5. NITROGEN FAMILY

CLASS: 12th (NEET) **EXERCISE # 1** **DPP**

General Physical Properties of Nitrogen Family

Q.1 Which of the following is the most abundant in the earth's crust -
(A) Arsenic (B) Nitrogen
(C) Phosphorus (D) Antimony

Q.2 The electronic configuration of outermost shell of group 15 elements is -
(A) ns^2np^4 (B) ns^2np^3
(C) ns^2np^2 (D) ns^2np^1

Q.3 Which of the following does not show allotropy -
(A) Nitrogen (B) Phosphorus
(C) Arsenic (D) Antimony

Q.4 The correct order of thermal stability of hydrides of group 15 is -
(A) $NH_3 > PH_3 > AsH_3 > BiH_3 > SbH_3$
(B) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$
(C) $NH_3 < PH_3 < SbH_3 > AsH_3 > BiH_3$
(D) $BiH_3 > SbH_3 > AsH_3 > PH_3 > NH_3$

Q.5 Arrange the hydrides of group 15 in the order of increasing boiling points -
(A) $PH_3 < AsH_3 < SbH_3 < BiH_3 < NH_3$
(B) $PH_3 < AsH_3 < SbH_3 < NH_3 < BiH_3$
(C) $PH_3 < AsH_3 < NH_3 < SbH_3 < BiH_3$
(D) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$

Q.6 Arrange the group 15 hydrides in the increasing order of H–M–H bond angle.
(A) $SbH_3 < AsH_3 < PH_3 < NH_3$
(B) $NH_3 < PH_3 < AsH_3 < SbH_3$
(C) $NH_3 < SbH_3 < AsH_3 < PH_3$
(D) $NH_3 < PH_3 < SbH_3 < AsH_3$

Preparation of Nitrogen family

Q.7 The percentage of N_2 in air is -
(A) 75% by weight (B) 78.7% by volume
(C) Both A & B (D) None of these

Q.8 The most unstable hydride among the following is -
(A) NH_3 (B) PH_3
(C) AsH_3 (D) BiH_3

Q.9 Nitrogen combines with metals to form -
(A) Nitrites (B) Nitrates
(C) Nitrosyl chlorides (D) Nitrides

Q.10 White phosphorus contains -
(A) P_2 molecules (B) P_6 molecules
(C) P_4 molecules (D) P_5 molecules

Q.11 In modern process phosphorus is manufactured by -
(A) Heating a mixture of phosphorite mineral with sand and coke in electric furnace.
(B) Heating calcium phosphate with coke
(C) Heating bone ash with coke
(D) Heating the phosphate mineral with sand

Q.12 Red phosphorus is chemically unreactive because -
(A) It does not contain P — P bonds
(B) It does not contain tetrahedral P_4 molecules
(C) It does not catch fire in air even upto 400° C
(D) It has a polymeric structure.

Q.13 Phosphorus vapours consists of -
(A) P molecule (B) P_2 molecule
(C) P_3 molecule (D) P_4 molecule

Q.14 Labour's working with phosphorus suffer from a disease in which bones decay. It is known as -
(A) Arthritis (B) Phossy jaw
(C) Rickets (D) Cancer

The oxides of the Nitrogen and Phosphorus

Q.15 Nitrogen(I) oxide is produced by -
(A) Thermal decomposition of ammonium nitrate
(B) Disproportionation of N_2O_4
(C) Thermal decomposition of ammonium nitrite
(D) Interaction of hydroxylamine and nitrous acid

Q.16 Nitrogen dioxide can not be obtained by heating -
(A) KNO_3 (B) $Pb(NO_3)_2$
(C) $Cu(NO_3)_2$ (D) $AgNO_3$

Q.17 The arrangement of oxygen atoms around phosphorus atoms in P_4O_{10} is -
(A) Pyramidal (B) Octahedral
(C) Square planar (D) Tetrahedral

Q.18 Phosphorus compound used as drying agent and desicating agent is -
(A) PCl_3 (B) PCl_5
(C) P_4O_{10} (D) P_4O_6

Questions based on Compounds of nitrogen and phosphorus

Q.19 By the action of conc. H_2SO_4, phosphorus changes to
(A) H_3PO_3 (B) HPO_3
(C) H_3PO_4 (D)$H_4P_2O_7$

Q.20 PH_3 produces smoky rings when it comes in contact with air. This is because
(A) it is inflamable
(B) it combines with water vapour
(C) it combines with nitrogen
(D) it contains impurity of P_2H_4

Q.21 Which one of the following statement is wrong ?
(A) Ammonia is more poisonous than phosphine
(B) Ammonia is more basic than phosphine
(C) Ammonia is more stable than phosphine
(D) Ammonia is more soluble in water than phosphine

Q.22 A white ppt is obtained on hydrolysis of
(A) PCl_5 (B) NCl_3
(C) $BiCl_3$ (D) $AsCl_3$

Q.23 Holme's signal is produced by
(A) CaC_2 (B)Ca_3P_2
(C) Both (D) None of these

Q.24 $Cr^{2+} + H^+ + NO \rightarrow (X) + Cr^{3+}$; X is
(A) N_2H_4 (B) NH_2OH
(C)N_2 (D) N_2O

Q.25 $MnO_4^- + NO + H^+ \rightarrow (X) + (Y)$; (X) and (Y) are
(A) X = Mn^{3+} , Y = NO_3^-
(B) X = Mn^{2+} , Y = NO_3^-
(C) X = MnO_2 , Y = NO_2^-
(D) X = Mn^{2+} , Y = NO_2

Q.26 When conc. HNO_3 is added to conc. H_2SO_4, the ions produced are
(A) NO_2^+, NO_3^- (B) NO^+, NO_2^-
(C) NO^+, NO_3^- (D) N_2, NO_3^-

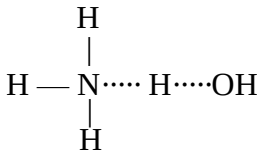
Q.27 Ammonium nitrate is formed in
(A) Zn + very dil. HNO_3
(B) Fe + very dil. HNO_3
(C) Sn + dil. HNO_3
(D) All of these

Q.28 The correct order of bond angle is
(A) $NO_2^+ < NO_2 < NO_2^-$
(B) $NO_2^+ = NO_2^- < NO_2$
(C) $NO_2^+ > NO_2 > NO_2^-$
(D) $NO_2^+ > NO_2 < NO_2^-$

TRUE OR FALSE TYPE QUESTIONS

Q.29 Urea is better nitrogeneous fertilizer than ammonium sulphate

Q.30 The H bond present in the aqueous solution of NH_3 is–



Q.31 $(CF_3)_3N$ is weaker base than $(CH_3)_3N$

Q.32 NO is paramagnetic in gaseous state but diamagnetic in liquid or solid state.

Q.33 The geometry of PBr_5 in solid state is tetrahedral–

FILL IN THE BLANKS

Q.34 $[Ag(NH_3)_2]Cl + HNO_3(dil) \longrightarrow$ .....(white ppt.)

Q.35 NH_3 (excess) + $Cl_2 \longrightarrow$ ..... + ...

