

QUESTIONS ON INORGANIC CHEMISTRY

- When H_2S is passed through conc. Nitric acid, in which manner does the oxidation state of Nitrogen change?
 (1) +5 to +2 (2) +5 to +3 (3) +3 to +5 (4) +5 to -4 (5) +5 to +4
- Which of the following substances give CO_2 as the only gaseous product when heated?
 (1) ZnCO_3 (2) Ag_2CO_3 (3) $(\text{NH}_4)_2\text{CO}_3$
 (4) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ (5) KHCO_3
- Which compound is the most acidic in an aqueous solution?
 (1) N_2O_5 (2) P_2O_5 (3) N_2O_3 (4) Br_2O (5) Cl_2O
- Which of the following compounds gives NO_2 when heated?
 (1) N_2O (2) HNO_3 (3) NaNO_3
 (4) NH_4NO_3 (5) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
- P_4O_6 reacts with water to produce,
 (1) H_3PO_4 (2) H_3PO_3 (3) H_3PO_2 (4) HPO_3
 (5) Equimolar mixture of H_3PO_4 and H_3PO_3 .
- Which of the following can be used to differentiate between KBr and HI ?
 (1) HBr (2) KI (3) Br_2 dissolved in toluene
 (4) I_2 dissolved in chloroform (5) None of these can be used
- Out of the following, in which does Chlorine act as a bleaching agent?
 (1) dry air (2) moisture (3) sunlight (4) pure oxygen (5) dry ether
- The main reason to use Hydrogen gas as a fuel is,
 (1) Hydrogen gas is light.
 (2) Heat of combustion of Hydrogen gas is high.
 (3) Hydrogen gas is efficiently adsorbed by some metals.
 (4) Combustion of Hydrogen gas doesn't pollute the environment.
 (5) Hydrogen gas can be stored easily as it can be compressed to a great extent.
- Which of the following gives a precipitate with a solution which contains $\text{Ba}(\text{NO}_3)_2$, H_2O_2 and diluted HNO_3 in excess?
 (1) K_2SO_3 (2) K_2CrO_4 (3) NH_4Br
 (4) $(\text{NH}_4)_2\text{CO}_3$ (5) None of these give a precipitate.
- Which of the following reacts with Potassium (K)?
 (1) C_6H_{12} (2) benzene (3) H_2
 (4) Kr (5) None of these react with Potassium (K)

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11. Which of the following gives a precipitate with aqueous CaCl_2 ?
 (1) $\text{KI}(\text{aq})$ (2) $\text{KNO}_3(\text{aq})$ (3) $\text{Na}_2\text{C}_2\text{O}_4(\text{aq})$
 (4) CO_2 dissolved in water. (5) NO_2 dissolved in water.
12. Which of the following cations is not precipitated by H_2S in acidic medium?
 (1) Pb^{2+} (2) Sn^{2+} (3) Sn^{4+} (4) Bi^{3+} (5) Zn^{2+}
13. Which compound doesn't show acidic properties?
 (1) SiO_2 (2) Cl_2O (3) N_2O (4) Mn_2O_7 (5) B_2O_3
14. Which of the following compounds doesn't undergo thermal decomposition easily?
 (1) PbO_2 (2) SrO (3) Ag_2O (4) BaCO_3 (5) I_2O_5
15. What are the products of the reaction between Carbon and hot conc. HNO_3 ?
 (1) $\text{CO}_2 + \text{NO} + \text{H}_2\text{O}$ (2) $\text{CO}_2 + \text{NO}_2 + \text{H}_2\text{O}$ (3) $\text{CO}_2 + \text{N}_2\text{O} + \text{H}_2\text{O}$
 (4) $\text{CO} + \text{NO}_2 + \text{H}_2\text{O}$ (5) $\text{CO} + \text{NO} + \text{NO}_2 + \text{H}_2\text{O}$
16. Which of the following doesn't react with NaOH ?
 (1) Al_2O_3 (2) P_2O_3 (3) Cl_2O (4) Cu (5) Sn
17. What are the products of the reaction between Sulphur and cold conc. HNO_3 ?
 (1) $\text{H}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$ (2) $\text{H}_2\text{SO}_4 + \text{NO} + \text{H}_2\text{O}$ (3) $\text{SO}_2 + \text{NO}_2 + \text{H}_2\text{O}$
 (4) $\text{SO}_2 + \text{NO} + \text{H}_2\text{O}$ (5) $\text{H}_2\text{SO}_4 + \text{H}_2\text{S} + \text{NO}_2 + \text{NO} + \text{H}_2\text{O}$
18. Cl_2O_7 reacts with water to produce,
 (1) HClO_3 and HClO_4 (2) HClO_3 and HCl (3) HClO_3
 (4) HClO_4 (5) HClO_4 and HCl
19. Reagent which can be used to differentiate between $\text{Na}_2\text{S}_2\text{O}_3$ and Na_2SO_3 is,
 (1) $\text{Br}_2(\text{l})$ (2) I_2/CCl_4 (3) dil. H_2SO_4
 (4) $\text{K}_2\text{CO}_3(\text{aq})$ (5) None of these can be used
20. To store Potassium,
 (1) CHCl_3 can be used (2) CCl_4 can be used
 (3) liquid NH_3 can be used (4) C_6H_6 can be used
 (5) None of the above compounds can be used.
21. When ICl is added to $\text{KI}(\text{aq})$ solution, which of the following is evolved / formed?
 (1) Cl_2 (2) I_2 (3) O_2 (4) KI_2 (5) KICl
22. When NH_4Cl is added to a hot NaNO_2 solution,
 (1) NO_2 is formed (2) N_2O and NO_2 are formed
 (3) N_2O is formed (4) N_2 is formed
 (5) HNO_3 and HNO_2 are formed

