



**Wings**

## Inorganic Chemistry\_Revision\_Set II

**DATE:** 08-01-2022

**TIME:** 200mins

**1 The concentration of dissolved oxygen (DO) in cold water can go upto :**

**Correct Options:**

**(B)** 10 ppm

**Solution:**

In cold water, dissolved oxygen (DO) can reach a concentration upto 10 ppm.

**2 Which of the following is not a green house gas ?**

**Correct Options:**

**(A)** CO

**Solution:**

-

**3 Electronic configuration of Eu (Z = 63) is :**

**Correct Options:**

**(B)**  $(\text{Xe})4f^76^2$

**Solution:**

-

**4** Which oxide of nitrogen is not a common pollutant introduced into the atmosphere both due to natural and human activity?

**Correct Options:**

**(A)**  $\text{N}_2\text{O}_5$

**Solution:**

**5 The electronic configuration of copper is**

**Correct Options:**

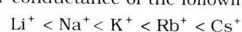
**(B)**  $[\text{Ar}] 4s^1 3d^{10}$

**Solution:**

-

**6**

**Statement I** Molar conductance of the following aqueous ion is



**Statement II** More the hydration of cation more will be the conductivity.

**Correct Options:**

(C)

Statement I is true but Statement II is false

**Solution:**

.....

**7      The artificial sweetener stable at cooking temperature and does not provide calories is**

**Correct Options:**

(C) sucralose

**Solution:**

Sucralose is trichloro derivative of sucrose. Its appearance and taste is like sugar. It is stable at cooking temperature and it does not provide calories.

**8      A reduction in atomic size with increase in atomic number is a characteristic of elements of:**

**Correct Options:**

(B) f-block

**Solution:**

-

**9      Kjeldahl's method cannot be used for the estimation of nitrogen in:**

**Correct Options:**

(D) All

**Solution:**

Three compound Pyridine, Nitro, Azo donot gives positive Kjeldahl's test

**10      The drug used for reducing fever is called**

**Correct Options:**

(C) antipyretic

**Solution:**

Auxochromes intensify the colour given by the chromophores. They by themselves do not give colour

**11      A water sample has ppm level concentration of following anions**

$F^- = 10$  ;  $SO_4^{2-} = 100$  ;  $NO_3^- = 50$

**The anion/anions that make/makes the water sample unsuitable for drinking is/are:**

$F^- = 10$  ;  $SO_4^{2-} = 100$  ;  $NO_3^- = 50$

**Correct Options:**

(B) only  $F^-$

**Solution:**

Acceptable level  $F^-$  upto 1PPM  $NO_3^-$  upto 50 PPM  $SO_4^{2-}$  upto 500 PPM

**12      Identify the pollutant gases largely responsible for the discoloured and lusterless nature of marble of the Taj Mahal.**

**Correct Options:**

(A)  $SO_2$  and  $NO_2$

**Solution:**

-

**13 Chloroamphenicol is an**

**Correct Options:**

**(D)** antibiotic-broad spectrum

**Solution:**

**14 Arrange  $\text{Ce}^{3+}$ ,  $\text{La}^{3+}$ ,  $\text{Pm}^{3+}$ , and  $\text{Yb}^{3+}$  in increasing order of their ionic radius -**

**Correct Options:**

**(A)**  $\text{Yb}^{3+} < \text{Pm}^{3+} < \text{Ce}^{3+} < \text{La}^{3+}$

**Solution:**

$\text{Yb}^{3+} < \text{Pm}^{3+} < \text{Ce}^{3+} < \text{La}^{3+}$

**15 Antiseptics and disinfectants either kill or prevent growth of microorganisms. Identify which of the following statements is not true.**

**Correct Options:**

**(A)**  
Dilute solutions of boric acid and hydrogen peroxide are strong antiseptics.

**Solution:**

**16 Which one of the following is not a common component of photochemical smog?**

**Correct Options:**

**(D)** Chlorofluorocarbons

**Solution:**

**17 Among the following, the one that is not a greenhouse gas is**

**Correct Options:**

**(A)** sulphur dioxide

**Solution:**

**(a) :** Besides carbon dioxide, other greenhouse gases are methane, water vapours, nitrous oxide, CFCs and ozone.

**18 The upper stratosphere consisting of the ozone layer protects us from the sun's radiation that falls in the wavelength region of :**

**Correct Options:**

**(D)** 200 – 315 nm

**Solution:**

The upper stratosphere consists of considerable amount of ozone ( $\text{O}_3$ ), which protects us from the harmful ultraviolet (UV) radiations ( $\lambda = 255 \text{ nm}$ ) coming from the sun.

s-option (4) is correct.

**19 The pH of rain water, is approximately :**

**Correct Options:**

**(D)** 5.6

**Solution:**

pH of rain water is approximately 5.6.

**20 Aspirin is**

**Correct Options:**

**(C)** Sedative

**Solution:**

Tranquilizers reduce anxiety and tension they are also called psychotropic drugs. These are of two type.(a) Sedative the drugs used for violent and mentally agitated patient e.g., Equanil and diazepam.(b) Antidepressant - The drug are used to patients who are highly depressed and lose self confidence e.g. tofranil vitalin, amphetamine etc.

**21 The molecule that has minimum/no role in the formation of photochemical smog, is :**

**Correct Options:**

**(A)** N<sub>2</sub>

**Solution:**

The common components of photo chemical smog are ozone, nitric oxide, acrolein, formaldehyde & peroxyacetyl nitrate (PAN).

**22 Which of the following metal is leached by cyanide process?**

**Correct Options:**

**(A)** Ag

**Solution:**

CONCEPTUAL

**23**  
**Green chemistry means such reactions which**

**Correct Options:**

**(D)**  
reduce the use and production of hazardous chemicals.

**Solution:**

**(d) :** Green chemistry is the design, development, and implementation of chemical products and processes to reduce or eliminate the use and generation of substances hazardous to human health and the environment. Green chemistry also refers to the redesign of chemical products and processes with the goal of reducing or eliminating any negative environmental or health effects.

**24 The mechanism of action of Terfenadine (Seldane) is:**

**Correct Options:**

**(D)** Inhibits the action of histamine receptor

**Solution:**

Seldane is an anti-histamine drug that has inhibitory action on histamine receptor.

25

Mixture of chloroxylenol and terpineol acts as

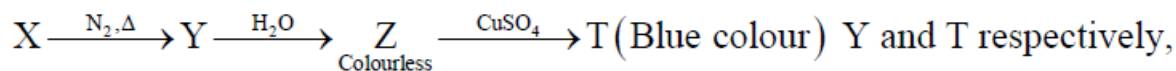
Correct Options:

(A) antiseptic

Solution:

Dettol which is a well known antiseptic is a mixture of chloroxylenol and c-terpineol in a suitable solvent.

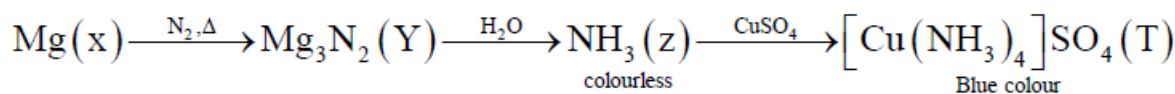
26



Correct Options:

(B)  $Mg_3N_2, [Cu(NH_3)_4]SO_4$ 

Solution:



27 The white paint lithopone is

Correct Options:

(B)  $ZnO + BaSO_4$ 

Solution:

conceptual

28

कच्ची (अपरिष्कृत) धातुओं के परिशोधन के लिए कौनसी विधि सही नहीं है ?

Correct Options:

(D) मॉण्ड प्रक्रम : एलुमिनियम

Solution:

मॉण्ड प्रक्रम Ni के परिशोधन की विधि है :



29 The effect of lanthanoid contraction in the lanthanoid series of elements by and large means :

Correct Options:

(B) decrease in both atomic and ionic radii

Solution:

The effect of lanthanoid contraction is overall decrease in atomic &amp; ionic radii from lanthanum to lutetium.

30

Column I (Radicals)	Column II (colour of borax bead in hot oxidizing flame)
(A) $Co^{2+}$	(p) Violet
(B) $Fe^{2+}$	(q) Blue
(C) $Cr^{3+}$	(r) Green
(D) $Mn^{2+}$	(s) Yellowish brown

Correct Options:

(A) A→q ; B→s; C→r; D→p

**Solution:**

conceptual

**31** Match the tests with the respective salt solutions:

**Column – I**

- A) White ppt. formation with aq.  $\text{BaCl}_2$
- B) Add excess of  $\text{HNO}_3$  and then ammonium molybdate., yellow ppt
- C) Add Conc.  $\text{H}_2\text{SO}_4$ , a pungent smell gas is evolved.
- D) Add  $\text{Na}_2\text{HPO}_4$  with  $\text{NH}_4\text{Cl}$  and  $\text{NH}_4\text{OH}$  a white ppt.

