



NOBLE GASES

1. Oxygen and Xenon have similar

- a. Atomic size
- b. Ionization energy
- c. Electron affinity
- d. Electronegativity

Ans: b

The ionization potentials of O_2 molecule and Xenon are almost the same, i.e. 1180 kJ/mol respectively.

Vikasana - CET 2012



2. Which of the following is least soluble in water ?

- a. Neon
- b. Argon
- c. Krypton
- d. Xenon

Ans. a

Neon is the lightest gas among these four.

Hence it cannot exert dipole-dipole interaction with water.

Vikasana - CET 2012



3. The least abundant noble gas in the atmosphere is

- a. Ne b. Kr c. Xe d. Rn

Ans: d

Rn is radioactive and unstable

Vikasana - CET 2012



4. Liquid Helium has a high

- a. Density b. viscosity
c. surface tension d. conductivity

Ans: d

Liquid Helium has a high heat conductance
i.e. 600 times that of Copper.

Vikasana - CET 2012



5. Helium is obtained mainly from

- a. Pitch blende
- b. Air
- c. Natural gas
- d. None of these

Ans: c

Natural gas contains hydrocarbons H_2S , CO_2 , N_2 and He. When natural gas is compressed, all gases except Helium liquefy.

Vikasana - CET 2012



6. The noble gas which is the least polarised

a. Rn b. Xe c. Ne d. He

Ans: d

Helium is the smallest rare gas atom.

$1s^2$ electrons are strongly held by the nucleus.

Vikasana - CET 2012



7. The forces acting between noble gas atoms are

- a. Ionic forces b. Covalent forces
- c. Dipole-dipole interactions
- d. van der Waal's forces

Ans: d

Noble gases are chemically inert.

Vikasana - CET 2012



8. The lowest boiling point of Helium is due to its
- a. Gaseous nature
 - b. Inertness
 - c. High conductivity
 - d. Weak van der Waal's forces

Ans: d

Helium atoms are very small,
hence exert very weak force of attraction

Vikasana - CET 2012



9. The noble gas which is used in airships is

- a. Ne b. Kr c. Xe d. He

Ans : d

Helium is the lightest and non-inflammable gas

Vikasana - CET 2012



10. Neon sign lamps produce

- a. Blue colour
- b. Red colour
- c. Green colour
- d. Yellow colour

Ans : b

Neon sign lamps produce
orange red glow in the discharge tubes

Vikasana - CET 2012



11. Welding of metals can be conducted in the atmosphere of

- a. He b. Ne c. Ar d. All of these

Ans: d

He , Ne & Ar are all inert gases.

They prevent oxidation and increase the durability of metals

Vikasana - CET 2012



12. The noble gas which does not form any compound is

- a. Rn b. Kr c. Ar d. He

Ans: d

Helium cannot be polarised due to its small size, hence cannot form compounds

Vikasana - CET 2012



13. Noble gases form complexes with

- a. Cl_2 b. F_2 c. N_2 d. I_2

Ans: b

Noble gases can react with only highly electronegative elements like F_2 and O_2



14. Noble gas heavier than air is

a. He

b. Ne

c. Ar

d. none of these

Ans: c

He and Ne are lighter than air.

Ar (atomic mass = 36) is heavier

than air (Average molecular mass of air \approx 30)

Vikasana - CET 2012



15. The noble gas which forms interstitial compounds with metals is

- a. Xe b. Kr c. Ne d. He

Ans : He

Helium is the smallest atom.

Vikasana - CET 2012



16. Which noble gas is used in very low temperature thermometer ?

- a. He b. Ne c. Ar d. Kr

Ans : a

Helium can be cooled to very low temperature up to 4 K.

Vikasana - CET 2012



17. Helium is mixed with oxygen for artificial breathing because

- a. It is lighter than nitrogen
- b. It is non-inflammable
- c. It is less soluble in blood
- d. It is more conducting than nitrogen

Ans : c

Nitrogen is more soluble under pressure whereas Helium is less soluble.

Vikasana - CET 2012



18. Which noble gas is used in safety devices to protect electrical instruments ?

- a. He b. Ne c. Ar d. Xe

Ans : b

Neon gas carries very high electric currents even under high pressure.

Vikasana - CET 2012



19. Helium is used in nuclear reactors as a

- a. Projectile
- b. As a neutron absorber
- c. As a coolant
- d. As a light element

Ans: c

Helium can be cooled to very low temperature up to 4K

Vikasana - CET 2012



20. The adsorption of noble gases on activated charcoal increases with

- a. Increase of temperature
- b. Decrease of atomic mass
- c. Decrease of pressure
- d. Decrease of temperature

Ans: d

The amount of adsorption of rare gases on charcoal increases with decrease in temperature and increase in atomic mass.

