

DAY TWENTY NINE

Unit Test 6

(Inorganic Chemistry II)

- 1 Which of the following element is extracted commercially by the electrolysis of an aqueous solution of its compound?
(a) Chlorine (b) Bromine (c) Sodium (d) Aluminium
- 2 Heating an ore in the absence of air below its melting point is called
(a) leaching (b) roasting
(c) smelting (d) calcination
- 3 A basic lining is given to a furnace by using
(a) calcined dolomite (b) limestone
(c) haematite (d) silica
- 4 Which of the following metal is leached by cyanide process?
(a) Ag (b) Na (c) Al (d) Cu
- 5 In the extraction of chlorine by electrolysis of brine
→ [NCERT Exemplar]
(a) oxidation of Cl^- ion to chlorine gas occurs
(b) reduction of Cl^- ion to chlorine gas occurs
(c) for overall reaction ΔG° has negative value
(d) a displacement reaction takes place
- 6 Refractory metals are used in the construction of furnaces because
(a) they can withstand high temperature
(b) they are chemically inert
(c) their melting point is high
(d) None of the above
- 7 The process of zone refining is used in the purification of
(a) Si (b) Al (c) Ag (d) Cu
- 8 Which one of the following beneficiation processes is used for the mineral $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$?
(a) Froth floatation (b) Leaching
(c) Liqumtion (d) Magnetic separation
- 9 Purification of aluminium by electrolytic refining is known as
(a) Hall's process
(b) Serpeck's process
(c) Baeyer's process
(d) Hoopé's process
- 10 Which one of the following ores is best concentrated by froth-floatation method?
(a) Magnetite (b) Cassiterite
(c) Galena (d) Malachite
- 11 A non copper alloy is
(a) solder (b) brass (c) bronze (d) bell metal
- 12 Which one of the following hydrides is maximum stable towards heat?
(a) H_2O (b) H_2S
(c) H_2Se (d) H_2Te
- 13 Fluorine is a stronger oxidising agent than chlorine in aqueous solution. This is due to many factors except
(a) heat of hydration (b) ionisation potential
(c) electron affinity (d) heat of dissociation
- 14 The shape of ClO_3^- is
(a) a triangular pyramidal (b) tetrahedral
(c) triangular planar (d) triangular bipyramidal
- 15 In which of the following groups, when He is placed, its all the properties are satisfied?
(a) With alkali metals (b) With halogens
(c) With inert gases (d) None of these
- 16 Which of the following exists as covalent crystals in the solid state?
(a) Iodine (b) Silicon
(c) Sulphur (d) Phosphorus

17 Which of the following is different from the other three oxides?

- (a) MgO (b) SnO (c) ZnO (d) Cr₂O₃

18 Which among FeO and Fe₂O₃ is more basic?

- (a) FeO
(b) Fe₂O₃
(c) Both have same basic strength
(d) None of the above is basic

19 The highest magnetic moment is shown by the transition metal ion with outer electronic configuration

- (a) 3d² (b) 3d⁵
(c) 3d⁷ (d) 3d⁹

20 When MnO₂ is fused with KOH in the presence of air, a coloured compound is formed, the product and its colour is

- (a) K₂MnO₄, dark green (b) KMnO₄, purple
(c) Mn₂O₃, brown (d) Mn₃O₄, black

21 Which of the following compounds has colour but no unpaired electrons?

- (a) KMnO₄ (b) K₂MnO₄
(c) MnSO₄ (d) MnCl₂

22 Gadolinium belongs to 4f series. Its atomic number is 64. Which of the following is the correct electronic configuration of gadolinium? → [NCERT Exemplar]