**Column – II**

- p)  $\text{BiCl}_3$
- q)  $(\text{CH}_3\text{COO})_2\text{Mg}$
- r)  $(\text{NH}_4)_3\text{PO}_4$
- s)  $\text{Na}_2\text{SO}_4$

**Correct Options:**

(A) a) r,s; b) r; c) p; d) p,q

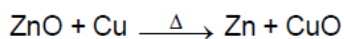
**Solution:**

conceptual

**32** Incorrect reduction process is :

**Correct Options:**

(C)



**Solution:**

Zn has more oxygen affinity than copper.

**33** The metal sulphide (A) is

**Correct Options:**

(B) ZnS

**Solution:**

conceptual

**34** Statement - I :- Molten  $\text{AlBr}_3$  is poor conductor of electricity

Statement - II :-  $\text{AlBr}_3$  being ionic in nature provides  $\text{Al}^{+3}$  and  $\text{Br}^-$  ions.

**Correct Options:**

(C) STATEMENT-1 is True, STATEMENT-2 is False

**Solution:**

CONCEPTUAL

**35** Which of the following ore is concentrated by froth floatation process

**Correct Options:**

(B) Silver glance

**Solution:**

CONCEPTUAL

**36** Ammonium dichromate is used in fire works. The green coloured power blown in the air is

**Correct Options:**

(B)  $\text{Cr}_2\text{O}_3$

**Solution:**

conceptual

**37** Of the following the metals that can not be obtained by electrolysis of the aqueous solution of their salts are

Correct Options:

(B) Mg

Solution:

CONCEPTUAL

**38** Number of unpaired electrons present in Thulium ( $\text{Tm}^{+2}$ ) and Holmium ( $\text{Ho}^{+3}$ ) are respectively :

(A) 0, 3

(B) 1, 4

(C) 2, 4

(D) 1, 3

Correct Options:

(B) B

Solution:

B

**39** The gas (E) is

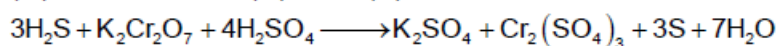
Correct Options:

(A)  $\text{SO}_2$

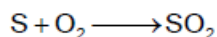
Solution:



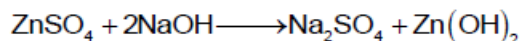
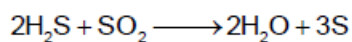
(A) (C) (B)



(B) (D)



(D) (E)



**40** Position of non-polar and polar part in micelle

Correct Options:

(A) polar at outer surface but non-polar at inner surface

Solution:

(a) : Micelles are the clusters or aggregates formed in solution by association of colloids. Usually such

molecules have a lyophobic group and a lyophilic group. The long hydrocarbon is the lyophobic portion which tries to recede away from the solvent water and the ionisable lyophilic group which tends to go into water resulting into ions. As the concentration is increased the lyophobic parts receding away from the solvent approach each other and form a cluster. Thus, the lyophobic ends are in the interior and lyophilic groups projecting outward in contact with the solvent.

**41 Consider the following statements :**

**S<sub>1</sub> : In extraction of iron from haematite ore, the reduction reactions take place only in the lower temperature range in the blast furnace.**

**S<sub>2</sub> : Calamine is a carbonate ore of zinc.**

**S<sub>3</sub> : The principal ore of aluminium, bauxite, usually contains silica, iron oxides and titanium oxide as impurities.**

**S<sub>4</sub> : Solidified copper obtained from silica lined convertor (Bessemer converter) has blistered appearance due to the evolution of SO<sub>2</sub>.**

**and arrange in the order of true/false.**

**Correct Options:**

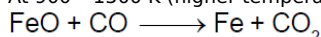
**(A) F T T T**

**Solution:**

S<sub>1</sub> : At 500 – 800 K (lower temperature range in the blast furnace)



At 900 – 1500 K (higher temperature range in the blast furnace)



S<sub>2</sub> : calamine is ZnCO<sub>3</sub>

S<sub>3</sub> : It contains Fe<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub> and TiO<sub>2</sub> as impurities

S<sub>4</sub> : The surface of solidified copper has blistered like appearances due to the evolution of SO<sub>2</sub> and so it is called blister copper.

**42 Down's cell is use for extraction of**

**Correct Options:**

**(C) Na**

**Solution:**

CONCEPTUAL

**43**

Which mixture of the solutions will lead to the formation of negatively charged colloidal [AgI]I<sup>-</sup> sol?

**Correct Options:**

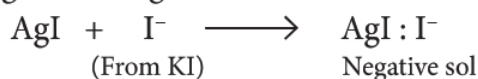
**(B)**

50 mL of 1 M AgNO<sub>3</sub> + 50 mL of 1.5 M KI

**Solution:**



**(b) :** If colloidal sol of AgI is prepared by adding KI solution to AgNO<sub>3</sub> till KI is in slight excess, iodide ion (I<sup>-</sup>) will be adsorbed on the surface of AgI thereby, giving a negative charge to the sol.



**44 Select incorrect statement(s)**

**Correct Options:**

**(D)**  
transition elements cannot form complexes.

**Solution:**

conceptual

**45 42. Match the following**

Column – I		Column – II	
(A)	Zn	(p)	Self reduction
(B)	Pb	(q)	Fused salt electrolysis
(C)	Ca	(r)	Carbon reduction
(D)	Cu	(s)	Electrolytic purification

**Correct Options:**

**(A)** (A – r), (B – s), (C – q), (D – p, s)

**Solution:**

conceptual

**46 STATEMENT - 1**  
**Thermite mixture Fe<sub>2</sub>O<sub>3</sub> + Al (powder) is used in the welding**  
**STATEMENT-2**  
**Al is a good reductant.**

**Correct Options:**

**(B)**  
STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is NOT a correct explanation for STATEMENT-1

**Solution:**

CONCEPTUAL

**47**  
Measuring zeta potential is useful in determining which property of colloidal solution?

**Correct Options:**

**(C)** Stability of the colloidal particles

**Solution:**

**(c) :** Measuring zeta potential is useful in determining stability of the colloidal particles.

**48 STATEMENT-1:**  
**Chalcocite, chalcopyrites are the ores of copper**  
**STATEMENT-2:**  
**They are mainly used to extract Cu**

**Correct Options:**

(A)

Statement – 1 is True, Statement  
– 2 is True; Statement – 2 is a  
correct explanation for Statement  
– 1.

**Solution:**

Chalcocite  $\text{Cu}_2\text{S}$  and chalcopyrite  $\text{Cu}_2\text{S} \cdot \text{Fe}_2\text{S}_3$  are used for extraction of Cu.

49

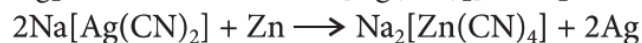
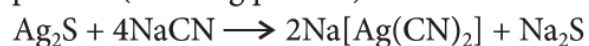
Sulphide ores of metals are usually concentrated by froth floatation process. Which one of the following sulphide ores offer an exception and is concentrated by chemical leaching?

**Correct Options:**

(D) Argentite

**Solution:**

(d) : Leaching process involves the treatment of the ore with a suitable reagent as to make it soluble while impurities remain insoluble. The ore is recovered from the solution by suitable chemical method. Argentite or silver glance,  $\text{Ag}_2\text{S}$  is an ore of silver. Silver is extracted from argentite by the Mac-Arthur and Forest cyanide process (leaching process).



50

Select the **CORRECT** order of property regarding p-block elements.

**Correct Options:**

(C)

$\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$  (Reducing Character).

**Solution:**

-

51

The Langmuir adsorption isotherm is deduced using the assumption

**Correct Options:**

(A) the adsorption sites are equivalent in their ability to adsorb the particles

**Solution:**

(a) : Langmuir adsorption isotherm is based on the assumption that every adsorption site is equivalent and that the ability of a particle to bind there is independent of whether nearby sites are occupied or not occupied.

**52** Conc.  $\text{HNO}_3$  is added before proceeding to test III group radicals, because

Correct Options:

(D) convert  $\text{Fe}^{2+}$  ion to  $\text{Fe}^{3+}$  ions

Solution:

(D) In presence of  $\text{H}_2\text{S}$  gas  $\text{Fe}^{3+}$  reduced to  $\text{Fe}^{2+}$ , and therefore to convert it again to  $\text{Fe}^{3+}$   $\text{HNO}_3$  is added.