23. Formula of the oxide derived from the highest oxidation state of element M having atomic number 41 is,
 (1) M_2O_3 (2) MO_2 (3) M_2O_5 (4) MO_3 (5) M_2O_7
24. A imparts golden yellow colour in flame, reacts with Zn or Al forming H_2 gas. A gives a white precipitate with $ZnCl_2$ or $AlCl_3$ but the precipitate dissolves in excess of A. A is,
 (1) KOH (2) NaOH (3) $Ca(OH)_2$ (4) $Mg(OH)_2$ (5) $Ba(OH)_2$
25. H_2S and SO_2 react in an aqueous solution to produce,
 (1) $S_2O_3^{2-}$ (2) $S_4O_6^{2-}$ (3) HSO_4^- (4) $H_2S_2O_2$ (5) S
26. When Iodine is reacted with dil. aqueous NaOH,
 (1) NaI and $NaIO_4$ are obtained (2) $NaIO_3$ and $NaIO_4$ are obtained
 (3) NaIO is obtained (4) NaIO and $NaIO_3$ are obtained
 (5) NaI and NaIO are obtained
27. Which of the following gives out $O_{2(g)}$ when heated?
 (1) SnO (2) Li_2O (3) $NaNO_2$ (4) $Fe_2(CO_3)_3$ (5) BaO_2
28. Which of the following statements is true regarding the reaction between Sulphur and conc. H_2SO_4 acid?
 (1) H_2O and H_2S are obtained as products
 (2) H_2O and SO_2 are obtained as products
 (3) H_2O , H_2S and SO_2 are obtained as products
 (4) H_2O and, SO_2 or H_2S can be obtained, depending on the concentration of acid
 (5) All the above statements are false
29. Identify the correct order in which the thermal stabilities of the following compounds increase.
- | | | | |
|-----------|----------|----------|----------|
| K_2CO_3 | $MgCO_3$ | $CaCO_3$ | $BeCO_3$ |
| A | B | C | D |
- (1) $A < B < C < D$ (2) $D < B < C < A$ (3) $D < B < A < C$
 (4) $B < D < C < A$ (5) $C < D < A < B$
30. Which of the following statements regarding H_2SO_4 is true?
 (1) It oxidises Sulphur (2) conc. H_2SO_4 reacts with S to produce SO_3
 (3) It oxidises Carbon into CO (4) It doesn't react with Carbon
 (5) All the above statements are false
31. Which of the following gives a precipitate with $BaCl_{2(aq)}$ solution?
 (1) $NH_4I(aq)$ (2) CO_2 dissolved in water (3) $(NH_4)_2CrO_4(aq)$
 (4) Bromine water (5) None of these give a precipitate

32. A white solid is first heated with dil. H_2SO_4 and then with conc. H_2SO_4 . No reaction was observed in either case. The salt contains,
 (1) S^{2-} (2) SO_3^{2-} (3) SO_4^{2-}
 (4) $\text{S}_2\text{O}_3^{2-}$ (5) None of the above.
33. Which of the following intensifies the colour when added to Bromine water?
 (1) $\text{SO}_2(\text{aq})$ (2) $\text{HI}(\text{aq})$ (3) $\text{NH}_3(\text{aq})$ (4) $\text{H}_2\text{S}(\text{aq})$ (5) $\text{BaO}(\text{s})$
34. It is required to prepare $\text{Pb}(\text{NO}_3)_2$ starting from a sample of HNO_3 acid provided to you. Which of the following is the most appropriate first step?
 (1) Reacting the sample of Nitric acid with PbCO_3
 (2) Diluting the sample of Nitric acid and reacting with Cu turnings
 (3) Reacting a portion of Nitric acid sample with $\text{NaOH}(\text{aq})$
 (4) Concentrating a portion of Nitric acid sample and reacting with Sulphur
 (5) Reacting a portion of Nitric acid with PbSO_4
35. Reagent that can be used to differentiate between $\text{Mg}(\text{NO}_3)_2$ and $\text{Ba}(\text{NO}_3)_2$ is,
 (1) $\text{Na}_2\text{CO}_3(\text{aq})$ (2) $\text{NaHCO}_3(\text{aq})$ (3) $\text{NH}_3(\text{aq})$
 (4) $\text{KI}(\text{aq})$ (5) None of these compounds can be used
36. Which of the following cannot be used to differentiate between KBr and KI ?
 (1) $\text{AgNO}_3(\text{aq})$ / dil. HNO_3 (2) $\text{Pb}(\text{NO}_3)_2(\text{aq})$ (3) conc. H_2SO_4
 (4) conc. HNO_3 (5) CCl_4
37. Which of the following statements is **false** regarding Phosphorous?
 (1) PCl_3 exists (2) PCl_5 exists (3) P_2O_3 exists
 (4) P_2H_5 exists (5) PO_4 doesn't exist
38. Sulphur reacts with hot conc. HNO_3 to give,
 (1) $\text{SO}_2 + \text{N}_2\text{O} + \text{H}_2\text{O}$ (2) $\text{H}_2\text{SO}_4 + \text{NO}_2 + \text{H}_2\text{O}$
 (3) $\text{SO}_2 + \text{H}_2\text{SO}_4 + \text{N}_2\text{O}_5 + \text{H}_2\text{O}$ (4) $\text{H}_2\text{SO}_4 + \text{N}_2\text{O} + \text{H}_2\text{O}$
 (5) $\text{SO}_2 + \text{NO}_2 + \text{N}_2\text{O} + \text{H}_2\text{O}$
39. Chlorine reacts with hot conc. KOH to produce,
 (1) $\text{KCl} + \text{KClO} + \text{KClO}_4 + \text{H}_2\text{O}$ (2) $\text{KCl} + \text{KClO} + \text{H}_2\text{O}$
 (3) $\text{KCl} + \text{KClO}_3 + \text{H}_2\text{O}$ (4) $\text{KCl} + \text{KClO}_4 + \text{H}_2\text{O}$
 (5) $\text{KClO}_3 + \text{KClO}_4 + \text{H}_2\text{O}$
40. To show that Sulphur is present in iron ores,
 (1) Sodium Hydroxide solution can be used.
 (2) Ammonia solution can be used.
 (3) Hydrochloric acid solution can be used.
 (4) All the above reagents can be used.
 (5) None of the above reagents can be used.