Vikasana - CET 2012



21. During the adsorption of Krypton on activated charcoal at low temperature,

- a. $\Delta H < 0$ $\Delta S < 0$ b. $\Delta H > 0$ $\Delta S < 0$ c. $\Delta H < 0$ $\Delta S > 0$
d. $\Delta H > 0$ $\Delta S > 0$

Ans: a

According to Gibbs equation, at low temperature for ΔG to be negative, ΔH & ΔS should be less than zero.

Vikasana - CET 2012



22. The liquid having a flat meniscus is

- a. He b. Ne c. Ar d. N₂

Ans : a

Liquid Helium has no surface tension

Vikasana - CET 2012



d Block elements

23. Which of the following has green colour

- a. KMnO_4 b. K_2MnO_4
c. MnSO_4 d. MnCl_2

Ans : b

Potassium manganate (K_2MnO_4) has green colour (Mn^{+6}), MnO_4^- ion is pink and Mn^{+2} salts are pale pink in the solid state.

Vikasana - CET 2012



24. Which of the following oxides of Chromium is amphoteric

- a. CrO_3 b. CrO_2 c. CrO d. Cr_2O_3

Ans: d

CrO is basic

CrO_3 and CrO_2 are acidic.

Cr_2O_3 , Chromium (III) oxide is amphoteric

Vikasana - CET 2012



25. Silver does not dissolve in

- a. $\text{dil.H}_2\text{SO}_4$ b. dil.HNO_3 c. $\text{Conc. H}_2\text{SO}_4$
d. Conc.HNO_3

Ans : a

$\text{dil.H}_2\text{SO}_4$ is not an oxidising agent hence cannot dissolve silver whereas dil.HNO_3 , $\text{Conc. H}_2\text{SO}_4$, Conc.HNO_3 are oxidising agents, hence can dissolve silver.

Vikasana - CET 2012



26. Which of the following oxides of Manganese is amphoteric ?

- a. MnO_2 b. Mn_2O_3 c. Mn_2O_7 d. MnO

Ans : a

MnO_2 is amphoteric whereas MnO & Mn_2O_3 are basic and Mn_2O_7 is acidic. Acidic character increases with increase in oxidation state.

Vikasana - CET 2012



27. Which is the best conductor of electricity

- a. Fe b. Al c. Cu d. Ag

Ans : d

Silver is the best conductor of electricity.
Cu, Au & Al are second, third
and fourth best conductors of electricity.

Vikasana - CET 2012



28. Which element will be repelled by the magnetic field

- a. Cobalt b. Silver c. Copper d. Mercury

Ans : d

Mercury atom has filled orbitals, $[\text{Xe}] 5d^{10} 6s^2$ hence there is no unpaired electron.

It is diamagnetic and repelled by the magnetic field.

Vikasana - CET 2012



29. Which of the following forms a colourless solution in aqueous medium ?

- a. Ti^{3+} b. Sc^{3+} c. V^{3+} d. Cr^{3+}

Ans : b

Sc^{3+} has only 18 electrons that can be arranged as $[Ar] 3d^0 4s^0$. Hence no d-d transition of electrons and no colour.

Vikasana - CET 2012



30. d block metal ions form complex compounds because

- a. They have low polarising power
- b. They have few valence electrons
- c. They have smaller size and higher charge
- d. They have completely filled d-orbitals

Ans : c

Charge/size ratio is called polarisability.

Due to high polarisability, they can attract ligand electrons and form complexes.

Vikasana - CET 2012



31. Ferric chloride solution is prepared in the laboratory in the acid medium because the acid

- a. Increases the reactivity of ferric chloride
- b. Prevents hydrolysis of ferric chloride
- c. Increases the solubility of ferric chloride
- d. Renders it stable to light

Ans : b

The hydrolysis reaction

$\text{FeCl}_3 + 3\text{H}_2\text{O} \rightleftharpoons \text{Fe}(\text{OH})_3 + 3\text{HCl}$ is prevented by the addition of HCl which reverses the reaction.