Q.36 $Na_2HPO_4 + MgSO_4 + NH_4OH \longrightarrow$ ..... (white ppt)

Q.37 $Ca_3(PO_4)_2 + H_3PO_4(conc.) \xrightarrow{\Delta}$ .....

Q.38 $I_2 + HNO_3 \longrightarrow$ ..... + ... + H_2O

EXERCISE # 2

PART–A (ONLY SINGLE CORRECT ANSWER TYPE QUESTIONS)

Q.1 Nitrogen is inert because of–
(A) Low atomic size
(B) Presence in gaseous state
(C) More electronegativity
(D) Presence of triple bond

Q.2 Pure nitrogen is obtained from–
(A) $NH_3 + NaNO_3$ (B) $NH_4Cl + NaNO_2$
(C) $N_2O + Cu$ (D) $(NH_4)_2Cr_2O_7$

Q.3 Large-scale manufacture of nitric acid by Ostwald process utilizes the reaction–
(A) $2NaNO_3 + H_2SO_4 \rightarrow Na_2SO_4 + 2HNO_3$
(B) $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$
(C) $NO_2^+ + NO_3^- + H_2O \rightarrow 2HNO_3$
(D) $2NO + O_2 + H_2O \rightarrow HNO_3 + HNO_2$

Q.4 Which reaction can be used to prepare phosphorus acid–
(A) $P_2O_3 + H_2O \xrightarrow{20^\circ C}$
(B) $P_2O_3 + H_2O \xrightarrow{80^\circ C}$
(C) $P_2O_3 + H_2O \xrightarrow{125^\circ C}$
(D) P + conc. $HNO_3 \rightarrow$

Q.5 PCl_5 reacts with compounds containing .... group–
(A) $-SO_3$ (B) –OH
(C) $-NO_3$ (D) –NO

Q.6 Which of the following sulphides is used in the manufacture of "Strike anywhere" matches–
(A) P_2S_2 (B) P_2S_3
(C) P_4S_3 (D) None

Q.7 The strongest acid is–
(A) H_3PO_2 (B) H_3PO_3
(C) HPO_3 (D) H_3PO_4

Q.8 In P_4O_6 the number of oxygen atoms bonded to each P atom is–
(A) 1.5 (B) 2
(C) 3 (D)4

Q.9 Solid PCl_5 exists as–
(A) PCl_5 (B) PCl_4^+ & PCl_6^-
(C) PCl_6^- (D) PCl_4^+

Q.10 The final product of hydrolysis of P_4O_6 is -
(A) H_3PO_3 (B) $(HPO_3)_n$
(C) $H_4P_2O_7$ (D) $H_3P_4O_{13}$

Q. 11 Arrange the hydrides of group 15 in the correct order of reducing nature–
(A) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$
(B) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$
(C) $PH_3 < AsH_3 < SbH_3 < BiH_3 < NH_3$
(D) $PH_3 > AsH_3 > SbH_3 > BiH_3 > NH_3$

Q. 12 Light blue colour of nitrous acid is due to dissolved–
(A) O_2 (B) N_2
(C) N_2O (D) N_2O_3

Q.13 Pick out the incorrect statement–
(A) Red phosphorus consists of a complex chain structure and black phosphorus has a layer structure
(B) Nitrogen shows a little tendency for catenation, because N - N single bond is very strong.
(C) The maximum number of covalent bonds formed by nitrogen is four, since it has no d-orbitals in its valence shell.
(D) The group 15 elements do not form M^{5+} ions, but +5 oxidation state is realized only through covalent bonding

Q.14 Which of following trihalides of nitrogen behaves as the weakest base–
(A) NF_3 (B) NCl_3
(C) NBr_3 (D) NI_3

Q.15 Arrange the oxides of group 15 elements in decreasing order of their acidity–
(A) $N_2O_5 > P_2O_5 > As_2O_5 > Sb_2O_5 > Bi_2O_5$
(B) $Bi_2O_5 > Sb_2O_5 > As_2O_5 > P_2O_5 > N_2O_5$
(C) $P_2O_5 > N_2O_5 > As_2O_5 > Sb_2O_5 > Bi_2O_5$
(D) $N_2O_5 > Bi_2O_5 > P_2O_5 > As_2O_5 > Sb_2O_5$

Q.16 Which of the following is least acidic–
(A) P_4O_6 (B) P_4O_{10}
(C) As_4O_6 (D) As_4O_{10}

Q.17 Which of the following oxyacids acts as most reducing agent–

(A) H_3PO_3 (B) H_3PO_4

(C) $H_4P_2O_6$ (D) $H_4P_2O_7$

Q.18 A substance which gives a yellow precipitate when boiled with an excess of HNO_3 and ammonium molybdate and a red precipitate with silver nitrate is–

(A) Orthophosphate (B) Pyrophosphate

(C) Metaphosphate (D) Arsenate

Q.19 Pick out the incorrect statement–

(A) PH_4^+ ion is tetrahedral like the NH_4^+ion and is obtained when PH_3 is bonded to proton

(B) PH_4I is one of the most stable salts containing the phosphonium ion. It is also more stable than ammonium salts.

(C) PH_4I is decomposed by water to form PH_3

(D) PH_3 converts silver salts in solution to silver phosphide, which subsequently reacts to give free metal

Q.20 Oxyacid of phosphorus that can reduce $AgNO_3$ to silver is–

(A) H_3PO_4 (B) $H_4P_2O_7$

(C) H_3PO_3 (D) HPO_3

Q.21 P_4O_{10} has short and long P–O bonds. The number of short P–O bonds in this compounds is–

(A) 1 (B) 2

(C) 3 (D) 4

Q.22 A monobasic acid of phosphorus, which reduces $HgCl_2$ to black Hg is–

(A) Hypophosphorus acid
(B) Phosphoric acid
(C) Metaphosphoric acid
(D) Pyrophosphoric acid

Q.23 In phosphorus estimation, the compound Mg NH_4PO_4 is converted on ignition to–

(A) $Mg_2P_2O_7$ (B) $Mg_3(PO_4)_2$

(C) $Mg_3(PO_4)_2$ (D) $Mg(PO_3)_2$

Q.24 Write the missing product in the following reaction–

$4HNO_3 + P_4O_{10} \rightarrow \ldots . \ 4HPO_3$

(A) $2N_2O_5$ (B) $2N_2O_3$

(C) $2NO_2$ (D) $2N_2O$

Q.25 Which of the following is/are paramagnetic–

NO_2, NO, N_2O_4, N_2O_2, N_2O_5

(A) Only NO_2

(B) NO_2, NO(C) NO, N O_2, N_2O_5

(D) All are paramagnetic

Q.26 A colourless gas X forms a brown coloured gas when mixed with air. The gas X is–

(A) NH_3 (B) NO

(C) N_2O (D) NO_2

Q.27 Which of the following can be used as dehydrating agents–

(A) Conc. H_2SO_4 (B) $POCl_3$

(C) P_2O_5 (D) All

Q.28 Arsenic is detected by–

(A) Ring test (B) Lucas test

(C) Lake test (D) Marsh test

PART- B (ONE OR MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

Q.29 On rubbing I_2 flackes with liquor NH_3 dark brown residue (X) is obtained. (X) on heating gives.