41. Which of the following reacts with aqueous H_2S ?
(1) $\text{HBr}(\text{aq})$ (2) $\text{HI}(\text{aq})$ (3) $\text{CH}_3\text{COOH}(\text{aq})$
(4) $\text{SO}_2(\text{aq})$ (5) None of the above reacts with $\text{H}_2\text{S}(\text{aq})$
42. Which of the following clearly shows a chemical reaction with water?
(1) CsCl (2) RbF (3) BiCl_3 (4) SrCl_2 (5) BaI_2
43. Which of the following solutions is the most acidic?
(1) SO_2 dissolved in water (2) NO_2 dissolved in water
(3) SO_2 and NO_2 dissolved in water (4) H_2S dissolved in water
(5) Cl_2O dissolved in water
44. Which of the following statements is correct regarding the reaction between molten NH_4Cl and Aluminium metal?
(1) Cl_2 evolves (2) H_2 evolves (3) NH_3 evolves
(4) H_2 and N_2 evolve (5) H_2 and NH_3 evolve
45. In the reaction between Cu and $\text{H}_2\text{S}_2\text{O}_7$ in aqueous medium,
(1) Oxidation number of Sulphur changes from +8 to +6
(2) Oxidation number of Sulphur changes from +7 to +4
(3) Oxidation number of Sulphur changes from +6 to +4
(4) Oxidation number of Copper changes from 0 to +1
(5) None of the above takes place.
46. The colourless solid A decomposes as follows. $\text{A} \xrightarrow{\Delta} \text{B}_{(\text{g})} + \text{C}_{(\text{g})}$.
Aqueous solutions of A and B turn blue litmus red and give white precipitate with AgNO_3 solution soluble in the aqueous solution of C. C turns red litmus blue. A, B and C are
(1) NH_4Cl , HCl , NH_3
(2) NH_4Br , HBr , NH_3
(3) NH_3 , NaCl , HCl
(4) Both (2) and (3) are correct.
(5) All (1), (2) and (3) are correct.
47. Chemical formula of Potassium stannate is,
(1) KSnO_3 (2) K_2SnO_3 (3) KSnO_2
(4) K_2SnO_2 (5) None of the above.
48. Which of the following easily releases CO_2 when heated?
(1) Li_2CO_3 (2) Na_2CO_3 (3) K_2CO_3 (4) Rb_2CO_3 (5) Cs_2CO_3
49. Which of the following compounds doesn't evolve NO_2 when heated?
(1) $\text{Ca}(\text{NO}_3)_2$ (2) CsNO_3 (3) $\text{Cd}(\text{NO}_3)_2$
(4) $\text{Al}(\text{NO}_3)_3$ (5) $\text{Pb}(\text{NO}_3)_2$

50. Which of the following statements regarding SO_2 is false?
- (1) SO_2 reacts with acidified KMnO_4 (2) SO_2 reacts with acidified CrO_3
(3) SO_2 reacts with conc. HNO_3 (4) SO_2 reacts with aqueous H_2S
(5) SO_2 reacts with aqueous HF
51. Which of the following statements is false regarding the differentiation between HBr(aq) and HI(aq) ?
- (1) $\text{HClO}_4(\text{aq}) / \text{CCl}_4$ can be used for this
(2) $\text{HClO}_3(\text{aq}) / \text{CCl}_4$ can be used for this
(3) Acidified $\text{KMnO}_4 / \text{CHCl}_3$ can be used for this
(4) $\text{Br}_2(\text{aq}) / \text{C}_6\text{H}_6$ can be used for this
(5) None of the above can be used for this
52. What are the most probable products that could be formed by the reaction between Silver and hot conc. HNO_3 ?
- (1) AgNO_2 , NO_2 and H_2O (2) AgNO_2 , N_2O_5 and H_2O (3) AgNO_3 , N_2O and H_2O
(4) AgNO_3 , NH_4NO_3 and H_2O (5) AgNO_3 , NO_2 and H_2O
53. When $\text{NH}_3(\text{g})$ is passed over heated MnO_2 ,
- (1) MnN_3 is formed (2) N_2O_4 is formed (3) N_2 is formed
(4) N_2O is formed (5) None of the above compounds are formed
54. Which of the following can be used to identify AgBr and AgI chemically?
- (1) dil. HNO_3 (2) conc. HNO_3 (3) dil. HCl
(4) conc. Cl_3CCOOH (5) dil. H_2SO_4
55. Which is the most volatile one out of the following?
- (1) CH_4 (2) NH_3 (3) H_2O (4) HF (5) Ne
56. Which of the following statements is false regarding an $\text{H}_2\text{S(aq)}$ solution?
- (1) It reacts with Hydrofluoric acid (2) It reacts with Iodic acid
(3) It reacts with HIO_4 acid (4) It reacts with H_3AsO_4 acid
(5) It reacts with HMnO_4 acid
57. Sn metal reacts with a solution of conc. CsOH to produce,
- (1) CsSnO_3 and H_2 (2) CsSnO_2 and H_2
(3) Cs_2SnO_3 and H_2 (4) Cs_2SnO_3 and O_2
(5) Cs_2SnO and O_2
58. NO_2 and SO_2 react with water to produce,
- (1) H_2SO_4 and NO (2) H_2SO_4 and N_2O (3) H_2SO_3 and H_2SO_4
(4) H_2SO_3 and HNO_3 (5) H_2SO_4 and N_2

59. Which of the following gives a precipitate with $\text{BaCl}_2(\text{aq})$?
- (1) $\text{NH}_4\text{I}(\text{aq})$ (2) $\text{NH}_3(\text{aq})$ (3) $\text{SO}_2(\text{aq})$
 (4) $\text{CO}_2(\text{aq})$ (5) $\text{K}_2\text{Cr}_2\text{O}_7(\text{aq})$
60. Which of the following statements regarding the chemistry of Phosphorous is true?
- (1) There are three O-H bonds in H_3PO_3
 (2) There are two O-H bonds in H_3PO_3
 (3) There are two O-H bonds in H_3PO_2
 (4) White P does not react with Chlorine
 (5) White P reacts with water
61. Which of the following doesn't undergo a chemical change with $\text{H}_2\text{O}_2(\text{aq})$?
- (1) NH_4MnO_4 / dil. HCl (2) NaMnO_4 /dil. HNO_3 (3) MnO_2 / dil. H_2SO_4
 (4) MnO_2 (5) HI

