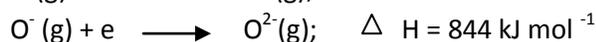
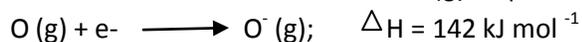


PERIODIC PROPERTIES

- The ionic radii of Li^+ , Be^{2+} and B^{3+} follow the order :
 (a) $\text{Be}^{2+} > \text{B}^{3+} > \text{Li}^+$ (b) $\text{Li}^+ > \text{B}^{3+} > \text{Be}^{2+}$ (c) $\text{B}^{3+} > \text{Be}^{2+} > \text{Li}^+$ (d) $\text{Li}^+ > \text{Be}^{2+} > \text{B}^{3+}$
- Which one of the following is correct order of increase in size?
 (a) $\text{Mg} < \text{Na}^+ < \text{F}^- < \text{Al}$ (b) $\text{Na}^+ < \text{Al} < \text{Mg} < \text{F}^-$ (c) $\text{Na}^+ < \text{F}^- < \text{Al} < \text{Mg}$ (d) $\text{Na}^+ < \text{F}^- < \text{Mg} < \text{Al}$
- Largest in size out of Na^+ , Ne and F^- is :
 (a) Na^+ (b) Ne (c) F^- (d) All are equal
- Which one of the following elements shows both positive and negative oxidation states?
 (a) Caesium (b) Flourine (c) Iodine (d) Xenon
- Arrange N, O and S in order of decreasing electron affinity.
 (a) $\text{S} > \text{O} > \text{N}$ (b) $\text{O} > \text{S} > \text{N}$ (c) $\text{N} > \text{O} > \text{S}$ (d) $\text{S} > \text{N} > \text{O}$
- The electronegativity of the following elements increases in the order:
 (a) $\text{C} < \text{N} < \text{Si} < \text{P}$ (b) $\text{Si} < \text{P} < \text{C} < \text{N}$ (c) $\text{C} < \text{Si} < \text{N} < \text{P}$ (d) $\text{N} < \text{C} < \text{P} < \text{Si}$
- The increasing order of electron affinity of the electronic configurations of element is :
 (I) $1s^2 2s^2 2p^6 3s^2 3p^5$ (II) $1s^2 2s^2 2p^3$ (III) $1s^2 2s^2 2p^5$ (d) $1s^2 2s^2 2p^6 3s^1$
 (a) $\text{II} < \text{IV} < \text{III} < \text{I}$ (b) $\text{I} < \text{II} < \text{III} < \text{IV}$ (c) $\text{I} < \text{III} < \text{II} < \text{IV}$ (d) $\text{IV} < \text{III} < \text{II} < \text{I}$
- The electron affinity of the following elements can be arranged:
 (a) $\text{Cl} > \text{N} > \text{C} > \text{O}$ (b) $\text{Cl} > \text{O} > \text{C} > \text{N}$ (c) $\text{Cl} > \text{O} > \text{N} > \text{C}$ (d) $\text{Cl} > \text{C} > \text{O} > \text{N}$
- The correct order of increasing electron affinity of the following elements is:
 (a) $\text{O} < \text{S} < \text{F} < \text{Cl}$ (b) $\text{S} < \text{O} < \text{Cl} < \text{F}$ (c) $\text{S} < \text{O} < \text{F} < \text{Cl}$ (d) $\text{O} < \text{S} < \text{Cl} < \text{F}$
- In which of the following pair, both the species are isoelectronic but the first one is large in size than the second?
 (a) $\text{N}^{3-}, \text{P}^{3-}$ (b) $\text{Cl}^-, \text{S}^{2-}$ (c) F^-, Na^+ (d) $\text{S}^{2-}, \text{O}^{2-}$
- Which is the correct order of ionization energies?
 (a) $\text{F}^- > \text{Cl}^- > \text{Cl} > \text{F}$ (b) $\text{F} > \text{Cl} > \text{Cl}^- > \text{F}^-$ (c) $\text{F}^- > \text{F} > \text{Cl}^- > \text{Cl}$ (d) $\text{F}^- > \text{Cl}^- > \text{F} > \text{Cl}$
- Which of the following statements is correct?
 (a) The first electron affinity of fluorine is greater than that of chlorine.
 (b) The magnitude of the second electron affinity of sulphur is less than that of oxygen.
 (c) The first electron affinities of bromine and iodine are approximately the same.
 (d) The magnitude of the second electron affinity of sulphur is greater than that of oxygen.
- Which of the following statements is incorrect?
 (a) The first ionization energy of aluminum is approximately the same as that of gallium.
 (b) The third ionization energy of phosphorus is greater than that of aluminium .
 (c) The second ionization energy of sulphur is greater than that of chlorine.
 (d) All of these .
- In which of the following arrangements, the order is not correct according to the property indicated against it:
 (a) Increasing size: $\text{Al}^{3+} < \text{Mg}^{2+} < \text{Na}^+ < \text{F}^-$ (b) Increasing I, $E_{.1}$: $\text{B} < \text{C} < \text{N} < \text{O}$
 (c) Increasing $E_{.1}$: $\text{I} < \text{Br} < \text{F} < \text{Cl}$ (d) None of these
- The incorrect statement among the following is:
 (a) The first ionisation potential of Al is less than the first ionization potential of Mg.
 (b) The second ionisation 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) None of these.
- Which among the following factors is the most important in making fluorine, the strongest oxidising halogen?
 (a) Electron affinity (b) Ionisation enthalpy (c) Hydration enthalpy (d) Bond dissociation energy
- In which of the following processes energy is absorbed?