(A) NH_4I (B) N_2

(C) I_2 (D) NI_2–NH_3

Q.30 N_2 can be obtained from by heating–

(A) NH_4I (B) NH_4NO_3

(C) $(NH_4)_2Cr_2O_7$ (D) $NH_4Cl + NaNO_2$

Q.31 Which of the following oxyacids of phosphorus disproportionate to PH_3 on heating ?

(A) H_3PO_3 (B) H_3PO_2

(C) H_3PO_4 (D) HPO_3

Q.32 Which of the following is /are correct for NH_3 and PH_3 ?

(A) Both are reducing agent.
(B) Both form complex compound
(C) PH_3 is weaker base than NH_3
(D) PH_3 is softer lewis base than NH_3

Q.33 Which of following are not known–

(A) PH_5 (B) PI_5

(C) NCl_5 (D) NF_5

Q.34 Which of the given gaseous substance are very poisonous ?

(A) CO (B) CO_2

(C) PF_3 (D) NI_3

Q.35 Which of the following gas/gases can not be dried by NaOH solution ?

(A) NO (B) N_2O_5

(C) N_2O_3 (D) NO_2

Q.36 P_4O_{10} on reacting with water form :

(A) Tetra metaphosphoric acid

(B) Phosphorus acid

(C) orthophosthoric acid

(D) Pyrophosphoric acid

Q.37 Which of the following exist as tetra atomic molecule ?

(A) N (B) P (C) As (D) Sb

Q.38 Which of the following conclusions are correct?

(A) The enthalpy of formation of NF_3 is exothermic whereas enthalpy of formation of NCl_3 is endothermic

(B) The enthalpy of formation of NF_3 and NCl_3 both are exothermic

(C) N–N bond distance in N_2O_4 is greater than the N–N usual single bond distance

(D) N–N bond distance in N_2O_4 is smaller than the N–N usual single bond distance

PART-C (ASSERTION & REASONING TYPE QUESTIONS)

The following questions 39 to 43 consists of two statements each, printed as Assertion and Reason. While answering these questions you are to choose any one of the following four responses.

(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

(B) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.

(C) If Assertion is true but the Reason is false.

(D) If Assertion is false but Reason is true.

(E) If Assertion & Reason are false.

Q.39 **Assertion :** The bond angles of hydrides of N-family decreases down the group.

Reason : The electronegativity of central atom decreases down the group which shows a decrease in lone electron pair and bond pair electron repulsion.

Q.40 **Assertion :** The boiling point of hydrides of N-family shows the order :

$NH_3 > BiH_3 > SbH_3 > AsH_3 > PH_3$

Reason : The abnormality in b. pt of NH_3 in hydrides of N-family is due to H-bonding.

Q.41 **Assertion :** The basic nature of trihalides of nitrogen decreases from NF_3 to NI_3.

Reason : The halogens develop + ve charge on N atom and thus more +ve charge is developed in NF_3 and therefore tendency to lose electron pair decreases.

Q.42 **Assertion :** PCl_5 molecules has two bond angles of Cl–P–Cl as 90º and 120º as well as two P–Cl bonds are weaker then rest three P–Cl bonds.

Reason : P in PCl_5 shows sp^3 d hybridisation leading to trigonal bi-pyramid geometry. Also two P–Cl bonds at axial positions give less stable bonds.

Q.43 **Assertion :** NH_3 and PH_3 differ from each other in their reaction with $CuSO_4$ or $AgNO_3$.

Reason : PH_3 acts as oxidising agent in these reaction but NH_3 not.

PART-D (COLUMN MATCHING)

Q.44

Column A	Column B
(A) Paramagnetic	(i) N_2O_3
(B) Dark blue liquid in liquid or solid state	(ii) N_2O
(C) Unstable gas due to auto decomposition.	(iii) NO
(D) Brown gas	(iv) N_2O_5
(E) Neutral gas and unreactive	(v) NO_2

Q.45

Column A	Column B
(A) Trivalent phosphorus	(i) $Ca_5(PO_4)F$
(B) Fluoraphatile	(ii)Black phosphorus
(C) Thermodynamically stable allotrope of phosphorus	(iii) Red phosphorus
(D) Fuming halides of phosphorus	(iv) PF_5
(E) Trigonal bipyramidal geometry both in gaseous and solid state	(v) PCl_5

ANSWER KEY

EXERCISE # 1

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Ans.	C	B	A	B	C	A	C	D	D	C	A	D	D	B
Qus.	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Ans.	A	A	D	C	C	D	A	C	C	B	B	A	D	C

29. True **30.** False **31.** True **32.** True

33. True **34.** AgCl **35.** NH_4Cl and N_2 **36.** $(NH_4)PO_4$, $6H_2O$

37. $Ca(H_2PO_4)_2$ **38.** HIO_3 and NO_2

EXERCISE # 2

PART-A

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	D	D	B	A	B	C	C	C	B	A	A	D	B	A	A
Qus.	16	17	18	19	20	21	22	23	24	25	26	27	28		
Ans.	C	A	D	B	C	D	A	A	A	B	B	D	D		

PART-B

Qus.	29	30	31	32	33	34	35	36	37	38
Ans.	A,B,C	C,D	A,B	A,B,C,D	A,B,C,D	A,C	B,C,D	A,C,D	B,C,D	A,C

PART-C

Qus.	39	40	41	42	43
Ans.	A	D	D	A	C

PART-D

44. (A)- iii, v, (B)-i (C)-i, iv, (D)-v, (E)-ii,

45. (A) - ii, iii, (B)-i, (C)-ii, (D)-v, (E)-iv

6. OXYGEN FAMILY

EXERCISE # 1

Question based on General properties of oxygen family

Q.1 Which of following elements is highest electronegative ?
(A) S (B) Se (C) Te (D) O

Q.2 The most stable allotropic form of sulphur is :
(A) rhombic (B) monoclinic
(C) plastic (D) milk of sulphur

Q.3 The maximum bond angle is in
(A) H_2O (B) H_2S
(C) H_2Se (D) H_2Te

Q.4 Which shows maximum catenation property ?
(A) Te (B) Se (C) S (D) O

Q.5 The highest bond strength is shown by
(A) O – O bond (B) S – S bond
(C) Se – Se bond (D) Te – Te bond

Question based on Preparation of Oxygen and Sulphur

Q.6 In the electrolysis method of acidified water to give O_2, the cathode used is
(A) graphite (B) lead
(C) platinum (D) Nickel

Q.7 Freezing point of O_2 is
(A) – 183ºC (B) – 229ºC
(C) – 195.8ºC (C) – 186ºC

Q.8 Which of the following is not a allotrope of sulphur
(A) plastic sulphur (B) Prismatic sulphur
(C) sulphate sulphur (D) colloidal sulphur

Q.9 An element forms a gaseous oxide which on dissolving in water gives an acidic solution. The element is
(A) Hydrogen (B) Sodium
(C) Magnesium (D) Sulphur

