 1.14 Å

B. 1.12Å

C. 1.16Å

D. 0.57Å

Answer: A

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9. The covalent and van der Waals radii of chlorine respectively are

A. $1.80Å \& 0.99Å$

B. $0.99Å \& 1.80Å$

C. $1.80Å \& 1.80Å$

D. $0.99Å \& 0.99Å$

Answer: B

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10. In the isoelectronic species the ionic radii (A°) of N^{3-}, O^{2-} and F^- are respectively given by

A. 1.36, 1.71, 1.40

B. 1.36, 1.40, 1.71

C. 1.71, 1.36, 1.40

D. 1.71, 1.40, 1.36

Answer: D

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11. Correct statement among the following is

A. Covalent radius is 40% more than Van der waals radius

B. Van der waals radius is less than covalent radius

C. Van der waal's radius is 40% more than covalent radius

D. Radii cannot be compared

Answer: C

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12. Very slight decrease in atomic radius occurs in a transition series when compared with that in representative series. This is due to

A. Shielding effect

B. Penetrating effect

C. Compton effect

D. Inert pair effect

Answer: A

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13. Separation of Lanthanides from their mixture is not easy because of

A. Shielding effect

B. Penetrating effect

C. Consequences of lanthanide contraction

D. Inert pair effect

Answer: C

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14. If the radius of Fe^{++} is $0.76A^{\circ}$, the radius of Fe^{+++} may be

A. 0.64Å

B. 0.76Å

C. 0.88Å

D. 1.80Å

Answer: A

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15. Among elements with the following electronic configurations, the one with the largest radius is

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

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

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

D. $1s^2 2s^2 2p^6 3s^2 3p^5$

Answer: A

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16. Largest ion among the following is

A. Na^{+}

B. O^{-2}

C. S^{-2}

D. Cl^{-}

Answer: C

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17. Which of the following has the largest atomic radius ?

A. Al

B. Si

C. Cl

D. Na

Answer: D

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18. Which of the following order is correct for the size of Fe^{3+}, Fe and Fe^{2+} ?

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

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

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

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

Answer: D

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19. Similarity in the radius of Zr and Hf is explained on the basis of

A. Lanthanide contraction

B. Inert pair effect

C. Same outershell configuration

D. Anomalous configuration

Answer: A

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20. Metallic radius of Ca is 200pm. Covalent radius of Ca is

A. 200 pm

B. 230 pm

C. 280 pm

D. 174pm

Answer: D

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

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

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

C. $I^+ > I^- > I$

D. $I^- > I > I^+$

Answer: D

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22. The correct sequence which shows decreasing order of the ionic radii of the elements is

A. $Na^+ > Mg^{2+} > Al^{3+} > O^{2-} > F^-$

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

C. $O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$

D. $Al^{3+} > Mg^{2+} > Na^+ > F^- > O^{2-}$

Answer: C

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23. The Lanthanide contraction relates to (AFMC)

A. Oxidaion states

B. Magnetic state

C. Atomic radii

D. Valence electrons

Answer: C

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24. In a group from top to bottom effective nuclear charge

A. increases

B. decreases

C. constant

D. can not be predicted

Answer: C

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25. Which of the following is not a periodic property ?

A. Valency

B. Speficifc heat

C. Ionisation portential

D. Atomic size

Answer: B

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26. Elements of the same vertical group of the periodic table have

A. same atomic size

B. Same electronic configuration

C. same number of electrons in outermost shell of their atoms

D. same number of atoms

Answer: C

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27. Which of the following ion has smaller size?

A. Cl^-

B. S^{2-}

C. Na^+

D. Ca^{2+}

Answer: D

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28. Which out of the following has the largest size ?

A. Rb^+

B. Mg^{2+}

C. Li^+

D. Na^+

Answer: A

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29. Which of the following statements concerning atomic size is correct?

A. Atoic size decreases down a group

B. Atomic size decreases along a period

C. Radius of cation is more than that of the atom

D. Radius of anion is less than that of the atom

Answer: B

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Objective Exercise 1 Ionisation Potential

1. How many ionisation energies can carbon have ? Electron configuration of carbon

in Ground state $1s^2 2s^2 2p_x^1 2p_y^1$

in Excited state $1s^2 2s^1 2p_x^1 2p_y^1 2p_z^1$

A. 1

B. 2

C. 4

D. 6

Answer: D

2. Why first ionisation potential of aluminium is less than that of magnesium?

A. Aluminium atom is very large when compared of Mg

B. Aluminium has a stable electronic configuration

C. Magnesium has a stable electronic configuration

D. The electrons affinity of Magnesium is positive (energy is absorbed)

Answer: C

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3. Electrons with the highest penetrating power are

A. p-electrons

B. s-electrons

C. d-electrons

D. f-electrons

Answer: B

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4. The elements that possess the lowest ionisation energy among the following

A. Oxygen

B. Fluorine

C. Sulphur

D. Nitrogen

Answer: C

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5. The species with largest ionisation potential

A. Li^+

B. Mg^+

C. Al^+

D. Ne

Answer: A

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6. The first ionisation potential is maximum for

A. Li

B. Na

C. K

D. H

Answer: D

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7. Second ioniation energy is higher than first ionisation energy for an element. This is because

A. Nuclear charge is high in cation

B. Size of cation is higher than neutral atom

C. Effective nuclear charge is more for cation

D. Bond energy changes with charge

Answer: C

8. Atoms of the following group possess the highest ionisaiton energies

A. IA

B. IIA

C. VA

D. Zero

Answer: D

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9. Atoms of the following group possess the lowest ionisation energies

A. IA

B. IIA

C. VA

D. Zero

Answer: A

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10. Configuration of the element with the highest ionisation energy is

A. $[Ne]3s^1$

B. $[Ne]3s^23p^3$

C. $[Ne]3d^{10}4s^24p^3$

D. $[Ne]3s^23p^4$

Answer: B

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11. When Lithium vapour is taken in a discharge tube and the potential difference between the electrodes is 5.4 ev, there is a sudden increase in the flow of current. The ionisation energy of Lithium is

A. 54 ev

B. $520kJmol^{-1}$

C. $54kJ\text{atom}^{-1}$

D. $5.4ev\text{atom}^{-1}$

Answer: D

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12. Which of the following transition 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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13. The first ionisation potential is maximum for

A. Lithium

B. Uranium

C. Iron

D. Hydrogen

Answer: D

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14. The lowest first ionization energy would be associated with which of the following configurations.