Consider the following compounds for questions 62, 63 & 64;

- (A) K_2CrO_4 (B) ZnSO_4 (C) CuCl_2 (D) FeCl_3 (E) NiSO_4

62. Which of the above is / are likely to give solid sediments with dil. HCl saturated with H_2S ?
- (1) Only A (2) A and B (3) Only C (4) A, C and D (5) B and E
63. Which of the above are likely to liberate I_2 with KI under some special conditions?
- (1) A and B (2) A, C and D (3) A and D (4) A and C (5) C, D and E
64. Which of the above will oxidise CH_3CHO under certain special conditions?
- (1) Only A (2) B and D (3) A and C (4) Only C (5) A, B and E
65. SrCrO_4 is dissolved in dil. HNO_3 acid. Colour of the solution thus obtained is,
- (1) purple (2) green (3) yellow (4) orange (5) red
66. Which of the following reactions is false regarding halogens?
- (1) $3\text{Cl}_2 + 8\text{NH}_3 \longrightarrow \text{N}_2 + 6\text{NH}_4\text{Cl}$ (2) $3\text{Cl}_2 + 2\text{NH}_3 \longrightarrow \text{N}_2 + 6\text{HCl}$
 (3) $\text{I}_2 + 2\text{H}_2\text{O} \longrightarrow \text{H}_3\text{O}^+ + \text{I}^- + \text{HOI}$ (4) $\text{Cl}_2 + \text{HF} \longrightarrow 2\text{HCl} + \text{F}_2$
 (5) $\text{Br}_2 + 2\text{HI} \longrightarrow 2\text{HBr} + \text{I}_2$

67. A is a yellow coloured solid, which is soluble in $\text{Na}_2\text{S}_2\text{O}_3$ solution and forms a complex B which on heating forms C (Black). C gives a white precipitate D with HCl and HNO_3 . D dissolves in NH_3 forming E. Identify A, B and E.
- (1) AgBr , Ag_2S , $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$
 (2) AgBr , $\text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2]$, $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$
 (3) Ag_2S , $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$, AgCl
 (4) Ag_2S , $\text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2]$, AgCl
 (5) None of the above is true.

68. Which of the following statements regarding 3 oxi acids of Phosphorous is true?
- (1) There is only one P-H bond in H_3PO_2 molecule
 - (2) There are three P-H bonds in H_3PO_2 molecule
 - (3) There is only one P-H bond in H_3PO_4 molecule
 - (4) There are three O-H bonds in H_3PO_4 molecule
 - (5) There are three O-H bonds in H_3PO_3 molecule
69. Which one of the following will have the least tendency to react with Chlorine?
- (1) Ag metal
 - (2) P(s)
 - (3) $N_2(g)$
 - (4) Ga(l)
 - (5) $Fe^{2+}(aq)$
70. Which one of the following statements regarding hot concentrated Sulphuric acid is correct?
- (1) It reacts with Carbon and gives CO_2 and SO_3
 - (2) It reacts with Carbon and gives CO_2 and SO_2
 - (3) It reacts with Copper and gives SO_2 and SO_3
 - (4) It doesn't react with Copper
 - (5) It doesn't react with Carbon
71. Which of the following statements is incorrect?
- (1) I_2 can act as an oxidising agent
 - (2) I_2 can act as a reducing agent
 - (3) HI can act as an oxidising agent
 - (4) Iodine in HI can be subjected to reduction by NaH
 - (5) Iodine in HOI can be subjected to oxidation
72. A decolorizes acidified $KMnO_4$ and gives a brown precipitate B with alkaline $KMnO_4$. Also A liberates I_2 from KI/H^+ solution and removes black stains from oil paintings. A and B are,
- (1) H_2O_2, MnO_2
 - (2) $MnO_2, PbSO_4$
 - (3) H_2O_2, MnO_4^{2-}
 - (4) H_2O_2, K_2SO_4
 - (5) $MnO_2, MnSO_4$
73. Assume that a piece of dry rust is provided to you. Which one of the following methods is the most appropriate to show that the above substance is rust?
- (1) Adding $K_3[Fe(CN)_6](aq)$ to the piece of substance
 - (2) Adding $NH_3(aq)$ to the piece of substance
 - (3) Adding $NH_4SCN(aq)$ to the piece of substance
 - (4) Adding HCl and KSCN to the piece of substance
 - (5) Adding dil. H_2SO_4 to the piece of substance
74. Which of the following statements is true regarding the hydroxides of alkaline earth metals?
- (1) Basicity increases with the atomic number of the metal
 - (2) Solubility decreases with the atomic number of the metal
 - (3) Basicity increases with the atomic number of the metal initially and then decreases
 - (4) Solubility increases with the atomic number of the metal initially and then decreases
 - (5) None of the above statements are true regarding basicity and solubility

75. When $\text{NH}_4\text{Cl}(\text{aq})$ and $\text{KOH}(\text{aq})$ are added into a solution of $\text{CrI}_3(\text{aq})$,
- (1) A green precipitate is obtained
 - (2) Blue precipitate is obtained
 - (3) Pink solution is obtained
 - (4) Brown solution is obtained
 - (5) Brown precipitate is obtained
76. You are supplied with an acidic solution containing the cations Fe^{2+} and Ni^{2+} . Which of the following statements regarding the demonstration of the presence of Ni^{2+} in this solution is the most appropriate?
- (1) Passing H_2S gas through the solution and filtering it through a filter paper is a suitable method
 - (2) Passing excess H_2S gas through the solution and filtering it through a filter paper is a suitable method
 - (3) Adding excess $(\text{NH}_4)_2\text{S}(\text{aq})$ into the solution and filtering it through a filter paper is a suitable method
 - (4) Adding excess $\text{NH}_3(\text{aq})$ into the solution and filtering it through a filter paper is a suitable method
 - (5) None of the above methods can be used
77. Which one of the following gives CO_2 at the lowest temperature when heated?
- (1) An aqueous solution saturated with BaCO_3
 - (2) An aqueous solution saturated with MgCO_3
 - (3) $\text{K}_2\text{CO}_3(\text{aq})$
 - (4) $\text{NaHCO}_3(\text{aq})$
 - (5) $\text{Ca}(\text{HCO}_3)_2(\text{aq})$
78. Which of the following statements regarding the compound $\text{K}_4[\text{Fe}(\text{CN})_6]$ is true?
- (1) Its IUPAC name is Potassium ferrocyanide(II)
 - (2) Its IUPAC name is Potassium ferricyanide(III)
 - (3) Its IUPAC name is Potassium hexacyanoferrate(IV)
 - (4) Its IUPAC name is Potassium hexacyanoferrate(III)
 - (5) None of the above is its IUPAC name.
79. All three ionic solutions A, B and C gave white precipitates with dil. HCl . B gave a black precipitate with NaOH . When NH_3 was added to the precipitate obtained for A, it dissolved. Precipitate obtained for C didn't undergo any reaction with NH_3 , while a white precipitate was obtained when dil. H_2SO_4 was added to C. A, B and C respectively are,
- (1) Ag^+ , Hg_2^{2+} , Pb^{2+}
 - (2) Ag^+ , Pb^{2+} , Hg_2^{2+}
 - (3) Ag^+ , Hg^{2+} , Pb^{2+}
 - (4) Hg_2^{2+} , Ag^+ , Pb^{2+}
 - (5) Cd^{2+} , Pb^{2+} , Hg^{2+}