**53** In the extraction of iron, the slag produced is

Correct Options:

(D)  $\text{CaSiO}_3$

Solution:

$\text{CaSiO}_3$  is the slag formed in the extraction of iron and  $\text{FeSiO}_3$  is the slag formed in the extraction of copper.

**54** गलत अपचयन प्रक्रिया है :

Correct Options:

(C)  $\text{ZnO} + \text{Cu} \xrightarrow{\Delta} \text{Zn} + \text{CuO}$

Solution:

Zn की ऑक्सीजन बंधुता कॉपर से अधिक होती है।

**55** Zinc blende is concentrated by

Correct Options:

(D) Froth floatation process

Solution:

conceptual

**56** The Langmuir adsorption isotherm is deduced using the assumption

Correct Options:

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**57** Position of non-polar and polar part in micelle

Correct Options:

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**Solution:**

**(a) :** Micelles are the clusters or aggregates formed in solution by association of colloids. Usually such

molecules have a lyophobic group and a lyophilic group. The long hydrocarbon is the lyophobic portion which tries to recede away from the solvent water and the ionisable lyophilic group which tends to go into water resulting into ions. As the concentration is increased the lyophobic parts receding away from the solvent approach each other and form a cluster. Thus, the lyophobic ends are in the interior and lyophilic groups projecting outward in contact with the solvent.

**58 Which of the following crystals acquire brownish yellow colour due to atmospheric oxidation -**

**Correct Options:**

**(C)**  $\text{FeSO}_4$

**Solution:**

$\text{FeSO}_4 \xrightarrow{\text{air}} \text{Fe}_2(\text{SO}_4)_3$  Brownish yellow

**59 Mac-Arthur forrest process is used for the extraction of**

**Correct Options:**

**(D)** Ag

**Solution:**

conceptual

**60 The chemical composition of the slag formed during smelting process is**

**Correct Options:**

**(B)**  $\text{FeSiO}_3$

**Solution:**

conceptual

**61 On igniting  $\text{Fe}_2\text{O}_3$  at  $1400^\circ\text{C}$  in blast furnace, the product obtained is**

**Correct Options:**

**(D)** *Metallic iron*

**Solution:**

CONCEPTUAL

**62 In the thermite process, the reducing agent is**

**Correct Options:**

**(D)** Aluminium

**Solution:**

Conceptual

**63 When calomel reacts with  $\text{NH}_4\text{OH}$ , we get?**

**Correct Options:**

(A)  $\text{HgNH}_2\text{Cl}$

**Solution:**

CONCEPTUAL

**64 Stainless steel does not rust because**

**Correct Options:**

(A)  
chromium and nickel combine  
with iron

**Solution:**

conceptual

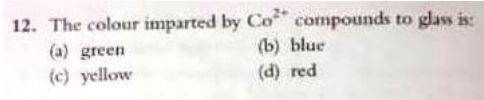
**65 STATEMENT - 1**  
 **$[\text{Ni}(\text{CN})_4]^{2-}$  is square planar and diamagnetic**  
**STATEMENT - 2**  
**It has no unpaired electrons due to presence of strong ligand**

**Correct Options:**

(A)  
Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

CONCEPTUAL

**66** 

**Correct Options:**

(B) B

**Solution:**

B

**67**

निम्न में से कौनसा तापीय अपचयन को दर्शाता है ?

**Correct Options:**

(A)  
 $3\text{Mn}_2\text{O}_4 + 8\text{Al} \longrightarrow 9\text{Mn} + 4\text{Al}_2\text{O}_3$

**Solution:**

Al को तापीय अपचयन में अपचायक के रूप में प्रयुक्त करते हैं।

**68 Which of the following is not a basic flux?**

**Correct Options:**

(C)  $\text{SiO}_2$

**Solution:**

CONCEPTUAL

69

The process of the isolation of a metal by dissolving the ore in a suitable chemical reagent followed by precipitation of the metal by a more electropositive metal is called :

Correct Options:

(A) hydrometallurgy

Solution:

A hydrometallurgical process for the extraction of metals from ores, concentrates, or secondary materials essentially contains three basic steps —dissolution of the valuable metal in the aqueous solution (leaching) purification of leach solution and subsequent recovery of metal from the purified solutions either by electrolysis or by adding some electropositive metal to it

70

Which one of the following is a mineral of iron?

Correct Options:

(D) Magnetite

Solution:

(d) : Magnetite is  $\text{Fe}_3\text{O}_4$  and contains upto 70% of iron metal.

71 The metallic lustre exhibited by sodium is explained by the presence of

Correct Options:

(B) conducting electrons

Solution:

CONCEPTUAL

72 **STATEMENT - 1**  
Cu is extracted from  $\text{CuFeS}_2$  by self reduction process.  
**STATEMENT - 2**  
Blister copper is obtained from self reduction.

Correct Options:

(B)  
Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is NOT a  
correct explanation for Statement  
- 1.

Solution:

conceptual

73 एलुमिनियम के व्यवसायिक निष्कर्षण में उपयोग में आने वाला वैद्युत अपघट्य है :

Correct Options:

(C)  $\text{Al}_2\text{O}_3$ ,  $\text{Na}_3\text{AlF}_6$  व  $\text{CaF}_2$  का गलित मिश्रण

Solution:

वैद्युत अपघट्य ( $\text{Na}_3\text{AlF}_6$  &  $\text{CaF}_2$ ) का कार्य गलनांक को घटाना तथा गलित मिश्रण को चालक बनाना होता है।

74 **STATEMENT - 1**  
 $[\text{Fe}(\text{CN})_6]^{4-}$  is an inner orbital complex.  
**STATEMENT - 2**  
 $\text{CN}^-$  is a strong field ligand which forces pairing of electrons.

Correct Options:

(A)

Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

CONCEPTUAL

**75 STATEMENT - 1**

**The ligands nitro and nitrite are called ambidentate ligands.**

**STATEMENT - 2**

**These ligands give linkage isomers.**

**Correct Options:**

(A)

Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

conceptual

**76 Which process of purification is represented by the following equation :**

$$\text{Ti (impure)} + 2\text{I}_2 \xrightarrow{250^\circ\text{C}} \text{TiI}_4 \xrightarrow{1400^\circ\text{C}} \text{Ti (Pure)} + 2\text{I}_2$$

**Correct Options:**

(C) Van-Arkel process

**Solution:**

**77**

The protecting power of lyophilic colloidal sol is  
expressed in terms of

**Correct Options:**

(B)

gold number

**Solution:**

**78 Consider the following statements :**

**S<sub>1</sub> : In electrolytic refining, the impurities from the blister copper deposits anode mud which contains antimony, selenium, tellurium, silver, gold and platinum. (From copper pyrites)**

**S<sub>2</sub> : In Serpeck's process silica is removed by heating the bauxite to 1800°C with coke in a current of N<sub>2</sub>.**

**S<sub>3</sub> : Chalcocite and azurite are ores of copper.**

**S<sub>4</sub> : The tin is obtained by the carbon reduction of black tin.  
and arrange in the order of true/false.**

**Correct Options:**

(D) T T T T

**Solution:**

S<sub>1</sub> : The mud obtained below the anode contains unreactive Sb, Se, Te, Ag, Au and Pt.

S<sub>2</sub> :  $\text{SiO}_2 + 2\text{C} \xrightarrow[\text{N}_2(\text{g})]{1800^\circ\text{C}} \text{Si} \uparrow + 2\text{CO} \uparrow$  (Serpeck's method)

At this temperature silicon is volatile

S<sub>3</sub> : Chalcocite is CuFeS<sub>2</sub> and azurite is 2CuCO<sub>3</sub>·Cu(OH)<sub>2</sub>.

S<sub>4</sub> : Purified cassiterite ore containing 60-70% SnO<sub>2</sub> is called black tin.

$\text{SnO}_2$  (black tin) + 2C  $\longrightarrow$  Sn + 2CO (carbon reduction).

**79** The common impurities present in the bauxite ore are

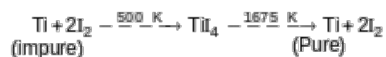
**Correct Options:**

**(C)**  $\text{Fe}_2\text{O}_3$  and  $\text{SiO}_2$

**Solution:**

CONCEPTUAL

**80** Which method of purification is represented by the equations ?



**Correct Options:**

**(C)** Van Arkel

**Solution:**

Purification of Ti and Zr are performed by Van Arkel method as given in the question.