Vikasana - CET 2012



32. Cuprous and cupric oxides find use in the manufacture of

- a. Paints
- b. medicinal preparations
- c. Special steels
- d. coloured glasses

Ans : d

Cuprous oxides provides red colour and cupric oxide provides blue green colour to glass

Vikasana - CET 2012



33. Which of the following nitrates on strong heating leaves the metal as a residue ?



Ans : d

When silver nitrate is heated, it decomposes to form silver metal



Vikasana - CET 2012



34. Which is wrongly matched ?

- a. German Silver – Cu, Zn, Ni
- b. Alnico – Fe, Al, Ni, Co
- c. Monel metal – Cu, Zn, Sn
- d. Duralumin – Al, Cu, Mn , Mg

Ans : c

Monel metal is an alloy of Cu, Ni, Fe and Mn

Vikasana - CET 2012



35. Cuprous ion is colourless while cupric ion is coloured because

- a. Cu^+ ion has a complete d-orbital and Cu^{2+} has incomplete d-orbital
- b. Both have unpaired electrons in d-orbital
- c. Cu^+ has incomplete d-orbital and Cu^{2+} ion has complete d-orbitals
- d. Both have half filled orbitals

Ans : a

Cu^+ ion has $3d^{10} 4s^0$ arrangement whereas Cu^{2+} ion has $3d^9 4s^0$.

A d^9 subshell has one unpaired electron and hence Cu^{2+} ion is blue coloured.

Vikasana - CET 2012



36. Which of the following alloys is used for making magnets for hearing aids ?

- a. Alnico b. Monel metal c. German Silver
d. Invar

Ans : a

Alnico is an alloy steel containing Fe, Al, Ni & Co. It is used for hearing aids because it is magnetic.

Vikasana - CET 2012



37. Iron loses magnetic property at

- a. Melting point b. Curie point
c. Boiling point d. 1000 K

Ans : b

When iron is heated to 768°C , it loses its magnetic property.

This temperature is called curie point.

Vikasana - CET 2012



38. Which metal is used to make alloy steel for armour plates, safes and helmets ?

- a. Cr b. Al c. Pb d. Mn

Ans : d

Manganese steel is very hard and does not corrode.



39. Stainless steel does not rust because
- Iron forms a hard chemical compound with chromium
 - Chromium and nickel combine with iron
 - Chromium forms oxide layer and protects iron from rusting
 - Nickel present in it does not rust

Ans : c

Chromium forms a thin film of chromium oxide which prevents rusting of iron.

Vikasana - CET 2012



40. Which of the following pairs cannot form an alloy ?

- a. Fe, C b. Zn, Cu c. Na, Hg d. Fe, Hg

Ans : d

Iron and platinum cannot form alloy
(amalgam) with mercury

Vikasana - CET 2012



41. Which one of the following is an amphoteric oxide ?

- a. ZnO b. Na₂O c. SO₂ d. B₂O₃

Ans : a

ZnO dissolves acid to form zinc salts
and dissolves in alkali to form Zincate salts



Vikasana - CET 2012



42. Of the following outer electronic configurations of atoms, the highest oxidation state is achieved by which one of them ?

- a. $(n - 1)d^3 ns^2$ b. $(n - 1)d^5 ns^1$
c. $(n - 1)d^8 ns^2$ d. $(n - 1)d^5 ns^2$

Ans : d

In the configuration of $(n - 1)d^5 ns^2$, all the electrons can be used for reaction hence maximum oxidation state of +7 is possible

Vikasana - CET 2012



43. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is

- a. +4 b. +6 c. +2 d. +3

Ans : d

$K_2Cr_2O_7$ is reduced to chromic sulphate, $Cr_2(SO_4)_3$ in which chromium is in +3 state

Vikasana - CET 2012



44. Ammonium dichromate is used in some fire works.
The green coloured compound formed is

- a. CrO_3 b. Cr_2O_3
c. Cr d. $\text{CrO}(\text{O}_2)_2$

Ans : b

Ammonium dichromate decomposes on heating to form green coloured chromic oxide. $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{Cr}_2\text{O}_3 + \text{N}_2\uparrow + 4\text{H}_2\text{O}$

Vikasana - CET 2012



45. The pair of compounds in which both the metals are in the highest possible oxidation state is

- a. $[\text{Fe}(\text{CN})_6]^{3-}$, $[\text{Co}(\text{CN})_6]^{3-}$
- b. CrO_2Cl_2 , MnO_4^-
- c. TiO_3 , MnO_2
- d. $[\text{Co}(\text{CN})_6]^{3-}$, MnO_3

Ans : b

Chromium is present in +6 oxidation state in CrO_2Cl_2 . Similarly Manganese is present in +7 oxidation state in MnO_4^-

Vikasana - CET 2012