80. Consider the following conditions of the black precipitates obtained with dil. HCl and H_2S .

- (a) Insoluble in hot dil. HNO_3
 (b) Dissolves in hot dil. HNO_3 and gives a blue solution with NH_3
 (c) Dissolves in hot dil. HNO_3 and gives a white precipitate with NH_3

(a), (b) and (c) respectively are,

- (1) SnS_2 , CuS , Bi_2S_3 (2) HgS , CuS , Bi_2S_3 (3) CuS , SnS_2 , HgS
 (4) HgS , SnS , CuS (5) CuS , Bi_2S_3 , HgS

81. A and B gave brown and yellow precipitates respectively with dil. HCl and H_2S . These precipitates dissolve in NaOH, while A gave a white precipitate with $HgCl_2$. A and B most probably are,

- (1) Sn^{2+} and Sn^{4+} (2) Sn^{2+} and Cd^{2+} (3) Sn^{2+} and Cu^{2+}
 (4) Sn^{4+} and Cd^{2+} (5) Cu^{2+} and Sn^{4+}

82. Ions that precipitate when NH_4Cl , NH_4OH and H_2S are added to a solution containing Zn^{2+} , Pb^{2+} , Cu^{2+} and Ni^{2+} are,

- (1) Only Zn^{2+} and Ni^{2+} (2) Only Zn^{2+} and Pb^{2+}
 (3) Only Zn^{2+} , Pb^{2+} and Ni^{2+} (4) Only Pb^{2+} and Cu^{2+}
 (5) All four ions given above precipitate

83. When dil. HCl was added to a solution containing Co^{2+} , Mn^{2+} , Sb^{3+} and Cd^{2+} and H_2S was bubbled through,

- (1) Mn^{2+} , Sb^{3+} and Cd^{2+} precipitate (2) Co^{2+} and Mn^{2+} do not precipitate
 (3) Only Cd^{2+} precipitates (4) None of the above ions precipitates
 (5) All the above ions precipitate

84. A student didn't obtain any precipitates for first 5 groups, when he carried out a proximate analysis to identify a mixture of cations. He later obtained a white precipitate with the reagents NH_4Cl , NH_4OH and Na_2HPO_4 .

- (1) Only Mg^{2+} is present in the ion solution (2) Solution doesn't contain any ion
 (3) Mn^{2+} is present in the solution (4) K^+ is not present in the solution
 (5) None of the above statements are 100% accurate

85. The ion which gives a light purple precipitate when heated with NH_4OH and $(NH_4)_2S$, and also which gives a white precipitate with dil. NaOH that turns brown upon shaking is,

- (1) Fe^{3+} (2) Ni^{2+} (3) Mn^{2+} (4) Co^{2+} (5) Fe^{2+}

86. Salt solutions A, B, C and D turned the Bunsen flame of a Pt wire dipped in dil. HCl into red, crimson, green and violet. A, B, C and D respectively are,

- (1) Cs^+ , Sr^{2+} , Ba^{2+} , Rb^+ (2) Li^+ , Sr^{2+} , Ba^{2+} , K^+ (3) K^+ , Sr^{2+} , Ba^{2+} , Li^+
 (4) Ca^{2+} , Ba^{2+} , Cs^+ , Na^+ (5) Na^+ , Sr^{2+} , Ba^{2+} , Rb^+

87. A particular colourless aqueous chloride solution gave a white precipitate with dilute Sulphuric acid. Salt solution gave apple green colour to flame test. Which of the following is the most correct statement?
- (1) Mg^{2+} can be present in the solution (2) Cs^+ can be present in the solution
 (3) Ca^{2+} is present in the solution (4) Ba^{2+} is present in the solution
 (5) Components present cannot be stated precisely
88. Solutions A and B give precipitates with the reagent NH_4Cl / NH_4OH . Colour of the precipitate formed by A is bluish green and the colour of the precipitate formed by B is gelatinous white. A and B most probably are,
- (1) $AlCl_3$ and $CrCl_3$ (2) $CrCl_3$ and $AlCl_3$ (3) $AlCl_3$ and $FeCl_2$
 (4) $FeCl_3$ and $FeCl_2$ (5) $CrCl_3$ and $FeCl_3$
89. Composition of Aqua Regia is,
- (1) $HCl : 3HNO_3$ (2) $HCl : 3H_2SO_4$ (3) $3HCl : H_2SO_4$
 (4) $3HCl : HNO_3$ (5) None of the above
90. With NH_4Cl / NH_4OH and Na_2HPO_4 (disodium hydrogen phosphate), Mg^{2+} solution gives,
- (1) $Mg \cdot NH_4 \cdot PO_4$ (2) $Mg_3(PO_4)_2$ (3) $(NH_4)_3PO_4$
 (4) $MgHPO_4$ (5) $Mg(H_2PO_4)_2$
91. An ionic solution of A gives an orange precipitate with H^+ / H_2S , which is soluble in $NaOH$. A can be,
- (1) Bi (2) Cu (3) Sb^{3+} (4) Cd^{2+} (5) Sb
92. A student precipitated Cd^{2+} as CdS by H_2S in the presence of dil. HCl in proximate analysis. If he thinks that both Fe^{3+} and Fe^{2+} are present in the ion solution, to check their presence he should,
- (1) Boil the solution until all H_2S expels, then boil again with 2 cm^3 of conc. HNO_3 and add NH_4Cl / NH_4OH .
 (2) Observe whether a reddish brown precipitate is formed with NH_4Cl / NH_4OH if Fe^{3+} is present.
 (3) Keep in mind that all Fe^{2+} convert into Fe^{3+} by boiling with conc. HNO_3 .
 (4) Observe whether a Turnbull's blue solution is obtained with $K_3[Fe(CN)_6]$ by initial solution, to check the presence of Fe^{2+} , if reddish brown precipitate $Fe(OH)_3(s)$ is obtained with NH_4Cl / NH_4OH .
 (5) All the above statements are true and the procedure is carried out according to them.