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

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

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

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

Answer: A

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15. The maximum tendency to form tripositive ion is for the element with the electronic configuration

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

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

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

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

Answer: B

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16. As one moves along a given row in the periodic table, ionisation energy

A. Remains same

B. Increasing from left to right

C. First increases and then decreases

D. Decreases from lest to right

Answer: B

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17. First four ionisation energy values of an element are 191, 578, 872 and 5972 K.Cals The number of valence electrons in the element is

A. 4

B. 3

C. 1

D. 2

Answer: B

18. Ionisation potential values of Li, Be and B are respectively in kJ mol^{-1}

A. 801, 899, 520

B. 520 , 801, 899

C. 899, 801, 520

D. 520, 899, 801

Answer: D

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19. Elements X, Y and Z have atomic numbers 19, 37 and 55 respectively. Which of the following statements is true about them?

A. Their ionization potential would increases with increasing atomic number

B. 'Y' would have an ionisation potential between those of X and Z.

C. Z would have the highest ionizaiton potential

D. Y would have the highest ionizaiton potential

Answer: B

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20. Which of the following process refers to ionisation potential ?

A. $X_{(s)} \rightarrow X^{+}_{(g)} + e^{-}$

B. $X_{(g)} + aq \rightarrow X^{+}_{(aq)} + e^{-}$

C. $X_{(g)} \rightarrow X^{+}_{(g)} + e^{-}$

D. $X_{(g)} + e^{-} \rightarrow X^{-}_{(g)}$

Answer: C

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21. The atomic numbers of vanadium (V), Chromium (Cr), maganese (Mn) and iron (Fe) are respectively 23, 24, 25 and 26. Which one of these may be expected to have the highest second ionization enthalpy?

A. Cr

B. Mn

C. Fe

D. V

Answer: A

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22. Which of the following ionization energy values for Calcium show a sudden increase ?

A. Third

B. Second

C. First

D. Fourth

Answer: A

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23. When the screening effect increases, ionisation energy

A. Decreases

B. Increases

C. First increases and then decreases

D. Remains constant

Answer: A

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24. With an increase in the extent of penetration of valence electrons, ionisation energy

A. Decreases gradually

B. Increases gradually

C. Remains constant

D. Both are not related

Answer: B

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25. The group of elements with highest second ionisation energy is

A. II A group

B. Zero group

C. VII A group

D. IA group

Answer: D

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Objective Exercise 1 Electron Affinity

1. Electron affinity is

A. Energy required to take out an electron from an isolated gaseous atom

B. The tendency of an atom to attract an electron towards itself

C. Energy absorbed when an electron is added to an isolated atom in gaseous state

D. Energy released when an electron is added to an isolated atom in the gaseous state.

Answer: D

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2. Electron affinity is measured in

A. No units

B. $\mathrm{kcal\ mol^{-1}}$

C. $\mathrm{kJ\ mol^{-1}}$

D. Both (2) and (3)

Answer: D

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3. The element with highest electron affinity is

A. Fluorine

B. Cesium

C. Helium

D. Chlorine

Answer: D

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4. Which of the following is true about the element with atomic number 18 ?

A. It has a very low ionisation potential

B. It has a very high electron affinity

C. Its molecules are monoatomic

D. Its electroneagtivity is very high

Answer: C

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5. Ionisation of energy of F^- 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

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6. The electron affinity values of elements A,B, C and D are respectively -135, -60, -200 and -348 kJ mol^(-1)`. The outer electronic configuration of elecment B is

A. $3s^2 3p^5$

B. $3s^2 3p^4$

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

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

Answer: C

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7. Which of the following is an endothermic process?

A. First electron affinity of chlorine

B. Second electron affinity of oxygen

C. Formation of $NaCl$ from gaseous ions

D. Hydration of $MgCl_2$

Answer: B

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8. In a period from left to right, electron affinity

A. increases

B. decreases

C. Remains constant

D. First increases and then decreases

Answer: A

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9. For the process

$X_{(g)} + e^- \rightarrow X^-_{(g)}, \Delta H = x$ and

$X_g^- \rightarrow X_g + e^-, \Delta H = y$

Select correct alternat :

A. ionisation energy of $X^-_{(g)}$ is y

B. electron affinity of $X_{(g)}$ is x

C. electron affinity of $X_{(g)}$ is -y

D. all are correct statements.

Answer: D

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10. Configuration that shows the highest energy released when an electron is added to the atom

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

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

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

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

Answer: C

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11. Electron affinity of Fluorine is less than that of Chlorine because

A. Electronegativity of Fluorine is more

B. 2p sub shell of F is smaller

C. Chlorine is a stronger oxidant

D. Bond dissociation energy of F_2 is less

Answer: B

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12. Among chalcogens electron affinity is highest for

A. O

B. S

C. Se

D. Te

Answer: B

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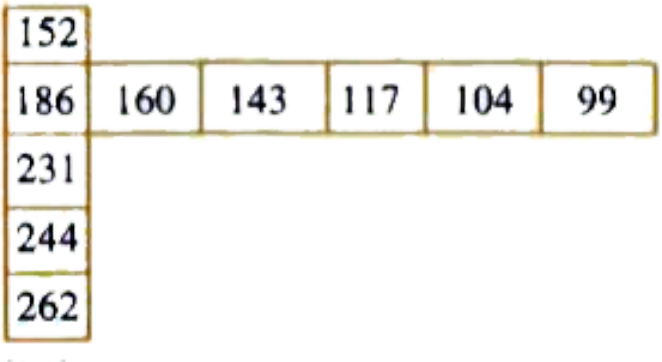
13. Few values are given in the table in the direction from left to right and top to bottom predit the property which could be depicted in

the table.



A. atomic number

B. Ionisation enthalpy

C. Atomic radius

D. Electron gain enthalpy

Answer: C

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Objective Exercise 1 Electronegativity

1. Pauling's electronegativity is based on

A. Electron affinity

B. Ionisatin potential

C. Both IP and EA

D. Bond energies

Answer: D

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2. The electronegativity value of chlorine and bromine are respectively 3 and 2.8 . Formula of a binary compound is best represented as

A. $BrCl$

B. $ClBr_3$

C. $ClBr$

D. $ClBr_5$

Answer: A

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3. The electronegativity of the following elements increase in the order

A. S lt P lt N lt O

B. P lt S lt N lt O

C. N lt O lt P lt S

D. N lt P lt S lt O

Answer: B

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4. Which of the following element has less electronegativity

A. O

B. S

C. F

D. N

Answer: B

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5. Pauling's electronegativity values for elements are useful in predicting

A. Polarity of the molecules

B. Positon in the E.M.F. series

C. Coordination numbers

D. Dipole moments

Answer: A

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6. Correct relation among X_A, X_B, and Δ, where X_A, and X_B are the electronegativities of elements A and B.