**81** Which one of the following method is commonly used method for destruction of colloid?

**Correct Options:**

**(D)** By adding electrolyte

**Solution:**

**(d) :** By adding electrolytes the colloidal particles are precipitated. The electrolytes neutralise the charge of colloids leading to their coagulation and thus, destroy the colloid.

**82** In the commercial electrochemical process for aluminum extraction, electrolyte used is:

**Correct Options:**

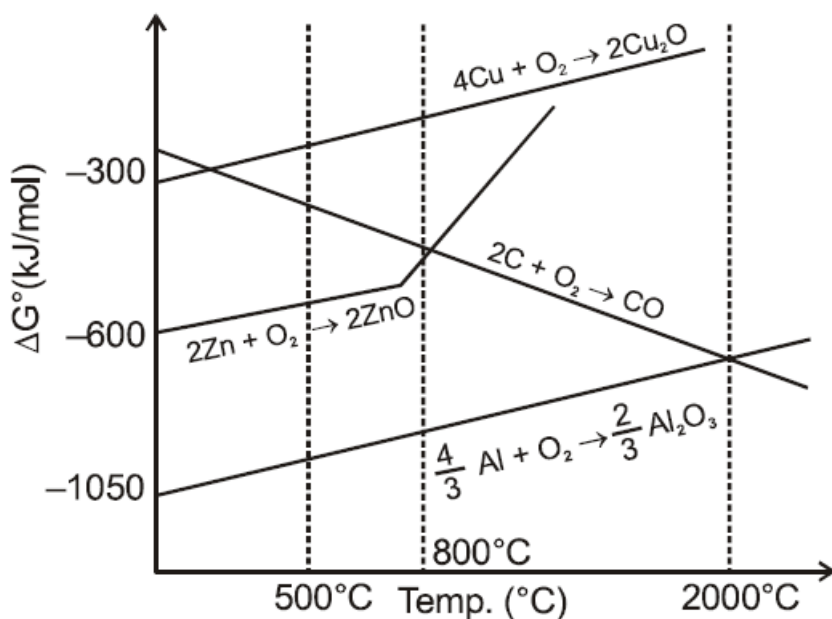
**(C)** a molten mixture of  $\text{Al}_2\text{O}_3$  and  $\text{Na}_3\text{AlF}_6$

**Solution:**

conceptual



83 The correct statement regarding the given Ellingham diagram is :



Correct Options:

(A)  
At 1400°C, Al can be used for the extraction of Zn from ZnO

Solution:

According to given Ellingham diagram Al can reduce ZnO.  $3\text{ZnO} + 2\text{Al} \rightarrow 3\text{Zn} + \text{Al}_2\text{O}_3$ .

84 **STATEMENT - 1**  
Complex formation can be seen as a Lewis acid-base reaction.  
**STATEMENT - 2**  
There occurs formation of co-ordinated covalent bond between empty orbitals of metals and filled orbital of ligands.

Correct Options:

(A)  
Statement - 1 is True, Statement - 2 is True; Statement - 2 is a correct explanation for Statement - 1.

Solution:

CONCEPTUAL

85 **Manganese steel is used for making railway tracks because-**

Correct Options:

(A)  
it is hard with high percentage of Mn

Solution:

Mn in iron makes it hard

86 **In the commercial extraction of lead from its sulphide ore, a metal is formed by reduction of PbO with :**

Correct Options:

(C) PbS

Solution:

87 Which of the following is not a hydroxide ore

Correct Options:

(D) Cuprite

Solution:

88

Match list I with list II and select the correct answer using the codes given below the lists .

**List I**

- A** van Arkel method  
**B** Solvay process  
**C** Cupellation  
**D** Poling

**List II**

- 1.** Manufacture of caustic sods  
**2.** Purification of titanium  
**3.** Manufacture of  $\text{Na}_2\text{CO}_3$   
**4.** Purification of copper  
**5.** Refining of silver

Correct Options:

(C) 2 3 5 4

Solution:

CONCEPTUAL

89 In which of the following all salts are almost insoluble in water?

Correct Options:

(B)  $\text{Fe}(\text{OH})_3$ ,  $\text{PbCl}_2$ ,  $\text{MgF}_2$

Solution:

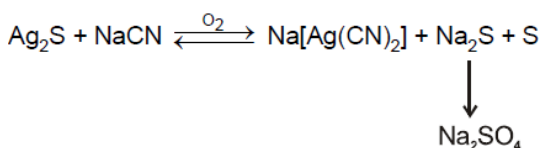
CONCEPTUAL

90 Leaching of  $\text{Ag}_2\text{S}$  by  $\text{NaCN}$  solution is carried out in the presence of air it because :

Correct Options:

(C) both (A) and (B)

Solution:



91 In zone refining method the molten zone

Correct Options:

(B)  
contains more impurity than the original metal

Solution:

conceptual

92 **STATEMENT - 1**  
Wrought iron is prepared from cast iron by oxidizing impurities in a reverberatory furnace lined with haematite.  
**STATEMENT-2**  
Haematite oxidizes carbon to carbon monoxide

Correct Options:

**(A)**

STATEMENT-1 is True, STATEMENT-2 is True; STATEMENT-2 is a correct explanation for STATEMENT-1

**Solution:**

CONCEPTUAL

**93**

84. For the reaction,

$$A + 2B \longrightarrow C + D, \frac{d[A]}{dt} = k[A][B]^2$$

the expression for  $\frac{d[B]}{dt}$  will be:

(a)  $2k[A][B]^2$  (b)  $\frac{1}{2}k[A][B]^2$   
(c)  $k[A][B]^2$  (d)  $k[A][B/2]^2$

**Correct Options:**

**(A)** A

**Solution:**

A

**94 Thomas slag is**

**Correct Options:**

**(C)**

Tricalcium phosphate and calcium silicate

**Solution:**

CONCEPTUAL

**95 In the alumina thermite process Al acts as**

**Correct Options:**

**(C)** a reducing agent

**Solution:**

CONCEPTUAL

**96 Poling process is used**

**Correct Options:**

**(A)**

for the removal of  $\text{Cu}_2\text{O}$  from Cu

**Solution:**

CONCEPTUAL

**97 In the Hoop's process of aluminium extraction , the fused materials remain in three different layers . These layers remain separated even in electrolytic reduction , because :**

**Correct Options:**

**(C)**

all the layers have different densities

**Solution:**

CONCEPTUAL

- 98 STATEMENT-1 :**  
**Zinc is used for the recovery of Ag from the complex  $[\text{Ag}(\text{CN})_2]^-$**   
**STATEMENT-2 :**  
**Zinc is more electropositive than Ag.**

**Correct Options:**

- (A)**  
Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

conceptual

- 99 Ferrous sulphate on heating gives:**

**Correct Options:**

- (A)**  $\text{SO}_2$  and  $\text{SO}_3$

**Solution:**

conceptual

- 100 Identify the statement which is not correct regarding  $\text{CuSO}_4$ .**

**Correct Options:**

- (C)** It reacts with KCl to give  $\text{Cu}_2\text{Cl}_2$

**Solution:**

conceptual

- 101 The following metal is purified by Zone refining**

**Correct Options:**

- (A)** Ge

**Solution:**

CONCEPTUAL

- 102 STATEMENT-1**  
**The complex  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$  gives no precipitate with  $\text{AgNO}_3$  solution.**  
**STATEMENT-2**  
**The given complex is non-ionizable.**

**Correct Options:**

- (A)**  
Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

CONCEPTUAL

- 103  $\text{La}(\text{OH})_3$  is more basic than  $\text{Lu}(\text{OH})_3$  because :**

**Correct Options:**

- (B)**  $\text{La}^{3+}$  is larger in size than  $\text{Lu}^{3+}$

**Solution:**

-

**104 STATEMENT-1 :**  
 **$\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$  is white**  
**STATEMENT-2 :**  
 **$\text{Zn}^{2+}$  has filled  $3d^{10}$  configuration.**

**Correct Options:**

**(A)**  
Statement – 1 is True, Statement  
– 2 is True; Statement – 2 is a  
correct explanation for Statement  
– 1.

**Solution:**

d-d transition is not possible, in  $d^{10}$ .