Question based on Oxides and Oxides of Sulphur

Q.10 Ozone acts as
(A) Oxidising agent (B) reducing agent
(C) bleaching agent (D) all

Q.11 Which of the following oxides is a basic oxide
(A) PbO (B) SiO_2
(C) SnO_2 (D) CrO_3

Q.12 Ozone on reacting with KI in neutral medium produces
(A) KIO_3 (B) KOH
(C) KCl (D) KO_2

Q.13 Sulphur reacting with H_2SO_4, produces
(A) H_2O (B) SO_2
(C) S (D) H_2SO_3

Q.14 H_2S oxidises in presence of excess oxygen, gives -
(A) SO_2 (B) SO_3
(C) S (D) H_2SO_4

Q.15 SO_2 can acts as -
(A) Reducing agent (B) Oxidising agent
(C) Bleaching agent (D) Disinfectant

Q.16 SO_3 on combining with HCl gives -
(A) Chloro sulphonic acid
(B) Chlorine
(C) SO_2Cl_2
(D) None

Question based on Compounds of sulphur and oxygen

Q.17 Which of the following elements form $p\pi$-$d\pi$ bonding in its oxide ?
(A) Li (B) B (C) S (D) N

Q.18 In which of the following species S atom assumes sp^3 hybrid state ?
(I) (SO_3); (II) SO_2, (III) H_2S (IV) S_8
(A) I, II (B) II, III (C) II, IV (D) III, IV

Q.19 The number of unpaired electrons in a paramagnetic diatomic molecule of an element with atomic number 16 is –
(A) 4 (B) 1 (C) 2 (D) 3

Q.20 The structure of O_3 and N_3^- are –
(A) Linear and bent respectively
(B) both linear
(C) both bent
(D) bent and linear respectively

Q.21 Among liquified N_2 and liquified O_2 which will stick to the magnetic pole ?

(A) $O_2(\ell)$ (B) $N_2(\ell)$

(C) both (D) None of these

Q.22 Oxygen is more electronegative than sulphur yet H_2S is more acidic than H_2O. Because –

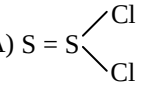
(A) stronger inter molecular H-bonding among H_2O

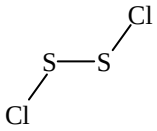
(B) H_2O have higher boiling point than H_2S

(C) H-S is weaker than O – H bond

(D) H_2S is a gas at ordinary temperature where as H_2O is a liquid

Q.23 Which of the following is the correct structure of S_2Cl_2 ?

(A)  (B) Cl – S – S – Cl

(C)  (D) Cl – S = S – Cl

Q.24 Identify the correct sequence of increasing number of π-bonds in structure of following molecules ?

(I) $H_2S_2O_6$ (II) H_2SO_3 (III) $H_2S_2O_5$

(A) I, II, III (B) II, III, I

(C) II, I, III (D) I, III, II

Q.25 The number of lone pairs and the number of S-S bonds in S_8 molecules are respectively –

(A) 8, 8 (B) 16, 8 (C) 8, 16 (D) 8, 4

TRUE / FALSE TYPE QUESTIONS

Q.26 SF_6 not hydrolysed while SF_4 is hydrolysed

Q.27 The bond order of S–O bond in oxyhalides of sulphur $SOF_2 < SOCl_2 < SOBr_2$

Q.28 The number of sulphur atoms in pohythionic acid H_2SnO_6 have only S–S bond is (n – 2)

Q.29 Among Rhombic S, Monoclinic S and plastic S, plastic S has highest enthalpy of combustion–

Q.30 S_8 ring is non-planar –

FILL IN THE BLANKS

Q.31 $SF_6 + SO_3 \longrightarrow$ .....

Q.32 $PCl_5 + H_2SO_4 \longrightarrow$ ..... + ... + H_2O

Q.33 $SO_3 + H_2SO_4 + CO(NH_2)_2 \longrightarrow$ ....+CO_2 + H_2O

Q.34 $SF_4 + H_2O \longrightarrow$ ..... + ...

Q.35 Cu + conc. $H_2SO_4 \longrightarrow$ ..... + ... + H_2O

EXERCISE # 2

PART-A (ONLY SINGLE CORRECT ANSWER TYPE QUESTIONS)

Q.1 The product A in the following equation.
$2KMnO_4 \longrightarrow A + MnO_2 + O_2$, is –
(A) $K_2Mn_2O_7$ (B) K_2MnO_4
(C) K_2O (D) KO_2

Q.2 Oxygen is denser than air so it is collected over–
(A) H_2O (B) Spirit
(C) Mercury (D) Kerosene oil

Q.3 Sulphur is readily soluble in–
(A) Alcohol (B)Carbon disulphide
(C) Ether (D) Water

Q.4 Which of the following is not the application of sulphur–
(A) in the vulcanisation of rubber
(B) as a antiseptic
(C) in match industry
(D) alloying agent

Q.5 Conc. H_2SO_4 displaces hydrogen chloride from chlorides because–
(A) it is stronger than hydrochloric acid
(B) HCl is a gas while H_2SO_4 is a liquid
(C) sulphates are more soluble than chlorides
(D) sulphates are less soluble than chlorides

Q.6 H_2SO_4 has very high corrosive action on skin because–
(A) it reacts with proteins
(B) It acts as an oxidising agent
(C) it acts as a dehydrating agent
(D) it acts as dehydrating agent and absorption of water is highly exothermic

Q.7 Oxygen molecule exhibits–
(A) Paramagnetism (B) Diamagnetism
(C) Ferromagnetism (D) Ferrimagnetism

Q.8 Oxide of a non-metal possesses the following characteristics–
(i) It is both a proton donor and an acceptor
(ii) It is a poor conductor of electricity
(iii) It reacts readily with basic and acidic oxides
(iv) It oxidises Fe at its boiling point This oxide is
(A) SO_2 (B) CO_2
(C) H_2O_2 (D) H_2O

Q.9 Oxygen has + 2 oxidation state in the compound –
(A) MgO (B) F_2O
(C) Na_2O (D) H_2O

Q.10 The compound which gives off oxygen on moderate heating is–
(A) Cupric oxide (B) Mercuric oxide
(C) Zinc oxide (D) Aluminium oxide

Q.11 Which one of the following on heating will give mixture of SO_2 and SO_3 ?
(A) $ZnSO_3$ (B) $CuSO_4$
(C) Na_2SO_4 (D) $FeSO_4$

Q.12 In sulphate ion the oxidation state of sulphur is + 6 and hybridization state of sulphur is–
(A) sp^2 (B) sp^3d^2
(C) dsp^3 (D) sp^3

Q.13 Sulphur on oxidation with hot sulphuric acid gives–
(A) SO_3 (B) SO_2
(C) H_2SO_3 (D) none of these

Q.14 A gas that cannot be collected over water is–
(A) N_2 (B) O_2
(C) SO_2 (D) PH_3