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

B. $\sqrt{X_A - X_B} = 0.208 \times Detla$

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

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

Answer: C

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7. Reference element for Pauling's electronegativity is

A. H

B. C

C. Cl

D. He

Answer: A

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8. What is the correct order of electronegativity

A. $M^{+1} < M^{+2} < M^{+3} < M^{+4}$

B. $M^{+1} > M^{+2} > M^{+3} > M^{+4}$

C. $M^{+1} < M^{+2} > M^{+3} < M^{+4}$

D. $M^{+4} < M^{+2} < M^{+3} < M^{+1}$

Answer: A

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9. Among the following , the pair of elements having same electronegativity values are

A) (H,P) B) (Be , Al)

C) (N,Cl) D) (C,P)

A. A,B,C

B. B,C,D

C. A,C,D

D. A,B,C,D

Answer: C

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10. In a period electronegativity is highest for

A. Chalcogen

B. Halogen

C. Inert gas

D. Alkali metal

Answer: B

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11. The values that are useful in writing chemical formulae and in calculation of oxidation states are

A. Ionisation potential

B. Electron affinity

C. Electronegativity

D. Matallic character

Answer: C

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12. Elements with high electronegativity are generally

A. Good reductants

B. Hard solids

C. Good oxidants

D. Soft solids

Answer: C

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13. Pauling's electronegativity values for elements are useful in predicting

A. Polarity of bonds in molecules

B. Position of elements in electromotive series

C. Coordination numbers

D. Dipole moment of various molecules

Answer: A

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14. In the periodic table, the maximum chemical reactivity is at the extreme left (alkali metals) and extreams right (halongens). Which properties of these two groups are responsible for this ?

A. Least ionisaiton enthalpy on the left and highest negative electron gain enthalpy on the right

B. Non-metallic character on the left and meatallic character on the right

C. High atomic radii on the left and small atomic radii on the right

D. Highest electronegativity on the right

Answer: A

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15. The electronegativites of C, N, Si and P are in the order of

A. P lt Si lt C lt N

B. Si lt P lt C lt N

C. P lt Si lt N lt C

D. Si lt P lt N lt C

Answer: B

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Objective Exercise 1 Valency And Oxidation States

1. The stable oxidation state of Thallium, a IIIA group element is

A. $+1$

B. $+3$

C. -3

D. $+5$

Answer: A

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2. All the following elements show both positive and negative oxidation states, except

A. N

B. H

C. O

D. F

Answer: D

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3. The valence shell of transition element consists of

A. nd orbitals

B. (n - 1)d - orbitals

C. ns np nd orbitals

D. (n-1)d ns np orbitals

Answer: B

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4. An element with electronic arrangement as 2, 8, 18, 1 will exhibit the following stable oxidation states

A. $+2 \& +4$

B. $+1 \& +2$

C. $+2$ only

D. $+1$ only

Answer: B

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5. Number of oxidation states that the most electronegative element can exhibit is its compounds with other elements

A. 9

B. 5

C. 4

D. 1

Answer: D

6. The compound of vanadium has magnetic moment of 1.73 BM. The vanadium chloride has the formula:

A. VCl_2

B. VCl_3

C. VCl_4

D. VCl_5

Answer: C

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7. The formula of a metallic carbonate is MCO_3.

The formula of that metallic perchlorate is

A. $MClO_4$

B. M_2ClO_4

C. M_3ClO_4

D. $M(ClO_4)_2$

Answer: D

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8. Maximum oxidation state (+8) is exhibited by

A. Co and Ni

B. Ru and Os

C. Cl and I

D. Te and I

Answer: B

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Objective Exercise 1 Metallic Nature And Nature Of Oxides

1. An elements has electronic configuration $1s^2 2s^2 2p^6 3s^1$ in its + 2 oxidation state. The formula of its sulphide is

A. M_3S_2

B. MS_2

C. MS_3

D. M_2S_3

Answer: D

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2. The tendency of an element to lose an electron is called

A. Electronegativity

B. Non-metllic character

C. Electronegativity character

D. Electron affinity

Answer: C

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3. The most electropositive element is

A. I

B. Mg

C. Cs

D. Li

Answer: C

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4. Basic nature of the oxides of a period from left to right

A. increases

B. decreases

C. Remains constant

D. First increases and then decreases

Answer: B

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5. Strongest reducing agent and strongest oxidising agent are respectively

A. Cs and Cl_2

B. Li and Cl_2

C. Cs and F_2

D. Cs and O_2

Answer: C

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6. Compound of an element A with an alkali metal gave a neutral solution in water. In the periodic table the element A belongs to

A. Second group

B. Third group

C. Fourth group

D. Seventh group

Answer: D

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7. Which of the following oxide is amphoteric ?

A. SnO_2

B. SiO_2

C. CO_2

D. CaO

Answer: A

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8. Which of the following element has the greatest tendency to lose electrons ?

A. Na, Cl, Al

B. Cu, Ag , Au

C. Be, F, N

D. F, Cl, Br

Answer: D

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9. Oxide that is most acidic

A. Cl_2O_7

B. SO_3

C. P_4O_{10}

D. N_2O_5

Answer: A

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10. Generally the nature of the non-metal oxides is

A. Basic

B. Acidic

C. Amphoteric

D. Neutral

Answer: B

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11. The outermost electronic configuration of most electropositive element is

A. ns^1

B. ns^2np^2

C. ns^2np^3

D. ns^2np^5

Answer: A

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12. Most acidic oxide in the periodic table is formed by an element in

A. 2^{nd} period , Group VI A

B. 4^{th} period, Group VII A

C. 3^{rd} period, VI A

D. 3^{rd} period, VII A

Answer: D

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13. Nature of Sb_4O_6 is

A. Acidic

B. Neutral

C. Basic

D. Amphoteric

Answer: D

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14. Which of the following metallic oxide exhibit amphoteric nature?