**105 The most abundant metal in the earth's crust is**

**Correct Options:**

**(A)** Al

**Solution:**

CONCEPTUAL

**106**  
आयरन के धातुकर्म के सम्बन्ध में वात्या भट्टी में नहीं होने वाली अभिक्रिया को पहचानिये :

**Correct Options:**

**(C)**  $\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3$

**Solution:**

यह अभिक्रिया कॉपर के धातुकर्म में होती है।

**107**  
एलुमिनियम के व्यवसायिक निष्कर्षण में उपयोग में आने वाला वैद्युत अपघट्य है :

**Correct Options:**

**(C)**  $\text{Al}_2\text{O}_3$ ,  $\text{Na}_3\text{AlF}_6$  व  $\text{CaF}_2$  का गलित मिश्रण

**Solution:**

वैद्युत अपघट्य ( $\text{Na}_3\text{AlF}_6$  &  $\text{CaF}_2$ ) का कार्य गलनांक को घटाना तथा गलित मिश्रण को चालक बनाना होता है।

**108**  
Measuring zeta potential is useful in determining  
which property of colloidal solution?

**Correct Options:**

**(C)** Stability of the colloidal particles

**Solution:**

**(c)** : Measuring zeta potential is useful in  
determining stability of the colloidal particles.

**109 The metal extracted by leaching with cyanide  
is :**

**Correct Options:**

(B) Ag

Solution:

110

Identify the incorrect statement.

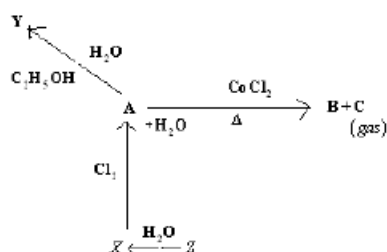
Correct Options:

(D) Gangue is an ore contaminated with undesired materials.

Solution:

(d) : An ore rarely contains only a desired substance. It is usually contaminated with earthly or undesired materials known as gangue.

111



Y reacts with  $\text{HNO}_3$  to form tear gas. If A is kept for long standing in open air, the important product formed is

Correct Options:

(A)  $\text{CaCO}_3$

Solution:

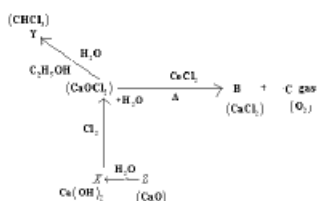


Image caption

112 Which one of the following cannot be obtained from  $\text{B}_2\text{H}_6$

Correct Options:

(D)  $\text{B}_2(\text{CH}_3)_6$

Solution:

Two non terminal H of  $\text{B}_2\text{H}_6$  cannot be replaced.

113 Which of the following commonly used alloys is not a variety of steel, that is, it has no content of iron as such (less than 5%)?

Correct Options:

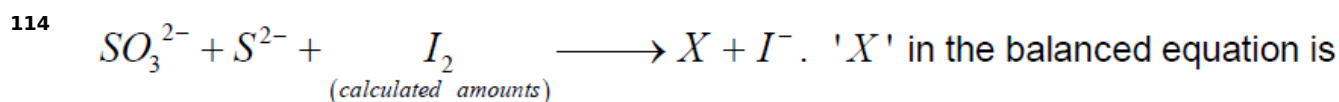
(C) Misch metal

Solution:

Alnico  $\longrightarrow$  Fe = 60, Ni = 20, Al = 12, Co = 8

Invar  $\longrightarrow$  Fe = 64, Ni = 36

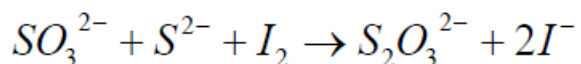
Permalloy  $\longrightarrow$  Fe = 25, Ni = 75



Correct Options:

(C)  $S_2O_3^{2-}$

Solution:



115 Which of the following is the most basic oxide?

Correct Options:

(C)  $Tl_2O$

Solution:

In any group as we move from top to bottom basic strength increases;  $Tl^+$  oxide is more basic than  $Tl^{+3}$  oxide.

116 Molecular shapes of  $SF_4$ ,  $CF_4$  and  $XeF_4$  are:

Correct Options:

(D) different with 1, 0 and 2 lone pairs of electrons respectively

Solution:

S in  $SF_4$  is in  $sp^3d$  hybridized state with one lone pair. C in  $CF_4$  is in  $sp^3$  hybridized state with no lone pair while Xe in  $XeF_4$  is in  $sp^3d^2$  hybridized state with two lone pairs

117 Ozone is a diamagnetic gas having .... colour

Correct Options:

(C) Dark blue colour

Solution:

CONCEPTUAL

118 Nitrogen is liberated by the thermal decomposition of -

Correct Options:

(D) All the three

Solution:

$NH_4NO_2$  liberate nitrogen on heating  
 $(NH_4)Cr_2O_4 \rightarrow Cr_2O_7 + 4H_2O + N_2$

119 The type of hybrid orbitals used by the chlorine atom in  $ClO_3^-$  is

Correct Options:

(A)  $sp^3$

Solution:

conceptual

120

The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are

Correct Options:

(B)  $[\text{Xe}]4f^7 6s^2$ ,  $[\text{Xe}]4f^7 5d^1 6s^2$  and  $[\text{Xe}]4f^9 6s^2$

Solution:

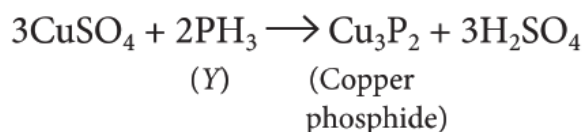
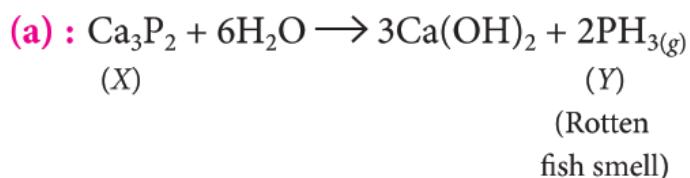
121

A compound 'X' upon reaction with  $\text{H}_2\text{O}$  produces a colourless gas 'Y' with rotten fish smell. Gas 'Y' is absorbed in a solution of  $\text{CuSO}_4$  to give  $\text{Cu}_3\text{P}_2$  as one of the products. Predict the compound 'X'.

Correct Options:

(A)  $\text{Ca}_3\text{P}_2$

Solution:



122 The shape of the orbital designated by the wave function

$\psi_{3,1,0}$  is

Correct Options:

(B) Dumbell

Solution:

conceptual

123 On passing  $\text{H}_2\text{S}$  through  $\text{HNO}_3$ , we get

Correct Options:

(A) Colloidal sulphur

Solution:

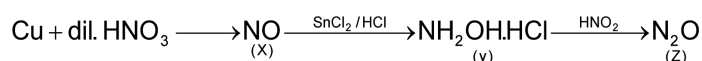
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124 Copper metal on treatment with dilute  $\text{HNO}_3$  produces a gas (X). (X) when passed through acidic solution of stannous chloride, a nitrogen containing compound (Y) is obtained. (Y) on reaction with nitrous acid produces a gas (Z). Gas (Z) is:

Correct Options:

(D)  $\text{N}_2\text{O}$

Solution:





**125** There is no S-S bond in :

**Correct Options:**

**(D)**  $\text{S}_2\text{O}_7^{2-}$

**Solution:**

refer structure.

**126** Ammonia react with excess of chlorine to form :

**Correct Options:**

**(B)**  $\text{NCl}_3$  &  $\text{HCl}$

**Solution:**

With excess chlorine  $\text{NCl}_3$  is formed.

**127** The compound which does not obey the octet rule is -

**Correct Options:**

**(B)**  $\text{SO}_2$

**Solution:**

CONCEPTUAL

**128**

Which of the following statements is not true for halogens?

**Correct Options:**

**(C)** All but fluorine show positive oxidation states.

**Solution:**

**(c) :** All halogens show both positive and negative oxidation states while fluorine shows only negative oxidation state except +1 in  $\text{HOF}$ .

**129** In  $\text{B}_4\text{H}_{10}$ , the number of banana bonds are

**Correct Options:**

**(D)** 4

**Solution:**

CONCEPTUAL

**130** Which of the following is a neutral oxide ?

**Correct Options:**

**(B)**  $\text{NO}$

**Solution:**

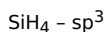
$\text{NO}$  is a neutral oxide.

**131** What is not true for  $\text{SiH}_4$  molecule -

**Correct Options:**

**(D)** 4-lone pair of electrons

**Solution:**



It has no lone pair of e-.

**132 The solubility of noble gases in water shows the order :**

**Correct Options:**

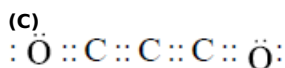
(C)  $\text{Xe} > \text{Kr} > \text{Ar} > \text{Ne} > \text{He}$

**Solution:**

Bigger size results in greater degree of polarisation.