Q.15 The order in which the following oxides are arrange according to decreasing basic nature is–
(A) Na_2O, MgO, Al_2O_3, CuO
(B) MgO, Al_2O_3, CuO, Na_2O
(C) Al_2O_3, MgO, CuO, Na_2O
(D) CuO, Na_2O, MgO, Al_2O_3

Q.16 When SO_2 is passed through acidified $K_2Cr_2O_7$ solution–
(A) The solution turns blue
(B) The solution is decolourised
(C) SO_2 is reduced
(D) Green $Cr_2(SO_4)_3$ is formed

Q.17 Bleaching action of SO_2 is due to–
(A) Reduction (B) Oxidation
(C) Hydrolysis (D) Its acidic nature

Q.18 H_2S on incomplete combustion with oxygen forms mainly –
(A) H_2 and S (B) H_2 and SO_2
(C) H_2O and S (D) H_2O and SO_2

Q.19 The geometry of H_2S and its dipole moment are–
(A) angular and non zero
(B) angular and zero
(C) linear and zero
(D) linear and non zero

Q.20 Which of the following molecule does not possess a permanent dipole moment ?
(A) H_2S (B) SO_2
(C) SO_3^{2-} (D) CS_2

Q.21 Which of the following is the most powerful oxidising agent ?
(A) H_2SO_4 (B) H_3BO_3
(C) HPO_3 (D) H_3PO_4

Q.22 When SO_2 is passed through cupric chloride solution–
(A) the solution becomes colourless and a white ppt. of Cu_2Cl_2 is obtained
(B) a white ppt. is obtained
(C) the solution becomes colourless
(D) no visible change takes place

Q.23 The products of the chemical reaction between $Na_2S_2O_3$, Cl_2 and H_2O are–
(A) S + HCl + Na_2S
(B) S + HCl + Na_2SO_4
(C) S + HCl + $Na_2S_2O_3$
(D) S + $NaClO_3$ + H_2O

Q.24 When sulphur is boiled with Na_2SO_3 solution, the compound formed is –
(A) sodium sulphide
(B) sodium sulphate
(C) sodium persulphate
(D) sodium thiosulphate

Q.25 Ozone –
(A) Turns benzidine solution brown
(B) Turns tetramethyl base violet
(C) Is tested by tailing of mercury
(D) All

Q.26 When H_2S is passed through nitric acid solution the products formed are–
(A) β-sulphur (B) γ-sulphur
(C) colloidal sulphur (D) milk of sulphur

Q.27 Copper turnings when heated with concentrated sulphuric acid will give–
(A) SO_2 (B) SO_3 (C) H_2S (D) O_2

Q.28 A black sulphide when treated with ozone becomes white. The white compound is–
(A) $ZnSO_4$ (B) $CaSO_4$
(C) $BaSO_4$ (D) $PbSO_4$

Q.29 In the reaction,
$2KI + H_2O + O_3 \rightarrow 2KOH + O_2 + A$,
the compound A is –
(A) KIO_3 (B) I_2O_5
(C) HIO_3 (D) I_2

Q.30 Moist iodine reacts with ozone to form–
(A) HI (B) I_2O_5
(C) HIO_3 (D) HIO_4

PART- B (ONE OR MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

Q.31 H_2S cannot be dried by–
(A) $CaCl_2$ (B) P_2O_5
(C) H_2SO_4 (D) CaO

Q.32 Ozone is more reactive than oxygen because–
(A) ozone is formed endothermically from oxygen.
(B) ozone possess higher energy.
(C) ozone on decomposition yields atomic oxygen
(D) ozone is triatomic

Q.33 Which of the following compound on heating produces O_2(g)–
(A) $KClO_4$ (B) $NaNO_3$
(C) $KMnO_4$ (D) NH_4NO_2

Q.34 SO_2 is more powerful reducing agent in–
(A) Acidic medium
(B) Alkaline medium
(C) Neutral medium
(D) Equally powerful reducing agent in acidic and alkaline solution

Q.35 The peroxy linkage present in–
(A) H_2SO_5 (B) $H_2S_2O_7$
(C) $H_2S_2O_8$ (D) $H_2S_2O_3$

Q.36 Which of the following oxyanions contain S–S (single bond)–
(A) $S_2O_3^{2-}$ (B) $S_2O_4^{2-}$
(C) $S_2O_5^{2-}$ (D) $S_2O_7^{2-}$

Q.37 Which of the following are ozonides–

(A) KO_3 (B) NH_4O_3

(C) Cr_2O_3 (D) SO_3

Q.38 Three gases are identified by the following test : the first turned lime water milky. The second gas turnes $COCl_2$ paper pink. The third gas on dissolbing in H_2O gives pH = 3. The gases are–

(A) CO_2 (B) SO_3

(C) SO_2 (D) H_2O

Q.39 Which have the following gas have zero dipole moment–

(A) SF_6 (B) SF_4

(C) H_2S (D) SO_3

Q.40 Which of the following observations are correct–

(A) Dry SO_2 does not bleach dry flowers.

(B) Dry SO_2 can bleach moist flowers

(C) Aluminium sulphide gives foul smell when damp.

(D) H_2O is stronger acid than H_2S

PART-C (ASSERTION & REASONING TYPE QUESTIONS)

The following questions 41 to 50 consists of two statements each, printed as Assertion and Reason. While answering these questions you are to choose any one of the following five responses.

(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

(B) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.

(C) If Assertion is true but the Reason is false.

(D) If Assertion is false but Reason is true.

(E) If Assertion & Reason are false.

Q.41 **Assertion :** Number of peroxide bonds in permono and perdisulphuric acid are 1 and 2 respectively.

Reason : Both are dibasic and permono sulphuric acid does not exist in free state but its salts are reducing agent whereas perdisulphuric acid salts are oxidant–

Q.42 **Assertion :** Element of oxygen are not capable of forming $p\pi-p\pi$ bonds with other elements of smaller size like C, N, etc.

Reason : Only oxygen possess this property to show multiple bonding.

Q.43 **Assertion :** SF_4 and SeF_4 are used as fluorinating agent.

Reason : The conversion of –COOH to $-CF_3$, $\diagdown\!\!\diagup C=O$ to $\diagdown\!\!\diagup CF_2$ can be made by SF_4 or SeF_4

Q.44 **Assertion :** The thermal stability of hydrides of oxygen family decreases with molecular wt.

Reason : The decomposition of M–H bond requires lesser energy in O–H than S–H

Q.45 **Assertion :** Number of S–S bonds in H_2SnO_6 is (n – 1)

Reason : H_2SnO_6 shows $HO_3S–S_{n-1}–SO_3H$

Q.46 **Assertion :** F_2O is more powerful oxidising agent than O_3

Reason : E°_{RP} of F_2O > E°_{RP} of O_3

Q.47 **Assertion :** O_3 whenever used as oxidising agent essentially liberates O_2

Reason : $3SnCl_2 + 6HCl + O_3 \longrightarrow 3SnCl_4 + 3H_2O$

is possible reaction showing oxidising nature of O_3

Q.48 **Assertion :** Bleaching action of SO_2 is temporary and by reduction

Reason : The colour of material is regained due oxidation by air–

Q.49 **Assertion :** Cyclic trimer of SO_3 possesses have six membered heterocyclic chains made of S and O atoms.