A. CaO

B. Al_2O_3

C. Na_2O

D. BaO

Answer: B

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Objective Exercise 1 Diagonal Relationship

1. Assertion: Be and Al have similar properties.

Reason : Cations of Be and Al have same polarising power

A. Both A and R are correct and R is the correct explanation of A

B. Both A and R are correct, R is not the correct explanation of A.

C. A is correct but R is false

D. A is false , but R correct

Answer: B

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2. Pair of ions with similar ionic radii

A. Li^+, Mg^{2+}

B. Li^+, Na^+

C. Mg^{2+}, Ca^{2+}

D. Mg^{2+}, K^+

Answer: A

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3. Which of the following pairs show diagonal relationship ?

A. B, Al

B. Li, Na

C. C, Si

D. B, Si

Answer: B

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4. Chemical similarity between B and Al is due to

A. Diagonal relationship

B. Both belong to same period

C. Similar outer electronic configuration

D. Inert pair effect

Answer: C

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5. Among the following pairs of elements, the pair that is different from others is

A. Lithium and Magnisium

B. Nitrogen and Phosphorus

C. Beryllium and Aluminium

D. Boron and Silicon

Answer: B

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6. Diagonal relationship is shown by

A. all elements with their diagonally opposite elements

B. all elements of 3rd and 4th periods

C. some of the elements of 2nd and 3rd period

D. elements of d-block

Answer: C

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Objective Exercise 2 Periodic Classification

1. The triad not present in Group VIII of Mendeleeff's table

A. Li , Na , K

B. Fe, Co, Ni

C. Ru, Rh, Pd

D. Os, Ir, Pt

Answer: A

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2. The atomic number of an element is 58. it blongs to

A. 6^{th} period , III A group

B. 7^{th} period, III A group

C. 6^{th} period , III B group

D. 7^{th} period, III B group

Answer: B

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3. In the periodic table, inversion of atomic weights took place in this pair

A. Argon - Potassium

B. Boron - Scandium

C. Hydrogen - Helium

D. Beryllium - Boron

Answer: A

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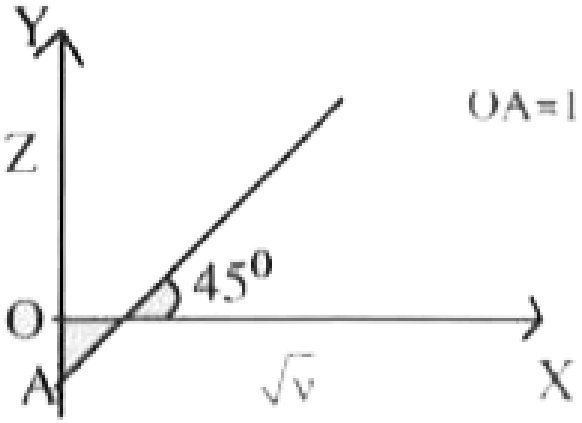
4. The frequency of the characterstic X ray of K_α line of metal target 'M' is 2500 cm^{-1} and the graph between $\sqrt{v}$ Vs 'z' is as follows, then atomic number of M is



A. 49

B. 50

C. 51

D. 25

Answer: C

5. The period that contains only gaseous elements is

A. 1

B. 2

C. 3

D. 4

Answer: A

6. Pair of elements with the following atomic numbers have the same chemical properties

A. 13 and 22

B. 3 and 11

C. 4 and 24

D. 2 and 1

Answer: B

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7. The sub-shells filled one by one for 4th period elements are

A. $3d, 4s \text{ and } 4p$

B. $4s, 4p \text{ and } 4d$

C. $4s, 3d$ and $4p$

D. $3d, 4p$ and $4s$

Answer: C

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8. The starting element and last element in the largest period in modern periodic table are

A. Rb and Xe

B. Cs and I

C. Cs and Rn

D. Fr and Kr

Answer: C

9. Which of the following has both members from the same period of the periodic table

A. Na , F

B. Mg, Ca

C. Na, Cl

D. Be, Al

Answer: C

10. As per the modern periodic law, the physical and chemical properties of elements are periodic functions of their

A. Nuclear masses

B. Atomic numbers

C. Nuclear neutron-proton number ratios

D. Atomic masses

Answer: B

11. Atomic number of nitrogen is 7. The atomic number of the third member in the same family is

A. 23

B. 15

C. 33

D. 51

Answer: C

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12. Element with atomic number 38, belongs to

A. II A group and 5^{th} period

B. II A group and 2^{nd} period

C. V A group and 2^{nd} period

D. III A group and 5^{th} period

Answer: A

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13. Set of elements with the following atomic numbers belong to the same group

A. 9,16,35,3

B. 12,20,4,38

C. 11,19,27,5

D. 24,47,42,55

Answer: B

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14. The element which belong to 3rd period and IVA group of periodic table is

A. Silicon

B. Carbon

C. Germanium

D. Tin

Answer: A

15. Screening by inner electrons will be more effective in

A. Mg

B. K

C. Sr

D. Cs

Answer: D

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16. Which of the following pairs has elements containing same number of electrons in the outermost orbit?

A. N,O

B. Na, Cl

C. Ca, Cl

D. Cl, Br

Answer: D

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17. The period that includes all blocks of elements is

A. 1

B. 2

C. 6

D. 7

Answer: C

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18. Among s-block metals and transition metals, which are more metallic?

A. s-block metals

B. Transition metals

C. Both are equally metallic

D. Cannot be predicted.

Answer: A

19. Element with atomic number 52 belongs to

A. s-block metals

B. p-block

C. d-block

D. f-block

Answer: B

20. The period number and group number in which maximum number of elements placed are respectively

A. 6^{th} and I 'A'

B. 6^{th} and zero

C. 6^{th} and III 'A'

D. 6^{th} and III 'B'

Answer: D

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21. The general electronic configuration of f-block elements is

A. $ns^2np^6(n-1)d^{0-1}(n-2)f^{1-14}$

B. $ns^2(n-1)d^{0,1}(n-2)f^{1-14}$

C. $ns^2nd^{0,1}nf^{1-14}$

D. $ns^2(n-1)d^{0,1}(n-1)f^{1-14}$

Answer: B

22. The common oxidation state exhibited by inner transition elements usually in their compounds is

A. $+2$

B. $+3$

C. $+5$

D. Zero

Answer: B

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23. The pair of atomic numbers which represent the p-block elements

A. 6, 12

B. 7, 53

C. 19, 35

D. 38, 51

Answer: B

24. Which of the following is an element present in the d-block, but not a transition element?

A. Cd

B. Cu

C. Ca

D. Cr

Answer: A

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25. Which of the following is an alloy of non-transition elements?