**133 Lewis structure of carbon suboxide ( $\text{C}_3\text{O}_2$ ) in ground state is**

**Correct Options:**



**Solution:**

CONCEPTUAL

**134 Which one of the following oxides is neutral ?**

**Correct Options:**

(A) CO

**Solution:**

NO, CO,  $\text{N}_2\text{O}$  are neutral oxides.

**135**

Match List I (substances) with List II (processes) employed in the manufacture of the substances and select the correct option.

List I (Substances)	List II (Processes)
(A) Sulphuric acid	(i) Haber's process
(B) Steel	(ii) Bessemer's process
(C) Sodium hydroxide	(iii) Leblanc process
(D) Ammonia	(iv) Contact process

**Correct Options:**

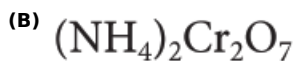
(D) A - (iv), B - (ii), C - (iii), D - (i)

**Solution:**

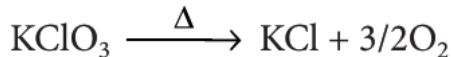
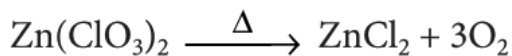
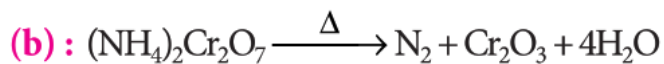
**136**

Which of the following does not give oxygen on heating?

**Correct Options:**



Solution:



137

The basic strength of the hydrides of group 15 elements:

- (a) decreases on moving down the group
- (b) increases on moving down the group
- (c) first decreases upto  $\text{AsH}_3$  and then increases
- (d) first increases upto  $\text{AsH}_3$  and then decreases

Correct Options:

(A)

Solution:

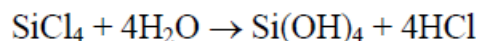
A

- 138 **STATEMENT-1:**  $\text{SiCl}_4$  reacts with water but  $\text{CCl}_4$  does not react with water.  
**STATEMENT-2:**  $\text{SiCl}_4$  is ionic but  $\text{CCl}_4$  is covalent.

Correct Options:

- (C) STATEMENT-1 is True, STATEMENT-2 is False

Solution:



The reaction is possible because Si has vacant 'd' orbital and C does not have the same.  $\text{SiCl}_4$  and  $\text{CCl}_4$ , both are covalent.

- 139 Which compound does not exist?

Correct Options:

- (B)  $\text{PbI}_4$

Solution:

conceptual

140

The pair of species that has the same bond order in the following is

Correct Options:

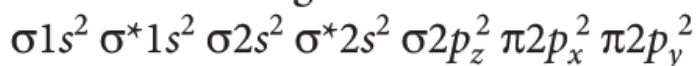
- (A)  $\text{CO}, \text{NO}^+$

Solution:

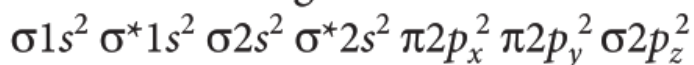
**(a) :**  $\text{CO} = 6 + 8 = 14$  electrons

$\text{NO}^+ = 7 + 8 - 1 = 14$  electrons

Electronic configuration of  $\text{NO}^+$ :



Electronic configuration of  $\text{CO}$  :



So, both have bond order =  $\frac{10-4}{2} = 3$

**141** Which of the following statements is false ?

**Correct Options:**

**(D)** hybridisation state of S in  $\text{SO}_2$  is sp

**Solution:**

Hybridisation of S in  $\text{SO}_2$  is  $\text{sp}^2$ .

**142**

Identify the correct formula of oleum from the following :

**Correct Options:**

**(A)**  $\text{H}_2\text{S}_2\text{O}_7$

**Solution:**

**143** Which is the correct order of density

**Correct Options:**

**(D)** none of these

**Solution:**

All the given orders are incorrect.

**144** Which of the following halide ion is not oxidised by  $\text{MnO}_2$  ?

**Correct Options:**

**(C)**  $\text{F}^-$

**Solution:**

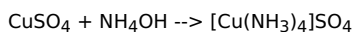
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**145** When  $\text{NH}_4\text{OH}$  is added to copper sulphate solution, blue colour is obtained due to formation of :

**Correct Options:**

**(A)**  $\text{Cu}(\text{NH}_3)_4\text{SO}_4$

**Solution:**



**146** Ionic reaction take place in -

Correct Options:

(C) solution state

Solution:

CONCEPTUAL

147 Molecular orbital is formed by the overlap of two atomic orbitals. It will be called -

Correct Options:

(B) covalent bond

Solution:

conceptual

148

In which of the following compounds, nitrogen exhibits highest oxidation state?

Correct Options:

(C)  $\text{N}_3\text{H}$

Solution:

$$(c) : \text{N}_2\text{H}_4 \Rightarrow 2x + 4(+1) = 0$$

$$\Rightarrow 2x + 4 = 0$$

$$\Rightarrow x = -2$$

$$\text{NH}_3 \Rightarrow x + 3(+1) = 0 \Rightarrow x = -3$$

$$\text{N}_3\text{H} \Rightarrow 3x + 1(+1) = 0$$

$$\Rightarrow 3x + 1 = 0 \Rightarrow x = -1/3$$

$$\text{NH}_2\text{OH} \Rightarrow x + 2 + 1(-2) + 1 = 0$$

$$\Rightarrow x + 1 = 0 \Rightarrow x = -1$$

Thus, highest oxidation state is  $-1/3$ .

149 Sodium thiosulphate is prepared by :

Correct Options:

(B)

boiling  $\text{Na}_2\text{SO}_3$  solution with S in alkaline medium

Solution:

Sodium thiosulfate can be prepared by heating sulfur with either aqueous sodium sulfite solution, aqueous sodium hydroxide solution.

150 The most stable hydride is :

(a)  $\text{NH}_3$

(b)  $\text{PH}_3$

(c)  $\text{AsH}_3$

(d)  $\text{SbH}_3$

Correct Options:

(A)

Solution:

A

**151 Assertion :  $\text{H}_3\text{PO}_3$  and  $\text{H}_3\text{PO}_4$  are tribasic acids as they contain three hydrogen atoms each. Reason : Both  $\text{H}_3\text{PO}_3$  and  $\text{H}_3\text{PO}_4$  are reducing in nature.**

**Correct Options:**

**(D)**

If both Assertion and Reason are false.

**Solution:**

Refer Structure.

**152 Which of the two ions from the list given below have the geometry that is explained by the same hybridization of orbitals,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{NH}_2^-$ ,  $\text{NH}_4^+$ ,  $\text{SCN}^-$  ?**

**Correct Options:**

**(A)**  $\text{NO}_2^-$  and  $\text{NO}_3^-$

**Solution:**

-

**153 Among the following  $\text{MgCl}_2$ ,  $\text{NaCl}$ ,  $\text{Na}_2\text{S}$ ,  $\text{MgS}$  compound having least melting point and highest solubility respectively is :**

**Correct Options:**

**(A)**  $\text{MgS}$ ,  $\text{NaCl}$

**Solution:**

NO SOLUTION

**154 Which of the following hydrides of the oxygen family shows the lowest boiling point?**

**Correct Options:**

**(B)**  $\text{H}_2\text{S}$

**Solution:**

$\text{H}_2\text{O}$  has highest boiling point due to H-bonding but down the group the boiling point increases with increasing molecular weight (as magnitude of van der Waal's force increases) and thus  $\text{H}_2\text{S}$  has lowest boiling point amongst the hydrides of the oxygen family.

**155 The number of S-S bonds in sulphur trioxide trimer ( $\text{S}_3\text{O}_9$ ) is :**

**Correct Options:**

**(D)** zero

**Solution:**

S-O-S linkage is present.

**156 First compound of inert gas was prepared by scientist Neil Barthlet in 1962. This compound is**

**Correct Options:**

**(A)**  $\text{XePtF}_6$

**Solution:**

$\text{Xe}[\text{PtF}_6]$  ;First noble gas compound

**157**

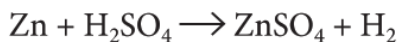
Zn gives  $\text{H}_2$  gas with  $\text{H}_2\text{SO}_4$  and  $\text{HCl}$  but not with  $\text{HNO}_3$  because

**Correct Options:**

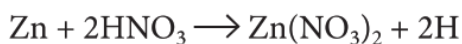
- (D)  $\text{NO}_3^-$  is reduced in preference to hydronium ion.