- (a) [Xe]4f⁷5d¹6s² (b) [Xe]4f⁶5d²6s²
(c) [Xe]4f⁸6s² (d) [Xe]4f⁹5s¹

23 Transition metals usually exhibit highest oxidation states in their

- (a) chlorides (b) fluorides
(c) bromides (d) hydrides

24 The 3d-series ranges from

- (a) Z = 21 – 30 (b) Z = 22 – 30
(c) Z = 20 – 30 (d) Z = 31 – 40

25 Formation of interstitial compound makes the transition metal

- (a) more soft (b) more ductile
(c) more metallic (d) more hard

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

- (a) (n – 1) d⁸ns² (b) (n – 1) d⁵ns¹
(c) (n – 1) d³ns² (d) (n – 1) d⁵ns²

27 The most stable ion is

- (a) [Fe(OH)₅]^{3–} (b) [FeCl₆]^{3–}
(c) [Fe(CN)₆]^{3–} (d) [Fe(H₂O)₆]³⁺

28 A group of atoms can function as a ligand only when

- (a) it is a small molecule
(b) it is a negatively charged ion
(c) it has an unshared electron pair
(d) it is positively charged ion

29 [Co(NH₃)₅Br] SO₄ and [Co(NH₃)₅ SO₄] Br are the example of which type of isomerism?

- (a) Linkage (b) Geometrical
(c) Ionisation (d) Optical

30 Which of the following hydrate is diamagnetic?

- (a) [Mn (H₂O)₆]²⁺ (b) [Cu (H₂O)₆]³⁺
(c) [Co (H₂O)₆]³⁺ (d) [Co (H₂O)₆]²⁺

31 The EAN of iron in [Fe(CN)₆]^{3–} is

- (a) 34 (b) 36 (c) 37 (d) 35

32 Which one of the following is odd one out?

- (a) Potassium ferricyanide
(b) Ferrous ammonium sulphate
(c) Potassium ferrocyanide
(d) Tetrammine copper (II) sulphate

33 The complex CoCl₃ · 3NH₃ ionises to give

- (a) two Cl[–] ions (b) one Cl[–] ion
(c) three Cl[–] ions (d) no Cl[–] ions

34 A mole of complex compound Co(NH₃)₅Cl₃ gives 3 moles of ions, when dissolved in water. One mole of the same complex reacts with two moles of AgNO₃ solution to form two moles of AgCl(s). The structure of complex is

- (a) [Co (NH₃)₅Cl] Cl₂ (b) [Co (NH₃)₃Cl₃] · 2NH₃
(c) [Co (NH₃)₄Cl₂]Cl · 2NH₃ (d) [Co (NH₃)₄Cl] Cl₂ · NH₃

35 Which one of the following has largest number of isomers?

(R = alkyl group, en = ethylenediamine)

- (a) [Ru(NH₃)₄Cl₂]⁺ (b) [Co(NH₃)₅Cl]²⁺
(c) [Ir(PR₃)₂H(CO)]²⁺ (d) [Co(en)₂Cl₂]⁺

Direction (Q. Nos. 36-37) In the following questions more than one of the answers given may be correct. Select the correct answers and mark it according to the codes.

Codes

- (a) 1, 2 and 3 are correct (b) 1 and 2 are correct
(c) 2 and 4 are correct (d) 1 and 3 are correct

36 Which of the following will yield H₂O with dilute HNO₃?

1. Cu 2. Zn 3. Hg 4. Mg
(a) 1, 2, 3 (b) 1, 2, 4
(c) 2, 3, 4 (d) 1, 3, 4

37 Which of the following statements about noble gases are correct?

1. In Fisher Ringe's method, a mixture of CaCl₂ and CaC₂ is used to remove N₂ and O₂.
2. He and Ne are chemically inert due to lack of d-orbitals and high ionisation potential.
3. At 173 K He and Ne are absorbed on activated charcoal.
4. XeO₃ is an explosive tetrahedral molecule.

- (a) 1, 2, 3 (b) 1, 2, 4
(c) 2, 3, 4 (d) 1, 3, 4

- 38** Match the complex in Column I with their structure and magnetic moments in Column II and choose the correct code given below.