Reason : Cyclic trimer of SO_3 is referred as SO_3

Q.50 **Assertion :** H_2SO_4 has high viscosity and high boiling point.

Reason : H_2SO_4 shows strong H bonding

PART-D (COLUMN MATCHING)

Match the items of column A to those of column B :

Q.51

Column A	Column B
(A) Engle's sulphur	(i)Chair conformation and unstable
(B) Sulphur	(ii) Fibrous or rubber like
(C) Rhombic sulphur	(iii)Crystalline form of sulphur
(D) Mono Clinic sulphur	(iv) Puckered S_8 rings crown conformation

Q.52

Column A	Column B
(A) SO_3^{2-}	(i) Pentagonal pyramidal
(B) IF_6^-	(ii)Linear
(C) ClO_4^-	(iii) Square planar
(D) ICl_4^-	(iv) Tetrahedral
(E) IBr_2^-	(v) Planar

Q.53

Column A	Column B
(A) H_2SO_4 is used as pickling agent	(i) H_2S when react with conc. H_2SO_4
(B) H_2SO_4 used as dehydrating agent	(ii) during dissolution of SO_3 in the formation H_2SO_4
(C) H_2SO_4 act as solvent	(iii) when sugar is in contact with conc. H_2SO_4
(D) H_2SO_4 act as Oxidising agent	(iv) In the metallurgy of Cu and Fe.

ANSWER KEY

EXERCISE # 1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	D	A	A	C	B	C	B	C	D	D	A	B	A,B	A	A,B,C	A	C	D	C	A
Q.No.	21	22	23	24	25															
Ans.	A	C	C	B	B															

26. True **27.** False **28.** True **29.** True **30.** True

31. SO_2F_2 **32.** $SO_2Cl_2 + POCl_3$ **33.** NH_2SO_3H **34.** $SO_2 + HF$

35. $CuSO_4 + SO_2$

EXERCISE # 2

(Part-A)

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	B	A	B	D	B	D	A	D	B	B	D	D	B	C	A
Q.No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Ans.	D	A	C	A	D	A	A	B	D	D	C	A	D	D	C

(Part-B)

Qus.	31	32	33	34	35	36	37	38	39	40
Ans.	C, D	A, B, C	A, B, C	B	A,C	B, C	A, B	A, C, D	A,D	A, B, C

(Part-C)

Qus.	41	42	43	44	45	46	47	48	49	50
Ans.	B	B	A	C	E	E	D	A	C	A

(Part-D)

51. (A)- i, (B)-ii, (C)-iii, (D)-iv **52.** (A) - v, (B)-i, (C)-iv, (D)-iii, (E)-ii

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

7. HALOGEN FAMILY PART-1

EXERCISE # 1

Question based on General properties of halogen

Q.1 Which of the following is insoluble in water –
(A) CaF_2 (B) $CaCl_2$ (C) $CaBr_2$ (D) CaI_2

Q.2 Which of the following is / are ionic in character –
(A) $AlCl_3$ (B) AlF_3 (C) SnF_4 (D) $SnCl_4$

Q.3 Select correct statement (s) from the following –
(A) UF_6 is more stable than UCl_6
(B) NF_3 is violently explosive while NCl_3 is nonexplosive
(C) UCl_6 is more stable than UF_6
(D) NF_3 is nonexplosive while NCl_3 is violently explosive

Q.4 The most reactive halogen is –
(A) I (B) Br (C) Cl (D) F

Q.5 Pick out the incorrect statement regarding halogens –
(A) Chlorine is hydrolysed by water to form hydrochloric acid and hypochlorous acid
(B) Bromine and iodine react with NaOH solution to form halide and halite ion
(C) Chlorine reacts with cold dilute NaOH solution to give sodium chloride and sodium chlorate
(D) Iodine forms a deep blue colour with starch solution

Q.6 The halide which does not give a precipitate with $AgNO_3$ is –
(A) F^- (B) Cl^- (C) Br^- (D) I^-

Question based on Preparation of Halogen

Q.7 Chlorine cannot be prepared by the action of HCl on -
(A) MnO_2 (B) $KMnO_4$
(C) NaCl (D) $K_2Cr_2O_7$

Q.8 Pure chlorine is obtained :
(A) by heating $PtCl_4$
(B) by heating MnO_2 with HCl
(C) by heating bleaching powder with HCl
(D) by heating mixture of NaCl, MnO_2 and Conc. H_2SO_4

Q.9 Bromine is prepared in the laboratory –
(A) by heating KBr with Conc. H_2SO_4
(B) by heating KBr, MnO_2 with Conc. H_2SO_4
(C) by heating KBr with HCl
(D) by passing I_2 vapours through KBr solution

Q.10 Which of the following measures are take in the preparation of fluorine -
(A) Electrolyte in dry KHF_2 or dry NaF
(B) Electrolytic vessel must be completely dry
(C) The gas must be made free from HF before starting by passing through NaF
(D) All of the above

Question based on Hydracids and Haloacids

Q.11 When a fluoride is heated with conc. H_2SO_4 in a glass tube and if a drop of water is held at the mouth of the glass tube, a white deposit formed is of –
(A) H_2SiF_6 (B) SiO_2
(C) H_2SiO_3 (D) $SiF_4 + H_2F_2$

Q.12 Similarity of fluorine and oxygen may not be attributed to –
(A) Their atomic and ionic radii are closely similar
(B) The atom of both elements are restricted to an octet of electrons in their valence shell
(C) Both of them are highly electronegative elements
(D) Both form stable $p\pi$-$p\pi$ multiple bonds with themselves

Q.13 HBr / HI are prepared by heating –
(A) Bromide / iodide respectively with conc. H_2SO_4
(B) Bromide / iodide respectively with conc. HPO_3
(C) Bromide / iodide respectively with conc. H_3PO_4
(D) Bromide / iodide respectively with dil. HPO_3

Q.14 Which has the highest heat of vaporisation –
(A) HF (B) HCl
(C) HBr (D) HI

Q.15 Which halogen acid is a liquid –
(A) HF (B) HCl
(C) HBr (D) HI

Q.16 Hydracids have no action on litmus when they are –
(A) In contact with water
(B) Dry
(C) Fused with each other
(D) Mixed together and dissolved in water

Q.17 Which of the following acids is most stable –
(A) HIO (B) $HClO_3$
(C) HIO_3 (D) $HBrO_3$

Q.18 Hypochlorous acid readily decomposes into –
(A) Cl_2, H_2 and O_2 (B) HCl and H_2O
(C) HCl and O_2 (D) Cl_2, HCl and O_2

Q.19 Cl_2O is an anhydride of –
(A) $HClO_4$ (B) HOCl
(C) Cl_2O_3 (D) $HClO_2$

Q.20 ClO_4^- ion is –
(A) Tetrahedral (B) Angular
(C) Pyramidal (D) None

Q.21 On distillation, chloric acid gives –
(A) Hypochlorous acid
(B) Chlorous acid
(C) HCl and hypochlorous acid
(D) Perchloric acid