93. A light red precipitate was obtained with H_2S by $\text{E}_{(\text{aq})}^{n+}$ solution in $\text{NH}_4\text{Cl}/\text{NH}_4\text{OH}$ medium. When NaOH is added to this solution, a white precipitate was obtained which readily turned into brown. $\text{E}_{(\text{aq})}^{n+}$ can be,
- (1) $\text{Mn}^{4+}(\text{aq})$ (2) $\text{Mn}^{2+}(\text{aq})$ (3) $\text{Ni}^{2+}(\text{aq})$ (4) $\text{Fe}^{2+}(\text{aq})$ (5) $\text{Fe}^{3+}(\text{aq})$
94. A student who was carrying out a proximate analysis, discarded the filtrate after getting the precipitate filtered, which was obtained when dil. $\text{HCl}_{(\text{aq})}$ was added to the cation mixture. If so,
- (1) Cations are not present in the filtrate
(2) Cations cannot be present in the precipitate as their Cl^-
(3) Filtrate is not important in this type of an experiment
(4) Use of the filtrate is limited after obtaining the precipitate
(5) None of the above statements can be accepted
95. A white compound 'A' which is soluble in hot dil. HCl , gives a white precipitate with NaOH . It's insoluble in excess NaOH . When this precipitate is dissolved forming a suspension in water and H_2S is passed through, a yellow precipitate is obtained. A can be,
- (1) ZnO (2) HgO (3) CdO (4) SnO_2 (5) As_2O_3
96. An inorganic compound X completely dissolves in dil. H_2SO_4 to give a brown coloured gas. The solution obtained by this gives green colour to flame test. X can most probably be,
- (1) BaBr_2 (2) $\text{Ba}(\text{NO}_2)_2$ (3) $\text{Cu}(\text{NO}_3)_2$
(4) CuBr_2 (5) $\text{Cu}(\text{NO}_2)_2$
97. An inorganic compound X gave a colourless solution and a gas with a bad odour upon reacting with dil. HCl . This solution gave green colour to flame test and the gas gave a black precipitate with $\text{Co}(\text{NO}_3)_2$ solution. Identify X.
- (1) CuSO_3 (2) CuS (3) BaSO_3
(4) BaS (5) BaS_2O_3
98. An inorganic compound X gave a colourless solution and a colourless gas upon reacting with dil. H_2SO_4 . A precipitate was obtained when $\text{KOH}_{(\text{aq})}$ was added in excess to this solution. Identify X.
- (1) ZnSO_3 (2) $\text{Al}_2(\text{CO}_3)_3$ (3) CuCO_3
(4) $\text{Ni}(\text{NO}_2)_2$ (5) MgSO_3
99. Compound R is white in colour and is insoluble in water. A coloured gas evolved when R is treated with conc. H_2SO_4 . Solution obtained by this gave a colour to the flame test. Identify R.
- (1) BaBr_2 (2) BaI_2 (3) CuBr
(4) $\text{Cu}(\text{NO}_2)_2$ (5) CuCl

100. A dark coloured gas evolved when an inorganic compound Y is boiled with conc. HNO_3 . Solution obtained by this gave a white precipitate with BaCl_2 . Identify Y.
 (1) CuBr (2) CuI (3) AgI (4) PbCO_3 (5) Ag_2CO_3
101. An inorganic compound P gave a colourless gas and a colourless solution with dil. HCl . The gas turned acidified K_2CrO_4 green. Solution gave a precipitate with dil. H_2SO_4 . Which compound is P?
 (1) $\text{Sr}(\text{NO}_2)_2$ (2) MgS_2O_3 (3) SrS (4) $\text{Ba}(\text{NO}_2)_2$ (5) NH_4HS
102. An inorganic compound X is insoluble in water. X gives an orange solution by dissolving in dil. HNO_3 . This solution gives green colour to flame test. The above solution turns green when H_2S is passed through it. Which of the following can X be?
 (1) CuCrO_4 (2) PbCrO_4 (3) $\text{Ba}(\text{MnO}_4)_2$ (4) BaCrO_4 (5) BaCl_2
103. An inorganic compound A dissolves in water and dil. H_2SO_4 without showing any chemical reaction. A gave green colour to flame test. A gave a dark coloured gas when heated with conc. HNO_3 . Which of the following can A be?
 (1) BaBr_2 (2) $\text{Ba}(\text{NO}_2)_2$ (3) CrI_3 (4) $\text{Cu}(\text{NO}_3)_2$ (5) CuBr_2
104. An inorganic compound P gives a gas Q and a solution R when heated with conc. HCl . Q decolorizes a filter paper dipped in acidified KMnO_4 . R gives a green precipitate when $\text{NH}_3(\text{aq})$ is added. This precipitate turns brown after reacting with atmospheric air. Which of the following can P be?
 (1) HgSO_3 (2) Bi_2S_3 (3) CoSO_3 (4) FeS (5) NiS
105. A gas and a light blue solution is obtained when dil. HCl is added to an inorganic compound Q. This gas didn't change the colour of acidified KMnO_4 . When excess aqueous NH_3 is added to a portion of light blue solution, a dark blue solution was obtained. No precipitate was obtained when H_2S was passed through another portion of the light blue solution. Q can be,
 (1) CuSO_3 (2) NiCO_3 (3) $\text{Ni}(\text{NO}_2)_2$
 (4) NiSO_3 (5) CuCO_3
106. An inorganic compound X gives a colourless gas and a coloured solution when reacted with dil. HCl . When this gas is passed through a $\text{H}_2\text{S}(\text{aq})$ solution, a sediment is obtained. When excess $\text{NH}_3(\text{aq})$ is added to the above coloured solution, a coloured precipitate is obtained. X can be,
 (1) $\text{Fe}(\text{NO}_2)_3$ (2) $\text{Cr}_2(\text{SO}_3)_3$ (3) $\text{Cr}_2(\text{CO}_3)_3$
 (4) CuSO_3 (5) $\text{Cu}(\text{NO}_2)_2$
107. NH_4OH and NH_4SCN are added to an aqueous solution of an inorganic compound Z and kept aside for a few minutes. Then this reactant mixture is acidified with dil. H_2SO_4 and a red coloured solution is resulted. Z can most probably be,
 (1) NiSO_4 (2) $\text{Cr}_2(\text{SO}_4)_3$ (3) $\text{Mn}(\text{NO}_3)_2$
 (4) $\text{K}_4[\text{Fe}(\text{CN})_6]$ (5) FeSO_4