Column I		Column II	
A.	$[\text{Ag}(\text{NH}_3)_2]^+$	1.	Square planar and 1.73 BM
B.	$[\text{Co}(\text{NH}_3)_6]^{3+}$	2.	Linear and 0
C.	$[\text{Fe}(\text{CN})_6]^{3-}$	3.	Octahedral and 0
D.	$[\text{Cu}(\text{NH}_3)_4]^{2+}$	4.	Octahedral and 1.73 BM

Codes

	A	B	C	D
(a)	3	2	1	4
(b)	1	2	4	3
(c)	2	3	4	1
(d)	4	1	3	2

Direction (Q. Nos. 39-40) Each of these questions contains two statements : Assertion and Reason. Each of these questions also has four alternative choices, only one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

- (a) Assertion is true, Reason is true; Reason is a correct explanation for Assertion
 (b) Assertion is true, Reason is true; Reason is not a correct explanation for Assertion
 (c) Assertion is true, Reason is false
 (d) Assertion is false, Reason is true

- 39 Assertion** Coke and flux are used in smelting.

Reason The phenomenon in which ore is mixed with suitable flux and coke and is heated to fusion is known as smelting.

- 40 Assertion** Caro's acid has S-atom in +6 oxidation state.

Reason Caro's acid contains one peroxo, O_2^{2-} group.

ANSWERS

1 (a)	2 (d)	3 (a)	4 (a)	5 (a)	6 (a)	7 (a)	8 (b)	9 (d)	10 (c)
11 (a)	12 (a)	13 (b)	14 (a)	15 (c)	16 (b)	17 (a)	18 (a)	19 (b)	20 (a)
21 (a)	22 (a)	23 (b)	24 (a)	25 (d)	26 (d)	27 (c)	28 (c)	29 (c)	30 (c)
31 (d)	32 (b)	33 (d)	34 (a)	35 (d)	36 (a)	37 (b)	38 (c)	39 (b)	40 (b)

Hints and Explanations

- 1** Chlorine is extracted commercially by the electrolysis of an aqueous solution of sodium chloride (brine). Cl_2 is obtained at anode.
2 Heating of an ore in the absence of air below its melting point is called calcination.
3 Calcined dolomite is used to give a basic lining of a furnace.
4 Ag is leached by cyanide process.
5 For the extraction of metals and non-metals by electrolysis, ΔG° for the overall reaction is positive. Thus, option (a), i.e. oxidation of Cl^- ion to Cl_2 gas is correct.
6 Refractory metals can withstand high temperature so, they are used in the construction of furnaces.
7 Zone refining method is used for the purification of Si.
8 Leaching is done in case of bauxite ore ($\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$).
9 Hoopes' process is used for purification of aluminium by electrolytic refining.

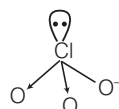
- 10** Froth floatation process is used to concentrate sulphide ores [Galena (PbS)].

- 11** Solder is a non-copper alloy.

- 12** Due to H—bonding, H_2O is more stable towards heat.

- 13** Greater reactivity of F_2 and Cl_2 in aqueous solutions is not due to ionisation potential. This is because halogens (Cl_2 , F_2) are good oxidising agents, i.e. their reactivity depend upon their ability to take up an electron and not to give any electron.

- 14** Structure of ClO_3^- is as follows



Trigonal pyramidal

- 15** Electronic configuration of He is $1s^2$. Hence, it is s-block element. However its properties resembles with noble gases placed in p-block elements.

- 16** Silicon exists as covalent crystal in solid state. It exhibits a network structure like diamond.

- 17** MgO is a basic oxide while the other three SnO , ZnO and Cr_2O_3 are amphoteric.

- 18** FeO is more basic than Fe_2O_3 .

- 19** The highest magnetic moment is shown by the transition metal ion having $3d^5$ configuration because it has maximum number of unpaired electrons, among the given choices i.e. five.

- 20** $2\text{MnO}_2 + 4\text{KOH} + \text{O}_2 \longrightarrow$



- 21** In KMnO_4 , Mn is in +7 state. It has no unpaired electron. Its colour is due to charge transfer.

- 22** General configuration for lanthanides
 $= (n-2)f^{1-14}(n-1)s^2p^6d^{0-1}ns^2$
 Therefore, the correct electronic configuration of Gd is $[\text{Xe}]4f^75d^16s^2$.

33 The complex $\text{CoCl}_3 \cdot 3\text{NH}_3$ is octahedral species having

37 (1) In Fisher Ringe's method, the oxygen and nitrogen of air are removed by passing it over a mixture of calcium carbide and calcium chloride.

$$2 + x - 6 - 2 = 0, \quad x = +6$$