Question based on Bleaching powder

Q.22 Chloride of lime is –
(A) $CaOCl_2$ (B) $Ca(OCl)_2$
(C) $CaCl_2$ (D) $(CaO)_2Cl$

Q.23 Good quality bleaching powder contains available chlorine about –
(A) 10-20% (B) 5-10%
(C) 35-38% (D) 20-25%

Question based on Pseudo halogens and inter halogen compounds

Q.24 Which of the following is/are not characterise inter halogen compounds ?
(A) Inter halogen compounds are reactive than ordinary diatomic halogens.
(B) The order of reactivity is $ClF_3 > BrF_5 > IF_7$
(C) $BrF_5 \xrightarrow{H_2O} HBrO_3 + HF$
(D) All of the above

Q.25 Which of the following reaction is/are possible ?
(A) $K[BrICl] \xrightarrow{\Delta} KCl + IBr$
(B) $K[BrICl] \xrightarrow{\Delta} KBr + ICl$
(C) $K[BrICl] \xrightarrow{\Delta} KI + BrCl$
(D) All of the above

Q.26 The structure of azido carbondisulphide is –
(A) $CS_2(N_3)_2$ (B) $(SCSN_3)_2$
(C) CS_2N_3 (D) $(CSN_3)_2$

TRUE / FALSE TYPE QUESTIONS

Q.27 The bond angle of Cl_2O is lesser than ClO_2 but bond length of Cl–O is longer in Cl_2O.

Q.28 Cl_2O_6 is diamagnetic both in solid and fused state.

Q.29 When a blue litmus is dipped into a solution HOCl it first turns red then turns blue later.

Q.30 The boiling point of I_2 is greater than ICl.

Q.31 ClF_2^- is linear but ClF_2^+ is a V-shaped molecule–

FILL IN THE BLANKS

Q.32 $FeCl_3$ is stable but FeI_3 is .....

Q.33 $CHClF_2 \xrightarrow[\text{Pyrolysis}]{1000^oC}$ ..... + ...

Q.34 $FeBr_2 + Cl_2 \longrightarrow$ ..... + ...

Q.35 $KClO_3$ + HCl (Conc.) $\longrightarrow$ ..... + ... + KCl + H_2O

Q.36 $SnCl_2$ + HCl(Conc.) + $I_2 \longrightarrow$ ..... + ...

EXERCISE # 2

PART-A (ONLY SINGLE CORRECT ANSWER TYPE QUESTIONS)

Q.1 Pick out the incorrect statement regarding halogens –
(A) Aq. solutions of Cl_2, Br_2 or I_2 oxidize H_2S to S
(B) Chlorine displaces bromine and iodine from aqueous solution of bromides and iodides
(C) Cl_2, Br_2 and I_2 all oxidize sodium thiosulphate to sodium sulphate
(D) Iodine is converted into silver iodide which is used in the manufacture of photographic films.

Q.2 Which nonmetal does not combine directly with Cl_2, Br_2 and I_2–
(A) Carbon (B) Nitrogen
(C) Oxygen (D) All of these

Q.3 Select the correct statement(s) from the following–
(A) UF_6 is more stable than UCl_6
(B) NF_3 is violently explosive while NCl_3 is non-explosive
(C) UCl_6 is more stable than UF_6
(D) NF_3 is non-explosive while NCl_3 is violently explosive

Q.4 Fluorination of organic compound is possible with fluorine –
(A) Concentrated with nitrogen in the presence of a reducing agent
(B) Diluted with nitrogen in the presence of a reducing agent
(C) Diluted with nitrogen in the presence of a catalyst
(D) Diluted with oxygen in the presence of a catalyst

Q.5 KF combines with HF to form KHF_2. The compound contains the species –
(A) K^+, H^+, and F^- (B) K^+, F^- and HF^-
(C) K^+ and $[HF_2]^-$ (D) $[KHF]^+$, and F^-

Q.6 Bromine vapour turns moist starch-iodide paper–
(A) Brown (B) red
(C) Blue (D) Colourless

Q.7 Which is the true covalent oxide of iodine–
(A) I_2O_4 (B) I_2O_5
(C) I_2O_8 (D) I_4O_9

Q.8 Select the correct statement(s) from the following–
(A) Concentrated HF does not react with oxides, hydroxides and carbonates
(B) HF is unique in forming salts containing hydrogen difluoride anion $[HF_2]^-$
(C) HF gives precipitate with $AgNO_3$
(D) HF does not give precipitate with $BaCl_2$

Q.9 HBr/HI can be prepared by the reaction of –
(A) Sodium, Br_2/I_2 and water
(B) Phosphorous, Br_2/I_2 and water
(C) Potassium, Br_2/I_2 and water
(D) Selenium, Br_2/I_2 and water

Q.10 Boiling of dil. HCl acid does not increase its concentration beyond 22.2 percent because hydrochloric acid –
(A) Is very volatile
(B) Is extremely soluble in water
(C) Forms a constant boiling mixture
(D) Forms a saturated solution at this concentration

Q.11 Hydroiodic acid acquires a brown colour on exposure to air due to the fact that–
(A) HI is a strong oxidising agent
(B) HI reacts with oxygen to form a coloured compound
(C) HI is so strong reducing agent that its dilute solution reduces oxygen and itself oxidised to iodine
(D) HI is a weak reducing agent that its concentrated solution reduces oxygen and itself oxidised to iodine

Q.12 HCl cannot form H_2Cl_2, while HF can form H_2F_2. The reason is –
(A) Fluorine is more reactive
(B) HF is more reactive
(C) Fluorine atom is small and can form hydrogen bonds
(D) None

Q.13 With $CuSO_4$ solution–
(A) HCl liberates Cl_2
(B) HBr liberates Br_2
(C) HI_2 liberates I_2
(D) None of these

Q.14 Chlorous acid and its salts (chlorites) are–
(A) Good oxidising agents
(B) Good reducing agents
(C) Good bleaching agents
(D) Good oxidising and bleaching agents

Q.15 On distillation, hypochlorous acid decomposes to give–
(A) Hydrogen and Cl_2O
(B) H_2, HCl and O_2
(C) H_2O and Cl_2
(D) Cl_2O and H_2O

Q.16 Chlorous acid is prepared by the action of–
(A) $Ba(ClO)_2$ + HCl
(B) $BaSO_4$ + HCl
(C) $BaCl_2 + H_2SO_4$
(D) $Ba(ClO)_2 + H_2SO_4$

Q.17 Fluorine does not form any polyhalide as other halogens because –
(A) It has maximum ionic character
(B) It has low F–F bond energy (38.5 kcal mol^{-1})
(C) Of the absence of d-orbitals in the valence shell of fluorine
(D) It brings about maximum coordination number in other elements

Q.18 Sulphur hexafluoride is used in X-ray and high voltage machine because of–
(A) Its high dielectric constant and high electricity conducting capacity
(B) Its low dielectric constant and high electricity conducting capacity
(C) Its high dielectric constant and low electricity conducting capacity
(D) Its high dielectric constant and insulating properties