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



This is because:

(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.

19. Mercury is the only metal which is liquid at 0°C . This is due to its

(a) very high ionisation energy and metallic bond (b) low ionization potential and high electronegativity

(c) High atomic mass and small size (d) high electronegativity and low ionisation potential

20. The C – C single bond length is 1.54 \AA and that of Cl – Cl is 1.98 \AA . If the electronegativity of Cl and C are 3.0 and 2.5 respectively, the C – Cl bond length will be equal to

(a) 3.12 \AA (b) 1.67 \AA (c) 1.71 \AA (d) 2.12 \AA

21. Match the column

Scientist

Periodic Table

A. Duma

P. Octave rule

B. Newland

Q. Atomic volume curve

C. Lothar Meyer

R. Homologous series

D. Dobereiner

S. Triad rule

The correct option is

(a) A-P, B-Q, C-R, D-S (b) A-R, B-P, C-Q, D-S (c) A-R, B-P, C-S, D-Q (d) A-S, B-P, C-S, D-Q

22. Two elements A and B have electrons affinity as $(\text{EA})_A$ and $(\text{EA})_B$ and ionization potentials I_A and I_B . If A is more electronegative element than B. Then, there must be

(a) $(\text{EA})_A > (\text{EA})_B$ and $I_A > I_B$ (b) $(\text{EA})_A + I_A < (\text{EA})_B + I_B$ (c) $(\text{EA})_A + I_A > (\text{EA})_B + I_B$ (d) $(\text{EA})_A > (\text{EA})_B$ but $I_A < I_B$

23. The incorrect statement(s) among the following is/are

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

B. The second ionisation potential of Mg is greater than second ionisation potential of Na.

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

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

24. The correct sequence of elements in the decreasing order of their first ionization energy is

(a) $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$ (b) $\text{Mg} > \text{Na} > \text{Al} > \text{Si}$ (c) $\text{Al} > \text{Mg} > \text{Na} > \text{Si}$ (d) $\text{Si} > \text{Mg} > \text{Al} > \text{Na}$

25. Match the elements in list- I with the type of hydrides, they are known to form in list – II and select the correct answer using the codes given below the lists.

List – I

List – II

I. K

1. Covalent hydride

II. Li

2. Salt-like ionic hydride

III. Fe

3. Complex hydride

IV. Sn

4. Non-stoichiometric hydride

I

II

III

IV

(a) 4

2

3

1

(b)	2	4	1	3
(c)	4	2	1	3
(d)	2	4	3	1

26. In which case bond length is shortened?

- (a) When multiplicity occurs between atoms (b) When electronegativities are different
(c) In both cases (d) In none of the cases

27. Select the correct statement:

- (a) $(IE)_1$ of the corresponding elements of 3d and 4d series are almost similar.
(b) $(IE)_1$ of 5d-series elements are smaller than that of 3d and 4d series elements.
(c) both are correct (d) both are incorrect

28. The ionization potential of nitrogen is :

- (a) same as that of oxygen (b) Less than that of oxygen
(c) greater than that of oxygen (d) none of the above

29. Elements A, B, C, D and E have the following electronic configurations



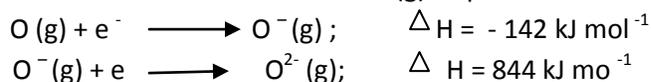
Which two elements fall into the same group?

- (a) B and C (b) A and C (c) B and D (d) A and B

30. The correct order of electron affinity is

- (a) Li Be B C (b) Si P S Cl (c) Cl F Br I (d) Mg Na Al Si

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



This is because

- (a) O^- ion has comparatively larger size than oxygen atom.
(b) Oxygen has high electron affinity.
(c) O^- ion will tend to resist the addition of another electron.
(d) Oxygen is more electronegative.