**Solution:**

(d) : Zinc is on the top position of hydrogen in electrochemical series. So, Zn displaces  $\text{H}_2$  from dilute  $\text{H}_2\text{SO}_4$  and HCl with liberation of  $\text{H}_2$ .



On the other hand,  $\text{HNO}_3$  is one oxidising agent. Hydrogen obtained in the reaction is converted into  $\text{H}_2\text{O}$ .



**158 Arrange the molecules  $\text{H}_2$ ,  $\text{O}_2$ ,  $\text{F}_2$ ,  $\text{N}_2$  in the order of increasing bond length**

**Correct Options:**

- (B)  $\text{H}_2 < \text{N}_2 < \text{O}_2 < \text{F}_2$

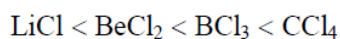
**Solution:**

As number of bond increases bond length decreases.  $\text{H}_2$  has least bond length.

**159 Among  $\text{LiCl}$ ,  $\text{BeCl}_2$ ,  $\text{BCl}_3$  and  $\text{CCl}_4$ , covalent bond character follows the order:**

**Correct Options:**

- (B)



**Solution:**

CONCEPTUAL

**160 Inorganic graphite is -**

**Correct Options:**

- (B) boron nitride (BN)

**Solution:**

conceptual

**161 The compound which gives off oxygen on moderate heating is :**

**Correct Options:**

- (B) mercuric oxide

**Solution:**

Mercury has high polarising power, hence its oxide is least stable.

162

Among the following which is the strongest oxidising agent?

Correct Options:

(D)  $F_2$ 

Solution:

**(d)** : Standard reduction potentials of halogens are positive and decrease from fluorine to iodine. So,  $F_2$  is the strongest oxidising agent.

**163** The correct sequence regarding the bond dissociation energy is

Correct Options:

(A)  $Cl_2 > Br_2 > F_2 > I_2$

Solution:

Interelectronic repulsion decreases the bond energy of fluorine.

164

The metal 'X' is prepared by the electrolysis of fused chloride. It reacts with hydrogen to form a colourless solid from which hydrogen is released on treatment with water. The metal is

Correct Options:

(B) Ca

Solution:

Ca

**165** Which of the following species is not a pseudohalide ?

Correct Options:

(B)  $RCOO^-$ 

Solution:

Pseudo halides are

$CN^-$ ,  $NC^-$ ,  $OCN^-$ ,  $SCN^-$ ,  $SeCN^-$   
 $NCS^-$ ,  $N_3^-$ ,  $NCO^-$

166

The number of unpaired electrons in paramagnetic tetrachloromagnate (II) anion is:

(A) 5

(B) 2

(C) 3

(D) 6

Correct Options:

(A) (A)

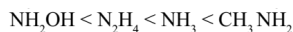
Solution:



**167 The correct arrangement of  $\text{NH}_3$  ,  $\text{N}_2\text{H}_4$  ,  $\text{NH}_2\text{OH}$  and  $\text{CH}_3\text{NH}_2$  in the order of increasing base strength is :**

**Correct Options:**

**(D)**



**Solution:**

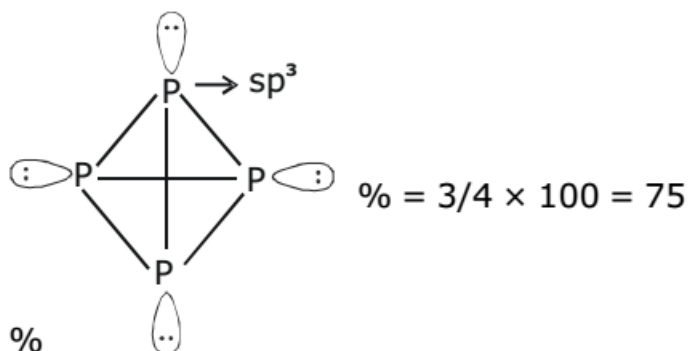
-I group decreases basic strength.

**168 The percentage of p-character in the orbitals forming P-P bonds in  $\text{P}_4$  is**

**Correct Options:**

**(D)** 75

**Solution:**



**169  $\text{BF}_3$  &  $\text{NF}_3$  are covalent compounds , but  $\text{BF}_3$  is non-polar and  $\text{NF}_3$  is polar because  $\text{BF}_3$  is planar symmetrical , but when both will combine so what will be the hybridisation of B & N .**

**Correct Options:**

**(D)**  $\text{sp}^3$  -  $\text{sp}^3$

**Solution:**

Hybridisation of  $\text{NH}_3$  remains same. While hybridisation of  $\text{BF}_3$  changes.

**170 The valency of B in  $\text{BCl}_3$  is 3. This is justified on the basis of -**

**Correct Options:**

**(B)** hybridisation

**Solution:**

CONCEPTUAL

**171 Which of the following overlap will always form  $\pi$  bond**

**Correct Options:**

**(A)**

When  $p_x - p_x$  orbitals overlaps  
colaterally

**Solution:**

-

**172 Among the following, the pair in which the two species are not isostructural is**

**Correct Options:**

(D)  $\text{SiF}_4$  and  $\text{SF}_4$

**Solution:**

$\text{SF}_4$  St NO = 5 hybrid =  $\text{sp}^3\text{d}$  → distorted trigonal bipyramidal

$\text{SiF}_4$  St. NO = 4 hybrid =  $\text{sp}^3$  → Tetrahedral

**173 Hydrogen bonding does not play central role in the following phenomenon**

**Correct Options:**

(C)

$\text{LiHCO}_3$  does not exist in solid form.

**Solution:**

Due to small size of  $\text{Li}^+$  ion and very large size of  $\text{HCO}_3^-$  ion  $\text{LiHCO}_3$  does not crystallize in solid form.

**174 Which one of the following is incorrectly given as per their dipole moments (m)?**

**Correct Options:**

(D)  $\text{XeF}_4$ ,  $\mu \neq 0$

**Solution:**

dipole moment of symmetrical molecule is zero.

**175 STATEMENT 1: Bond length C-O bond decreases when CO forms the complex with Fe as  $\text{Fe}(\text{CO})_5$**

**because**

**STATEMENT 2: The non bonded pair of electrons of metal involves in back bonding with vacant antibonding molecular orbital of CO.**

**Correct Options:**

(D)

STATEMENT-1 is False,  
STATEMENT-2 is True

**Solution:**

Due to the back bonding between metal and -CO and bond order between C - O decreases as  $\pi^*$  s are being accommodated in vacant anti bonding M.O. of CO.

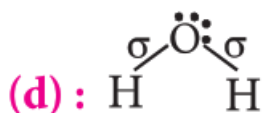
**176**

Which one of the following molecules contains no  $\pi$  bond?

**Correct Options:**

(D)  $\text{H}_2\text{O}$

**Solution:**



**177**

Which of the following compounds is non-polar:

(A)  $\text{CH}_3\text{Cl}$

(B)  $\text{CH}_2\text{Cl}_2$

(C)  $\text{CHCl}_3$

(D)  $\text{CCl}_4$

**Correct Options:**

(D) (D)

**Solution:**

**178 Which of the following statements is correct ?**

**Correct Options:**

**(A)**

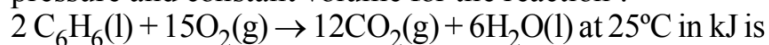
bond order is a measure of the strength of the bond.

**Solution:**

CONCEPTUAL

**179**

The difference between heats of reaction at constant pressure and constant volume for the reaction :



**Correct Options:**

**(A)** -7.43

**Solution:**

-7.43

**180 Arrange the molecules O<sub>2</sub>, F<sub>2</sub>, N<sub>2</sub> in the order of increasing bond length**

**Correct Options:**

**(B)** N<sub>2</sub> < O<sub>2</sub> < F<sub>2</sub>

**Solution:**

CONCEPTUAL

**181 Which of the following statements are true ?**

(i) Gas (A) is used in Holme's signal

(ii) When calcium carbide and calcium phosphide reacts with water produces acetylene and gas (A) is obtained.

(iii) Mixture of acetylene and gas (B) catches fire.