A. Elektron

B. Brass

C. Bronze

D. German silver

Answer: A

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26. Common oxidation state of elemental transition metal is

A. $+1$

B. 0

C. $+3$

D. $+2$

Answer: B

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27. Configuration that does not denote a transition element

A. $3d^1\ 4s^2$

B. $3d^{10}4s^1$

C. $3d^{10}4s^24p^2$

D. $3d^84s^2$

Answer: C

28. An element of 5f-series but has no electrons filled in 5f-sub shell

A. Ac

B. Ce

C. Th

D. U

Answer: C

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29. An element has 18 electrons in the outer most shell. The element is

A. Transition metal

B. Rare earth metal

C. Alkaline earth metal

D. Alkali metal

Answer: A

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30. Element with electronic arrangement $[Ar]3d^{24}s^2$ belongs to

A. s-block

B. p-block

C. d-block

D. f-block

Answer: C

31. Number of outer shells partially filled for representative elements

A. Zero

B. One

C. Two

D. Three

Answer: B

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

A. $Mg - Ba$

B. $Mg - Na$

C. $Mg - Cu$

D. $Mg - Cl$

Answer: A

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

A. Light metals

B. Inert gases

C. Halogens

D. Rare earths

Answer: B

34. Among the following, the number of elements showing only one non-zero oxidation state is O,Cl,F,N,P,Sn,Tl,Na and Ti.

A. 1

B. 3

C. 2

D. 4

Answer: A

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35. Following are some statements about modern periodic table

i) It consists of s, p, d and f blocks

ii) The energy levels filling order in 6th period is 6s, 4f, 5d and 6p

iii) IIIA group contains maximum number of elements

A. i and ii

B. only i

C. ii and iii

D. all

Answer: C

36. The atomic number of the element which is not included in the main body of the period table

A. 43

B. 57

C. 68

D. 80

Answer: C

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37. Match the Column

Column - I	Column - II
a) Po	i) Liquid metal
b) Mercury	ii) Liquid non-metal
c) Bromine	iii) Diamond
d) Carbon	iv) VIA group

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

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

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

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

Answer: A

38. Zinc is not considered as a transition metal because

A. It is diamagnetic

B. It is not known to from alloys

C. It has no unpaired electrons

D. It has white shade

Answer: C

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39. The electronic configuration of an element 'X', is $1s^2 2s^2 2p^6 3s^2 3p^3$? What is the atomic

number of the element which is just below 'Xin the periodic table

A. 33

B. 34

C. 31

D. 49

Answer: A

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40. The IUPAC name of „Bh is

A. Unnil heptium

B. Unnil septium

C. Unnil hexium

D. Unnil bium

Answer: B

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41. Number of unpaired electrons in Gd(Z =64) and the net electrons spin are

A. 7.3,5

B. 8,3

C. 6,3

D. 8,4

Answer: D

42. Identify the correct statement

A. Filling of 5d orbital begins with Hf in 5th period

B. Filling of 4f orbital begins with Ce in 6th period

C. Filling of 5d orbital begins with La in 5th period

D. Filling of 4f orbital begins with La in 6th period

Answer: D

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43. The following are some statements about transition elements

i) IIB group belong to transition elements

ii) In these elements last two shells ns and (n-1)d are partially filled

iii) They show variable valencies

A. all are correct

B. only iii is correct

C. ii and iii are correct

D. i and ii are correct

Answer: C

44. An element with a mass number of 81 contains 31.7% more neutrons as compared to protons. Identify the element

A. Sc

B. Ba

C. Br

D. I

Answer: C

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Objective Exercise 2 Atomic Radius

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

A. Ce gt Sn gt Yb gt Lu

B. Sn gt Ce gt Yb gt Lu

C. Lu gt Yb gt Sn gt Ce

D. Sn gt Yb gt Ce gt Lu

Answer: D

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2. If an element 'X' is assumed to have the types of radii, then their order is

A. Crystal radius gt Van der Waals radius gt Covalent radius

B. Van der Waals radius gt Crystal radius gt Covalent radius

C. Covalent radius gt Crystal radius gt Van der waals radius

D. Van der Waals radius gt Covalent radius gt Carystal radius

Answer: B

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3. Which of the following has smallest radius?

A. Be^{2+}

B. Li^{+}

C. O^{2-}

D. F^{-}

Answer: A

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4. The elements in which of the following have most nearly the same atomic radius

A. Mg, Ca, Sr, Ba

B. Ca, Ge, As, Se

C. B, C, N, O

D. Cr, Mn, Fe, Co

Answer: D

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5. Identify the correct order in which the ionic radius of the following ions increases:

(I) F^- , (ii) Na^+ , (III) N^{3-}

A. III, I, II

B. I, II, III

C. II, III, I

D. I, I, III

Answer: B

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6. The correct order of radii is

A. $Al^{3+} > Mg^{2+} > Na^{+} > F^{-} > O^{2-}$

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

C. $Na^+ > F^- > Mg^{2+} > O^{2-} > Al^{3+}$

D. $O^{2-} > F^- > Na^+ > Mg^{2+} > Al^{3+}$

Answer: D

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7. Atomic radii of fluorine and neon (Å) respectively are given as

A. 0.72, 1.62

B. 0.72, 0.72

C. 1.2, 1.2

D. 1.62, 0.72

Answer: A

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8. Which of the following will have largest size?

A. Br

B. I^-

C. I

D. F

Answer: B

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

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

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

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

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

Answer: B

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10. In which of the following sets, elements have nearly same atomic radii?

A. Li, Be, B

B. Mg, Ca, Sr

C. Fe, Co, Ni

D. O, S, Se

Answer: C

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11. The correct order of atomic radius of Li, Be and B is

A. B gt Be gt Li

B. B gt Li gt Be

C. Li gt B gt Be

D. Li gt Be gt B

Answer: D

12. On going down a main subgroup in the periodic table (example Li to Cs in IA or Be to Ra in IIA) the expected trend of change in atomic radius is a

A. Continuous increase

B. Continuous decrease

C. An increase followed by decrease

D. A decrease followed by increase

Answer: A

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13. The atomic radius decreases in a period due to

A. Increase in nuclear attraction

B. Decrease in nuclear attraction

C. Increase in number of electrons

D. Decrease in number of electrons

Answer: A

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14. Correct order of atomic radii

A. $N < C < P < S$

B. $C < N < S < P$

C. $C < N < P < S$

D. $N < C < S < P$

Answer: D

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15. Which one of the following has the highest size?