32. Which set represents isoelectronic species:

- (a) $Na^+, Mg^{2+}, Al^{3+}, Cl^-$ (b) $Na^+, Ca^{2+}, Se^{3+}, F^-$ (c) $K^+, Cl^-, Mg^{2+}, Se^{3+}$ (d) $K^+, Ca^{2+}, Se^{3+}, Cl^-$

33. 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: $Li < Na < K < Rb$

PASSAGE – 1

It is not possible to measure the atomic radius precisely since the electron cloud surrounding the atom does not have a sharp boundary. One practical approach to estimate the size of an atom of a non-metallic element is to measure the distance between two atoms when they are bound together by a single bond in covalent molecule and then dividing by two. For metals we define the term "metallic radius" which is taken as half the internuclear distance separating the metal cores in the metallic crystal. The van der Waal's radius represents the overall size of the atoms which includes its valence shell in a nonbonded situation. It is the half of the distance between two similar atoms in separate molecules in a solid. The atomic radius decreases across a period and increases down the group. Same trends are observed in case of ionic radius. Ionic radius of the species having same number of electrons depends on the number of protons in their nuclei.

34. The size of iso electronic species – F^-, Na^+ and Mg^{2+} is effected by

- (a) Nuclear charge (b) Valence principal quantum number (n)

- (c) electron-electron interaction in the outer orbitals (d) None of these
35. The correct order of radii is
 (a) $\text{Na} < \text{Li} < \text{K}$ (b) $\text{O} > \text{S} > \text{Se}$ (c) $\text{Cl} < \text{F} < \text{Li}$ (d) $\text{Fe}^{3+} < \text{Fe}^{2+} < \text{Fe}$
36. Atomic radii of noble gases are larger than the precedent elements of the same periods because
 (a) Atomic radius of a noble gas is expressed as van der Waal's radius.
 (b) Valence shell electron are completely filled so there is interelectronic repulsions
 (c) Both (a) and (b) (d) None
37. Which of the following statement is correct?
 (a) Metallic radius refer to metals only and is greater than covalent radius.
 (b) Metallic radius refer to metals only and is smaller than covalent radius.
 (c) Generally covalent radius refer to non-metals as well as metals in bonded state(covalent bond).
 (d) Atomic radii of noble gases are expressed as van der Waal's radii which are smaller than metallic radii.
38. Which one among the following sets of ions represents the collection of isoelectronic species?
 (a) $\text{S}^{2-}, \text{Cl}^-, \text{K}^+, \text{Ca}^{2+}, \text{Sc}^{3+}$ (b) $\text{N}^{3-}, \text{O}^{2-}, \text{Na}^+, \text{Mg}^{2+}, \text{Al}^{3+}$
 (c) $\text{K}^+, \text{Cl}^-, \text{Mg}^{2+}, \text{Al}^{3+}, \text{Sc}^{3+}$ (d) (a) and (b) both

PASSAGE – 2

The effective nuclear charge Z^* actually depends on type of orbit and orbital in which electron is housed and on the ability of other electrons in more penetrating orbitals to screen the electron concerned. The relative extent to which the various orbitals penetrate the electron clouds of other orbitals is $s > p > d > f$ and so on. But what of the atoms of the p-block where the last electron is placed in every case into an orbital of the same type? There each new electron experiences a new and different effective nuclear charge suppose for B the new electron is added into one of the p-orbitals say the p_x -orbital, the new electron that is added for C must now go into another of the 2p-orbital, say the p_y . But the p_y -orbital is perpendicular to the p_x -orbital and the p_y -orbital is poorly screened from the nuclear charge by the p_x -orbital. Consequently, the effective nuclear charge for the last electron in C is higher than that for B. Thus Hund's rule of maximum multiplicity follows the concept.

39. Which of the following valence electron experience maximum effective nuclear charge?
 (a) $4s^1$ (b) $4p^1$ (c) $3d^1$ (d) $2p^3$
40. Which of the following is not concerned with effective nuclear charge?
 (a) Higher ionization potential of carbon than boron
 (b) Higher ionization potential of magnesium than aluminium
 (c) Higher values of successive ionization energy
 (d) Higher electronegativity of higher oxidation energy
41. Hund's rule of maximum multiplicity suggests filling of electron in degenerate orbitals as
 (a) screening value increases (b) nuclear charge increases
 (c) effective nuclear charge increases (d) effective nuclear charge decreases