108. When KSCN solid was added to a portion of an aqueous solution containing cations of a certain element, a red colour was not obtained. $\text{NH}_3(\text{aq})$ was added to another portion of the original solution and kept aside for a short time. The product obtained was made acidic by adding dil. HCl. When KSCN solid was added to this acidic solution, a red colour was obtained. The cation under consideration could be,
 (1) Cr^{3+} (2) Mn^{2+} (3) Cu^{2+} (4) Fe^{2+} (5) Fe^{3+}
109. An inorganic compound D, when treated with dil. H_2SO_4 gave a brown gas and a coloured solution. When excess $\text{NH}_3(\text{aq})$ was added to a portion of this solution, a blue solution was obtained. When H_2S gas was passed through the initial coloured solution, a black precipitate was not obtained. Which one of the following is most likely to be D?
 (1) $\text{Cu}(\text{NO}_3)_2$ (2) $\text{Cu}(\text{NO}_2)_2$ (3) $\text{Cd}(\text{NO}_2)_2$
 (4) $\text{Ni}(\text{NO}_3)_2$ (5) $\text{Ni}(\text{NO}_2)_2$

Follow the instructions given in the table below to answer questions 110 - 126.

1	2	3	4	5
Only (a) and (b) are correct	Only (b) and (c) are correct	Only (c) and (d) are correct	Only (a) and (d) are correct	Any other combination of answers is correct

110. Which of the following give(s) a precipitate with a $\text{AgNO}_3(\text{aq})$ solution?
 (a) $\text{Ba}(\text{NO}_3)_2$ (b) NaOH (c) Na_2SO_3 (d) Na_2SO_4
111. Which of the following oxide(s) is / are amphoteric?
 (a) N_2O (b) Na_2O (c) Al_2O_3 (d) ZnO
112. Which of the following is / are true regarding Group VI elements?
 (a) Metallic character increases down the group
 (b) Acidity of hydrides increases down the group
 (c) All are non metals
 (d) Boiling point of hydrides increases down the group
113. Which of the following statement(s) is/are true?
 (a) Sometimes alkali metals form divalent compounds
 (b) Sometimes alkaline earth metals form monovalent compounds
 (c) Chlorides of some alkali metals are not soluble in water
 (d) Oxides of some alkaline earth metals are not soluble in water
114. Zn dust has been added to $(\text{NH}_4)_2\text{SO}_4(\text{aq})$ solution and then heated. Which of the following statement(s) is / are true regarding this system?
 (a) N_2 can evolve (b) NH_3 can evolve
 (c) H_2 can evolve (d) SO_2 can evolve

115. Which of the following is / are true regarding alkaline earth metals?
- (a) Basicity of oxides increases with atomic number of the metal
 - (b) Water solubility of sulphates decreases with atomic number of the metal
 - (c) Water solubility of hydroxides decreases with atomic number of the metal
 - (d) Bicarbonates are insoluble in water
116. Which of the following is / are true about HBr?
- (a) It can act as an acid
 - (b) It can act as a reducing agent
 - (c) It cannot act as an oxidising agent
 - (d) All the above statements are true
117. Which of the following is / are true about NO?
- (a) It can act as an oxidising agent
 - (b) It can act as a reducing agent
 - (c) It causes air pollution
 - (d) All the above statements are true
118. Which of the following is / are true about halogens?
- (a) All halogens can exist in positive oxidation states
 - (b) All halogens are electronegative
 - (c) All halogens form diatomic molecules
 - (d) All halogens participate in an explosive reaction with $H_2(g)$
119. Zn granules are added to an aqueous solution of NH_4I , shaken well and kept aside. Which of the following is / are true about the aqueous solution thus produced?
- (a) Turns blue litmus red
 - (b) Turns red litmus blue
 - (c) Turns a starch solution dark blue
 - (d) Turns light red litmus into dark red
120. Which of the following react(s) with SO_2 ?
- (a) $HI(aq)$
 - (b) $I_2(aq)$
 - (c) $K_2CO_3(aq)$
 - (d) dil. H_2SO_4
121. A few drops of Methyl orange and Mg powder have been added to a $NH_4NO_3(aq)$ solution. Which of the following statement(s) regarding this system is / are true?
- (a) Methyl orange turns red
 - (b) Methyl orange turns yellow
 - (c) H_2 evolves
 - (d) NO_3^- anion reduces into NH_3
122. Which of the following evolve(s) NO_2 upon heating?
- (a) $CsNO_3$
 - (b) $Ba(NO_3)_2$
 - (c) $Ni(NO_3)_2$
 - (d) NH_4NO_3
123. Which of the following react(s) with NO_2 ?
- (a) C
 - (b) Mg
 - (c) HI
 - (d) $KMnO_4$
124. Which of the following react(s) with $KOH(aq)$?
- (a) Zn
 - (b) Sn
 - (c) Fe
 - (d) C

125. Which of the following is / are true about K_2O_2 ?

- (a) Valency of K in this compound is 2
- (b) Oxidation number of K is +4
- (c) Oxidation number of Oxygen is -1 here
- (d) An aqueous solution of this compound is strongly basic

126. Which of the following oxides are amphoteric in nature while their pure elements are non-amphoteric,

- (a) Sb_2O_3
- (b) SnO_2
- (c) MnO_2
- (d) As_2O_3

Follow the instructions given in the table below to answer Questions 127-150.