A. Mg

B. Mg^{2+}

C. Al

D. Al^{3+}

Answer: A

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Objective Exercise 2 Ionisation Potential

1. Which of the following element has the greatest tendency to lose electrons ?

A. F

B. S

C. Fe

D. Be

Answer: C

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2. Second ionisation potential of oxygen is

A. Equal to that of fluorine

B. Less than that of fluorine

C. Greater than that of fluorine

D. Half of that of fluorine

Answer: C

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3. $I_1, I_2, I_3,$ of an element are 176, 346 and 1850K.cals respectively. The molecular formula of its phosphate is

A. M_3PO_4

B. MPO_4

C. $M_2(PO_4)_3$

D. $M_3(PO_4)_2$

Answer: D

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

A. $+1720K.\ cal$

B. $+526K.\ cal$

C. $-170K.\ cal$

D. $-526K.\ cal$

Answer: B

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5. Among the elements A, B, C and D having atomic numbers 7,8,9 and 12 the element having smallest size is _____

A. $A > B > C > D$

B. $B > A > D > C$

C. $B > A > C > D$

D. $D > C > B > A$

Answer: B

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6. Correct order of first ionisation potentials

A. $K < Na$

B. $Ca < K$

C. $Mg < Ca$

D. $Li < Be$

Answer: A

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7. The first ionisation potentials of four consecutive elements present in the second period of the periodic table are 8.3, 11.3, 14.5 and 13.6 eV respectively. Which one of the following is the first ionisation potential (in eV) of nitrogen ?

A. 13.6

B. 11.3

C. 8.3

D. 14.5

Answer: B

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8. The decreasing order of second ionisation potential of K, Ca, Ba is

A. K gt Ca gt Ba

B. Ca gt Ba gt K

C. Ba gt K gt Ca

D. K gt Ba gt Ca

Answer: A

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9. The incorrect order of second ionization energies in the following is

A. Rb gtK

B. Na gt Mg

C. Cr gt Mn

D. S gt P

Answer: A

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10. Ionisation energy of F^- is equal in magnitude with the electron affinity of

A. F^-

B. F

C. F^+

D. F^{2+}

Answer: B

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11. Some statements are given. Among them the correct statements are

(a) IP_2 of sodium is greater than that of

Magnesium

(b) IP_2 of lithium is greater than IP_1 of Helium

(c) IP_2 of sodium is greater than IP_1 of Neon

(d) IP_1 of oxygen is greater than that of Nitrogen

A. All are correct

B. Only a, b and c are correct

C. Only a and b are correct

D. Only a and d are correct

Answer: B

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12. $(IE)_1$ and $(IE)_2$ of $Mg_{(g)}$ are 740, 1540 kJ mol^{-1} . Calculate percentage of $Mg^{+}_{(g)}$ and $Mg^{2+}_{(g)}$ if 1 g of $Mg_{(s)}$ absorbs 50.0 kJ of energy.

A. $\%\, Mg^{+} = 50\,\%$ $\%\, Mg^{+2} = 50\,\%$

B.

$\%\, Mg^{+} = 70.13\,\%$ $\%\, Mg^{+2} = 29.87\,\%$

C. $\%\, Mg^{+} = 75\,\%$ $\%\, Mg^{+2} = 25\,\%$

D. $\%\, Mg^{+} = 60\,\%$ $\%\, Mg^{+2} = 40\,\%$

Answer: B

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13. Successive ionisation potentials of an element M are 8.3, 25.1, 37.9, 259.3 and 340.1ev. The formula of its bromide is

A. MBr_5

B. MBr_4

C. MBr_3

D. MBr_2

Answer: C

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14. The decreasing order of the first ionization energy in $kJmol^{-1}$ of He, Mg and Na is He > Mg > Na. The increasing order of second ionization energy in of these elements will be

A. Na lt Mg lt He

B. Mg lt Na lt He

C. Mg lt He lt Na

D. Na lt He lt Mg

Answer: B

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15. In a period from left to right

A) nuclear charge increases

B) effective nuclear charge increases

C) atomic size decreases

D) Ionisation potential increases

Correct among the above are

A. A, B

B. B, C

C. A, C, D

D. A, B, C, D

Answer: D

16. If the lonisation potential (I.P.) of Na is 5.48 eV. The I.P. of K will be

A. 4.34 eV

B. 5.68 eV

C. 10.88 eV

D. 5.48 eV

Answer: B

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17. A sudden jump between the values of second and third ionisation energies of an element is associated with configuration

A. $1s^2 2s^2 2p^{63} s^1$

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

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

D. $1s^2 2s^2 2p^{63} s^2$

Answer: C

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18. Amongst the following elements (whose electronic configurations are given below), the one having the highest first ionization energy is

A. $[Ne]3s^{23} p^1$

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

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

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

Answer: B

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19. The first ionization energy of Lithium will be

A. Greater than Be

B. Less than Be

C. Equal to that of Na

D. Equal to that of F

Answer: B

20. A sudden jump between the values of second and third ionisation energies of an element is associated with configuration

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

B. $3s^2$

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

D. $3s^1$

Answer: B

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21. Generally the ionisation potential in a period increases, but there are some exceptions. The one which is not an exception is

A. Be and B

B. N and O

C. Mg and Al

D. Na and Mg

Answer: C

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22. Element that has the highest first ionisation energy among the following is

A. Ca

B. Mg

C. Al

D. Si

Answer: B

23. The ionization potential of nitrogen is more than that of oxygen because of

A. the greater attraction of the electrons by the nucleus

B. the extra stability of the half filled p-orbitals

C. the smaller size of nitrogen

D. more penetration effect Electron affinity

Answer: B

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Objective Exercise 2 Electronic Affinity

1. When an electron is added, energy is absorbed in which of the following?

A. C

B. N

C. F

D. O

Answer: B

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2. The correct order of electron affinity of the elements of oxygen family in the periodic table is

A. O gt S gt Se

B. S gt O gt Se

C. S gt Se gt O`

D. Se gt O gt S

Answer: C

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3. Energy is released in the process of