(iv) Acetylene produces a non luminous flame

**Correct Options:**

**(A)** i, ii, iii

**Solution:**

conceptual

**182 Which one of the following molecules the central atom does not have sp<sup>3</sup> hybridization ?**

**Correct Options:**

**(B)** CH<sub>4</sub>

**Solution:**

-

**183 All the following substances react with water. The pair that gives the same gaseous product is**

**Correct Options:**

**(C)** Ca and  $\text{CaH}_2$

**Solution:**

-

**184 Among  $\text{LiCl}$ ,  $\text{RbCl}$ ,  $\text{BeCl}_2$  and  $\text{MgCl}_2$ , the compounds with the greatest and the least ionic character respectively are :**

**Correct Options:**

**(B)**  $\text{RbCl}$  and  $\text{BeCl}_2$ .

**Solution:**

According to Fajan's rule

**185 Which statement regarding benzene and borazine is incorrect ?**

**Correct Options:**

**(C)**  
Reactivity of both towards  $\text{HCl}$  is same

**Solution:**

$\text{B}_3\text{N}_3\text{H}_6$  (borazine) is more reactive w.r.t.  $\text{C}_6\text{H}_6$  (Benzene)

**186  $\text{HCl}$  molecule in the vapour state is an example of -**

**Correct Options:**

**(C)** polar covalent bond

**Solution:**

CONCEPTUAL

**187 Hybridisation of phosphorus in pyrophosphoric acid will be :**

**Correct Options:**

**(B)**  $\text{sp}^2$

**Solution:**

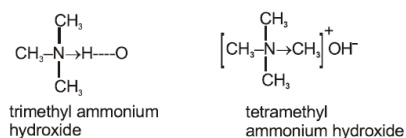
conceptual

**188 Which reason explains the less basic nature of  $(\text{CH}_3)_3\text{NOH}$  than  $(\text{CH}_3)_4\text{NOH}$  in aqueous medium.**

**Correct Options:**

**(A)** Hydrogen bonding

**Solution:**



In trimethyl ammonium hydroxide, OH group is hydrogen bonded to  $\text{Me}_3\text{NH}$  group and this makes it more difficult for OH group to ionize.

**189 Which of the following statement is CORRECT?**

**Correct Options:**

**(C)**  
both  $\text{H}_2\text{O}$  and  $\text{OF}_2$  have a bent structure

**Solution:**

First statement is incorrect, both  $\text{H}_2\text{O}$  and  $\text{OF}_2$  have a bent structure. Similarly, the second statement is also wrong, because  $\text{H}_2\text{O}$  is bent structure.

**190**

Consider the following species :  $\text{CN}^+$ ,  $\text{CN}^-$ ,  $\text{NO}$  and  $\text{CN}$ . Which one of these will have the highest bond order?

**Correct Options:**

**(B)**  $\text{CN}^-$

**Solution:**

**(b) :**  $\text{NO}(15) : (\sigma 1s)^2, (\sigma^* 1s)^2, (\sigma 2s)^2, (\sigma^* 2s)^2, (\sigma 2p_z)^2, (\pi 2p_x)^2 = (\pi 2p_y)^2, (\pi^* 2p_x)^1 = (\pi^* 2p_y)^0$

$$\text{B.O.} = \frac{10-5}{2} = 2.5$$

$\text{CN}^-(14) : (\sigma 1s)^2, (\sigma^* 1s)^2, (\sigma 2s)^2, (\sigma^* 2s)^2, (\pi 2p_x)^2 = (\pi 2p_y)^2, (\sigma 2p_z)^2$

$$\text{B.O.} = \frac{10-4}{2} = 3$$

$\text{CN}(13) : (\sigma 1s)^2, (\sigma^* 1s)^2, (\sigma 2s)^2, (\sigma^* 2s)^2, (\pi 2p_x)^2 = (\pi 2p_y)^2, (\sigma 2p_z)^1$

$$\text{B.O.} = \frac{9-4}{2} = 2.5$$

$\text{CN}^+(12) : (\sigma 1s)^2, (\sigma^* 1s)^2, (\sigma 2s)^2, (\sigma^* 2s)^2, (\pi 2p_x)^2 = (\pi 2p_y)^2$

$$\text{B.O.} = \frac{8-4}{2} = 2$$

Hence,  $\text{CN}^-$  has highest bond order.

**191**

Amongst  $\text{NH}_3$ ,  $\text{BeCl}_2$ ,  $\text{CO}_2$  and  $\text{H}_2\text{O}$ , the non-linear molecules are :

(A)  $\text{BeCl}_2$  and  $\text{H}_2\text{O}$     (B)  $\text{BeCl}_2$  and  $\text{CO}_2$     (C)  $\text{NH}_3$  and  $\text{H}_2\text{O}$     (D)  $\text{NH}_3$  and  $\text{CO}_2$

**Correct Options:**

**(C)** (C)

**Solution:**

192

In which of the following change bond order and magnetic moment both increases ?

Correct Options:

(D)  $C_2 \rightarrow C_2^-$ 

Solution:

 $C_2 = \sigma^2 1s^2, \sigma^{*2} 1s^2, \sigma^2 2s^2, \sigma^{*2} 2s^2, \pi^2 2p_x^2, \pi^2 2p_y^2$ 
 $C_2 \rightarrow C_2^-$  B.O = 2 B.O = 2.5  $\Rightarrow$  0  $\Rightarrow$  1.732 BM

193 STATEMENT - 1

**BF<sub>3</sub> has greater dipole moment than H<sub>2</sub>S**

STATEMENT - 2

**Fluorine is more electronegative than sulphur.**

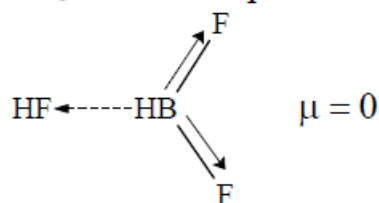
Correct Options:

(D)

Statement - 1 is False, Statement

- 2 is True.

Solution:

BF<sub>3</sub> has zero dipole moment because of its structure.H<sub>2</sub>S has two lone pairs on sulphur atoms and hence it has irregular shape. Thus it possess dipole moment.

194 Which of the following molecular species has unpaired electron (s) ? [JEE 2002]

Correct Options:

(C) O<sub>2</sub><sup>-</sup>

Solution:

N<sub>2</sub> 14 e<sup>-</sup> $\Rightarrow$  unpaired e<sup>-</sup> = 0(B) F<sub>2</sub>  $\Rightarrow$  18 e<sup>-</sup>  $\Rightarrow$  no unpaired e<sup>-</sup>(C) O<sub>2</sub><sup>-</sup>  $\Rightarrow$  17 e<sup>-</sup>  $\Rightarrow$  contain unpaired e<sup>-</sup>(D) O<sub>2</sub><sup>2-</sup>  $\Rightarrow$  18 e<sup>-</sup>  $\Rightarrow$  all e<sup>-</sup> paired

195

Which one of the following molecules has highest dipole moment:

(A) H<sub>2</sub>S(B) CO<sub>2</sub>(C) CCl<sub>4</sub>(D) BF<sub>3</sub>

Correct Options:

(A) (A)

Solution:

**196 Which of the following has minimum energy ?**

**Correct Options:**

**(D)** hydrogen bond

**Solution:**

conceptual

**197** The electronegativity difference between N and F is greater than that between N and H yet the dipole moment of  $\text{NH}_3$  (1.5 D) is larger than that of  $\text{NF}_3$  (0.2 D). This is because

**Correct Options:**

**(B)** in  $\text{NH}_3$ , the atomic dipole and bond dipole are in the same direction whereas in  $\text{NF}_3$  these are in opposite directions

**Solution:**

B

**198 Inert pair effect is prominent characteristic of :**

**Correct Options:**

**(B)** p-block

**Solution:**

CONCEPTUAL

**199 STATEMENT-1:**

**$\text{PCl}_5$  is covalent in gaseous and liquid states but ionic in solid state**

**STATEMENT-2:**

**$\text{PCl}_5$  in solid state consists of tetrahedral  $\text{PCl}_4^+$  and octahedral  $\text{PCl}_6^-$  anion.**

**Correct Options:**

**(A)**

Statement - 1 is True, Statement  
- 2 is True; Statement - 2 is a  
correct explanation for Statement  
- 1.

**Solution:**

$\text{PCl}_5$  is trigonal bipyramidal containing  $\text{sp}^3\text{d}$  hybridized P atom in liquid and gaseous state. Whereas in solid state it consist of tetrahedral  $\text{PCl}_4^+$  cation and octahedral  $\text{PCl}_6^-$  anion.

**200 KF combines with HF to form  $\text{KHF}_2$ . The compounds contains the species**

**Correct Options:**

**(C)**  $\text{K}^+$  and  $\text{HF}_2^-$

**Solution:**

$F^-$  forms H bond with HF therefore the species  $[H \cdots F - H]^-$  or  $HF_2^-$  exists.  
Hence (C) is the correct answer.