Response	First Statement	Second Statement
(1)	True	True and explains the first statement correctly
(2)	True	True but doesn't explain the first statement correctly
(3)	True	False
(4)	False	True
(5)	False	False

	First Statement	Second Statement
127	Lime obtained by burning Dolomite limestone having a high percentage of $MgCO_3$ is not suitable for plastering of walls.	Temperature of decomposition of $MgCO_3$ is less than the temperature of decomposition of $CaCO_3$.
128	Electrolysis is generally not used in the final stage of iron extraction from an iron ore.	Iron can exist as Fe^{2+} or Fe^{3+} in its ore.
129	H_2S cannot act as an oxidising agent.	Sulphur in H_2S is in the lowest oxidation state.
130	NO and NO_2 can be obtained by reacting Copper with HNO_3 at two different conditions.	Copper can exist in two oxidation states Cu^+ and Cu^{2+} .
131	Acidified $K_2Cr_2O_7$ solution is turned green by HI gas.	$Cr_{(aq)}^{3+}$ ion is green in colour.
132	Latent heat of sublimation of Carbon is extremely high.	Covalent bonds are the bonds present in graphite.
133	Though Sulphur forms S^{2-} ion, Chlorine doesn't form Cl^{2-} ion.	Sulphur is more electronegative than Chlorine.
134	NH_3 cannot act as an oxidising agent.	Nitrogen in NH_3 is in a reduced state.

135	SO ₂ doesn't react easily with Oxygen directly.	This reaction is an endothermic reaction.
136	Melting point of diamond is very high.	Covalent bonds are the bonds present in diamond.
137	Hydrogen Astatide (HAt) doesn't act as a reducing agent.	Astatine in HAt is in an oxidised state.
138	Zn gives H ₂ by reacting with both HCl(aq) and NaOH(aq).	Zn is an electropositive element.
139	Nitric acid cannot act as a base.	Nitric acid is derived from N ₂ O ₅ .
140	N ₂ O ₃ can act as an oxidising agent.	N ₂ O ₃ easily decomposes into NO and NO ₂ .
141	Cu ²⁺ and Al ³⁺ can be separated using aqueous NH ₃ .	Al(OH) ₃ shows amphoteric properties.
142	SiO ₂ can react with Rb ₂ CO ₃ .	Silicic acid is a strong acid.
143	Barium doesn't react rapidly with water.	Barium is not an alkali metal.
144	Nitrogen gas cannot act as an oxidising agent.	Electronegativity of Nitrogen is less than that of Oxygen.
145	Hardness of diamond is much higher than the hardness of solid Carbon dioxide.	Bond energy of C-C is much higher than the bond energy of C=O.
146	NO ₂ cannot act as an oxidising agent.	NO ₂ can be easily converted into HNO ₃ .
147	Nitrogen cannot act as an oxidising agent.	Nitrogen atom is incapable of accepting electrons from outside.
148	Lime water cannot be used to distinguish between NH ₄ Cl and (NH ₄) ₂ SO ₄ .	Both NH ₄ Cl and (NH ₄) ₂ SO ₄ give ammonia with lime water.
149	Carbon cannot act as an oxidising agent.	The electronegativity of Carbon is comparatively low.
150	Hot conc. H ₂ SO ₄ can be used to distinguish between AgCl and AgBr.	Hot conc. H ₂ SO ₄ can act as a strong acid.

ANSWERS

(1) 5	(41) 4	(81) 1	(121) 2
(2) 1	(42) 3	(82) 5	(122) 2
(3) 1	(43) 3	(83) 2	(123) 5
(4) 2	(44) 5	(84) 5	(124) 1
(5) 2	(45) 3	(85) 3	(125) 3
(6) 3	(46) 1	(86) 2	(126) 5
(7) 2	(47) 2	(87) 4	(127) 2
(8) 4	(48) 1	(88) 2	(128) 2
(9) 1	(49) 2	(89) 4	(129) 4
(10) 3	(50) 5	(90) 1	(130) 2
(11) 3	(51) 5	(91) 5	(131) 3
(12) 5	(52) 5	(92) 5	(132) 2
(13) 3	(53) 3	(93) 2	(133) 3
(14) 2	(54) 2	(94) 5	(134) 4
(15) 2	(55) 5	(95) 3	(135) 3
(16) 4	(56) 1	(96) 5	(136) 2
(17) 3	(57) 3	(97) 4	(137) 5
(18) 4	(58) 1	(98) 5	(138) 2
(19) 3	(59) 5	(99) 3	(139) 4
(20) 4	(60) 2	(100) 3	(140) 2
(21) 2	(61) 4	(101) 3	(141) 2
(22) 4	(62) 4	(102) 4	(142) 3
(23) 3	(63) 2	(103) 5	(143) 4
(24) 2	(64) 3	(104) 4	(144) 4
(25) 5	(65) 4	(105) 2	(145) 3
(26) 5	(66) 4	(106) 2	(146) 4
(27) 5	(67) 2	(107) 5	(147) 5
(28) 2	(68) 4	(108) 4	(148) 4
(29) 2	(69) 3	(109) 5	(149) 5
(30) 1	(70) 2	(110) 5	(150) 2
(31) 3	(71) 4	(111) 3	
(32) 3	(72) 1	(112) 1	
(33) 2	(73) 4	(113) 5	
(34) 1	(74) 1	(114) 2	
(35) 3	(75) 1	(115) 1	
(36) 5	(76) 4	(116) 1	
(37) 4	(77) 5	(117) 5	
(38) 2	(78) 5	(118) 2	
(39) 3	(79) 1	(119) 5	
(40) 3	(80) 2	(120) 2	