A. $Na_{(g)} \rightarrow Na^{+}_{(g)} + e$

B. $O^{+}_{(g)} + e \rightarrow O^{-2}_{(g)}$

C. $N^{-2}_{(g)} + e \rightarrow N^{-3}_{(g)}$

D. $O_{(g)} + e \rightarrow O^{-}_{(g)}$

Answer: B

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4. Which of the following is the correct order of electron affinity

A. $I > Br > F > Cl$

B. $F < Cl < Br < I$

C. $F > Cl > Br > I$

D. $I < Br < F < CI$

Answer: D

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5. In which of the following process maximum energy is released

A. $O_{(g)} + e^- \rightarrow O^-_{(g)}$

B. $O^-_{(g)} + e^- \rightarrow O^{-2}_{(g)}$

C. $S_{(g)} + e^- \rightarrow S^-_{(g)}$

D. $S^-_{(g)} + e^- \rightarrow S^{-2}_{(g)}$

Answer: C

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

$O_{(g)} + e^- \rightarrow O^-_{(g)}, \Delta_f H^0 = -141 kJmol^{-1}$

$O^-_{(g)} + e^- \rightarrow O^{-2}_{(g)}, \Delta_f H^0 = +780 kJmol^{-1}$

Thus, process of formation of O^{2-} in gas phase is unfavourable even thrugh O^{2-} is isoelectronic with neon. It is due to the fact that (2015)

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

B. Oxygen has high electron affinity

C. Oxygen is more electronegative

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

Answer: A

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7. Use (IE) and (EA) listed below to determine whether the following process is endothermic exothermic.

$Mg_{(s)} + 2F_{(g)} \rightarrow Mg^{2+}_{(g)} + 2F^{-}_{(g)}$

$(IE)_1$ of $Mg_{(g)} = 737.7\text{kJ mol}^{-1}$

$(IE)_2$ of $Mg_{(g)} = 1451\text{kJ mol}^{-1}$

(EA) of $F_{(g)} = -328\text{kJ mol}^{-1}$

A. Exo

B. Endo

C. both

D. None

Answer: B

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8. Screening effect influences

A) atomic radius

B) Ionisation enthalpy

C) electron gain enthalpy

A. A, B

B. B, C

C. A, C

D. A, B, C

Answer: B

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9. Which of the following are the values of electron affinities in kJ/mol for the formation of O^- and O^{2-} from O ?

A. $-142, \ -702$

B. $-141, 702$

C. $142, 702$

D. $-142, \ -142$

Answer: B

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10. $O + 2e^- \rightarrow O^-, \Delta H = 639$kJ/mole

$O + e^- \rightarrow O^- \Delta Ho = -141$kJ/mole

$O^- + e^- \rightarrow O^-, \Delta H = x$ kJ/mole

What is the value of x ?

A. -780

B. $+780$

C. -498

D. $+498$

Answer: B

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Objective Exercise 2 Electronegativity

1. Two elements A and B have the following electronic configurations. The formula of the compound formed between them can be $A = 1s^2 2s^2 2p^6 3s^2 3p^1, B = 1s^2 2s^2 2p^4$

A. AB

B. AB_2

C. A_2B_3

D. A_2B_3

Answer: C

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2. EN of the element (A) is E_1 and $IPis$E_2`. Hence EA will be

A. $2E_1 - E_2$

B. $E_1 - E_2$

C. $E_1 - 2E_2$

D. $(E_1 + E_2)/2$

Answer: A

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3. A metal forms a chloride with the formula MCl_2. Formula of Phosphoric acid is H_3PO_4. Formula of the Phosphate of the metal is

A. M_3PO_4

B. MPO_4

C. $M_3(PO_4)_2$

D. M_2PO_4

Answer: C

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4. Pair of elements with equal values of electronegativiy

A. Be, Al

B. Mg, Al

C. Mg, Ca

D. F, Ne

Answer: A

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

A. C, N, Si , P

B. N, Si, C, P

C. Si, P, C, N

D. P, Si, N, C

Answer: C

6. The difference in bond energy between the experimental and the calculated values of HY is $1.96 kcal mol^{-1}$. The electronegativity of Y is (electronegativity of H is 2.1)

A. 1.90

B. 1.81

C. 1.78

D. 1.75

Answer: B

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Objective Exercise 2 Metallic Nature And Nature Of Oxides

1. Elements A, B and C belong to the same period in the long form of the periodic table. The nature of the oxides of A, B and C is amphoteric

basic and acidic respectively. The correct order of the atomic numbers of these elements is

A. B gt A gt C

B. C gt B gt A

C. C gt A gt B

D. A gt B gt C

Answer: C

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2. Which of the following oxide is amphoteric?

A. CrO

B. Cr_2O_3

C. CrO_3

D. CrO_5

Answer: A

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3. Which of the following oxide behaves as acid as well as base

A. Cr_2O_3

B. CrO_3

C. CrO

D. CrO_5

Answer: A

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4. Acidic nature of the similar oxides of a group from top to bottom

A. Increases

B. Decreases

C. Remains constant

D. First increases and then decreases

Answer: B

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5. Which of the following properties increases across a period ?

A. Reducing property

B. Size of atom

C. Acidic nature of oxides

D. Metallic property

Answer: C

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6. Among the following elements most acidic oxide is given by

A. Al

B. P

C. N

D. Sb

Answer: C

7. The strongest reducing agent is

A. K

B. Al

C. Mg

D. Br

Answer: A

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8. The more basic oxide is

A. CaO

B. MgO

C. K_2O

D. Na_2O

Answer: C

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9. When an atom of an electronegative element becomes anion, which of the following occurs?

A. It acts as a reducing agent

B. It loses electrons

C. Its ionic radius becomes larger

D. It accepts electrons

Answer: C

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10. Among Al_2O_3, SiO_2, P_2O_3 and SO_2 the correct order of acid strength is

A. $Al_2O_3 < SiO_2 < SO_2 < P_2O_3$

B. $SiO_2 < SO_2 < Al_2O_3 < P_2O_3$

C. $SO_2 < P_2O_3 < SiO_2 < Al_2O_3$

D. $Al_2O_3 < SiO_2 < P_2O_3 < SO_2$

Answer: D

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11. Identify the correct order of acidic strengths of the oxides

A. $CaO < CuO < H_2O < CO_2$

B. $H_2O < CuO < CaO < CO_2$

C. $CaO < H_2O < CuO < CO_2$

D. $H_2O < CO_2 < CaO < CuO$

Answer: C

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12. An oxide of an element is a gas and dissolves in water to give an acidic solution. The element belongs to

A. II group

B. IV group

C. VIII group

D. Zero group

Answer: B

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13. The order of metallic character of Si, Na, Mg, P is

A. $P < Mg < Si < Na$

B. $P < Si < Mg < Na$

C. $Mg < Na < Si < P$

D. $Si < P < Na < Mg$

Answer: B

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Objective Exercise 2 Diagonal Relationship

1. Diagonal relationship is present between the lighter elements of periods

A. Second, third

B. Second, fourth

C. Third, fourth

D. Third, fifth

Answer: A

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2. The diagonal relationship phenomenon is not observed after

A. I A Group

B. II A Group

C. III A Group

D. IV A Group

Answer: D

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3. Which of the following is not correct in the case of Be and Al ?

A. both are rendered passive by conc.HNO_3

B. carbides of both give methane on hydrolysis

C. both give hydroxides which are basic

D. both give covalent chlorides

Answer: C

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4. The correct order of polarising ability of cations of Alkaline earth metals is

A. $Cl^- > Br^- > I^- > F^-$

B. $F^- > I^- > Br^- > Cl^-$

C. $I^- > Br^- > CF^- > F^-$

D. $F^- > CF^- > Br^- > I^{-1}$

Answer: C

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5. The chemistry of lithium is very similar to that of magnesium even though they are placed in different groups. Its reason is

A. Both are found together in nature

B. Both have nearly the same size

C. Both have similar electronic configuration

D. The ratio of charge and size is nearly same

Answer: D

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6. Be and Al exhibit many properties which are similar, but the two elements differ in

A. Forming covalent halides

B. Forming polymeric hydrides

C. Exhibiting maximum covalency in compounds

D. Exhibiting amphoteric nature in their oxides

Answer: C

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7. The polarising power of which of the following pair is similar

A. Li, Mg

B. Li^+, Mg^{2+}

C. Li^{2+}, Mg^{2+}

D. Li^{2+}, Mg^{2+}

Answer: B

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8. Be and Al are diagonally related pair of elements. However, they don't have similarity in the following property.

A. metallic nature of elements

B. amphoteric nature of oxide

C. hydrolysis product of carbide

D. electrical conductivity

Answer: D

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9. Which of the following electronic configura tions represent the most metallic element ?

A. $[Ne]3s^2 3p^5$

B. $[Xe]6s^1$

C. $[Xe]6s^2$

D. $[Xe]4f^{14}5d^{10}6s^2 6p^1$

Answer: B

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Objective Exercise 3 Recent Aipmt Neet Questions

1. Which one of the following orders is not in accordance with the property stated against it?

A. $F_2 > Cl_2 > Br_2 > I_2$ (Oxidising power)

B. $HI > HBr > HCI > HF$(Acidic property in water)

C. $F_2 > Cl_2 > Br_2 > I_2$ (Electron negativity)

D. $F_2 > Cl_2 > Br_2 > I_2$ (Bond dissociation energy)

Answer: D

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2. Which of the following electronic configuration of an atom has lowest Ionisation enthalpy?

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

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

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

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

Answer: C

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3. The correct order of decreasing second ionization enthalpy of Ti(22), V(23), Cr (24) and Mn(25) is

A. $Cr < Mn > V > Ti$

B. $V > Mn > Cr > Ti$

C. $Cr > Mn > V > Ti$

D. $Ti > V > Cr > Mn$

Answer: C

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4. Which one of the elements with the following outer orbital configurations exhibits the largest number of oxidation states?

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

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

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

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

Answer: C

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5. The correct order of decreasing ionic radii among the following isoelectronic species is

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

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

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

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

Answer: C

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6. Which of the following represents the correct order of increasing electron gain enthalpy with negative sign for the elements O, S, F and Cl ?

A. $Cl < F < O < S$

B. $O < S < F < Cl$

C. $F < S < O < C$

D. $S < O < Cl < F$

Answer: B

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7. Which one of the following ions has electronic configuration $[Ar]3d^6$ (Atomic number of $Mn = 25, Fe = 26, C_\circ = 27, Ni = 28$)

A. Co^{+3}

B. Ni^{+2}

C. Mn^{+3}

D. Fe^{+3}

Answer: A

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

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

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

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

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

Answer: B

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

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

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

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

D. $Al^{+3} > Mg^{+2} > N^{-3}$

Answer: A

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10. Among elements with the following electronic configurations, the one with the largest radius is

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

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

C. $[Ar]3d^{10}4s^24p^3$

D. $[Ne]3s^23p^1$

Answer: A

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

$O_{(g)} + e^- \rightarrow O^-_{(g)}, \Delta_f H^0 = -141 kJmol^{-1}$

$O^-_{(g)} + e^- \rightarrow O^{-2}_{(g)}, \Delta_f H^0 = +780 kJmol^{-1}$

Thus, process of formation of O^{2-} in gas phase

is unfavourable even thrugh O^{2-} is isoelectronic with neon. It is due to the fact that (2015)

A. Oxygen is more electronegative

B. Addition of electron in oxygen results in larger size of the atom

C. Electron repulsion outweighs the stability gained by achieving noble gas configuration

D. O^{-} ion has comparatively smaller size than oxygen atom

Answer: C

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

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

(increasing ionic size)

B. $B < C < N < O$ (increasing first ionisation enthalpy)

C. $I < Br < Cl < F$ (increasing electron gain enthalpy)

D. $Li < Na < K < Rb$(increasing metallic radius)

Answer: B::C

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

A. $I < Br < Cl < F$(electron negativity)

B. $Li < Na < K < Rb$(metallic radius)

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

D. $B < C < N < O$ (1^{st} ionization enthalpy)

Answer: D

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14. The element Z = 114 has been discovered recently. It will belong to which of the following family /group and electric configuration ?

A. Nitrogen family, $\left[[Rn]5f^{14}6d^{10}7s^27p^6\right]$

B. Halogen family, $\left[[Rn]5f^{14}6d^{10}7s^27p^5\right]$

C. Carobon family, $\left[[Rn]5f^{14}6d^{10}7s^27p^2\right]$

D. Oxygen family, $\left[[Rn]5f^{14}6d^{10}7s^27p^4\right]$

Answer: C

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