Q.19 In the commercial method of preparing hydrochloric acid, it is dried over–
(A) P_4O_{10} (B) Quick lime
(C) $CaCl_2$ (D) conc. H_2SO_4

Q.20 Standard electrode potential is highest for –
(A) $\frac{1}{2}F_2(g) + e^- \rightleftharpoons F^-(aq)$
(B) $\frac{1}{2}Cl_2(g) + e^- \rightleftharpoons Cl^-(aq)$
(C) $\frac{1}{2}Br_2(g) + e^- \rightleftharpoons Br^-(aq)$
(D) $\frac{1}{2}I_2(g) + e^- \rightleftharpoons I^-(aq)$

Q.21 In the oxyacids of chlorine Cl–O bond contains –
(A) dπ-dπ bonding (B) pπ-dπ bonding
(C) pπ-pπ bonding (D) None

Q.22 $HClO_4$, HNO_3 and HCl are all strong acids in aqueous solution. In glacial acetic acid medium, their acid strength is such that –
(A) $HClO_4 > HCl > HNO_3$
(B) $HNO_3 > HClO_4 > HCl$
(C) $HCl > HClO_4 > HNO_3$
(D) $HCl > HClO_4 \approx HNO_3$

Q.23 Consider the following perhalate ions in acidic medium
ClO_4^- (I), BrO_4^- (II), IO_4^- (III)
Arrange these in the decreasing order of oxidizing power–
(A) I > II > III (B) I > III > II
(C) II > I > III (D) II > III > I

Q.24 Inter halogen compounds are more reactive than the individual halogen because –
(A) Two halogens are present in place of one
(B) They are more ionic
(C) Their bond energy is less than the bond energy of the halogen molecule
(D) They carry more energy

Q.25 A reddish-brown gas, obtained on heating an inorganic compound with $K_2Cr_2O_7$ and concentrated sulphuric acid, was bubbled through dilute sodium hydroxide. The alkaline solution yielded a yellow precipitate on addition of lead acetate. The inorganic compound is most likely to be–
(A) A chloride (B) A nitrate
(C) A bromide (D) A Sulphide

PART- B (ONE OR MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

Q.26 Which of the following have same hybridisation but different geometry–
(A) SF_4 (B) PCl_5
(C) ICl_3 (D) BCl_3

Q.27 Pseudohalide ions are–
(A) I_3^- (B) CN^-
(C) OCN^- (D) HCO_3^-

Q.28 Concentrated HCl acid when kept in open air sometimes produces a cloud of white fumes It is due to –
(A) strong affinity of HCl gas for moisture in air results in forming of droplets of liquid solution which appears like a cloudy smoke
(B) Due to strong affinity for water, conc. HCl pulls moisture towards itself. This moisture forms droplets of water and hence the cloud
(C) conc. HCl emits strongly smelling HCl gas all the time.
(D) Oxygen in air reacts with emitted HCl gas to form a cloud of Cl_2 gas

Q.29 I_3^- reacts with IO_3^- in the presence of H_2SO_4 to form a deep coloured solution. This blue colouration is due to–
(A) I^+ (B) I_2 (C) IO_4^- (D) I_3^-

Q.30 Which of the following is/are correct–
(A) The decreasing order of the vanderwaals force among halogens is $F_2 > Cl_2 > Br_2 > I_2$
(B) The decreasing order of the vanderwaals force among halogens is $I_2 > Br_2 > Cl_2 > F_2$
(C) The decreasing order of bond energy of C–X bond isC–I > C–Br > C–Cl > C–F
(D) The decreasing order of bond energy of C–X bond is
C–F > C–Cl > C–Br > C–I

Q.31 $Cl_2(g)$ can be prepared by heating of –
(A) NaCl (B) $NaClO_4$
(C) $PtCl_4$ (D) $PbCl_4$

Q.32 Which of the following oxides are nonionic–
(A) I_4O_9 (B) I_2O_5
(C) BrO_2 (D) ClO_3

Q.33 Which of the following species are linear–
(A) I_3^- (B) ICl_2^-
(C) IF_3 (D) I–Cl

Q.34 Which of the following compounds are insoluble in water–
(A) CaF_2 (B) $CaCl_2$
(C) AgF (D) AgCl

Q.35 Which of the given conclusion is/are correct–
(A) Euchlorine is a mixture of Cl_2 and ClO_2
(B) Euchlorine is ClO_2
(C) Tincture of Iodine is I_2 and C_2H_5OH mixture
(D) Formula of iodine phosphate is IPO_4

PART-C (ASSERTION & REASONING TYPE QUESTIONS)

The following questions 36 to 43 consists of two statements each, printed as Assertion and Reason. While answering these questions you are to choose any one of the following five responses.
(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
(B) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.
(C) If Assertion is true but the Reason is false.
(D) If Assertion is false but Reason is true.
(E) If Assertion & Reason are false.

Q.36 **Assertion :** $FeCl_3$ is stable but FeI_3 unstable
Reason : Fe^{3+} is strong oxidant and I^- is strong reductant.

Q.37 **Assertion :** Liquid I_2 conducts current very slightly
Reason : Iodine in liquid state show partial auto ionisation.

Q.38 **Assertion :** HF is corosive and etches glass.
Reason : HF reacts with silica

Q.39 **Assertion :** Liquid HF is used as nonaqueous solvent and many acid base reactions occur in the solvent system.
Reason : Liquid HF undergoes self ionisation

Q.40 **Assertion :** Mineral acids on dissolving in liquid HF acts like a base.
Reason : Liquid HF act as an acid and possess strong tendency to donate proton.

Q.41 **Assertion :** the reaction between $HClO_4$ and liquid HF is :

$HClO_4 + HF \longrightarrow ClO_4^- + H_2F$

Reason : Liquid HF act as base

Q.42 **Assertion :** ClO_2 possess odd number of elements

Reason : ClO_2 dimerises to provide the pairing of odd electron in it like other odd electron molecules.

Q.43 **Assertion:** Iodine chloride act as chlorinating as well as iodinating agent.

Reason : The nature of ICl (g) to act as chlorinating or iodinating (ICl in nitrobenzene) agent depends upon the condition.

PART-D (COLUMN MATCHING)

Match the items of column A to those of column B :

Q.44

Column A	**Column B**
(A) Inter halogen compound	(i) $HClO < HClO_2 < HClO_3 < HClO_4$
(B) ClO_2	(ii) Paramagnetic
(C) Increasing order of thermal stability	(iii) diamagnetic
(D) Increasing order of Oxidising power	(iv) $HClO_4 < HClO_3 < HClO_2 < HOCl$

Q.45

Column A	**Column B**
(A) SbF_3	(i) T-Shaped
(B) SF_4	(ii) Square pyramidal
(C) BrF_5	(iii) Tetrahedral
(D) IF_3	(iv) See Saw

Q.46

Column A	**Column B**
(A) Increasing order of Dipole moment of halogen acids	(i) HF < HCl < HBr < HI
(B) Increasing order of reducing order of halogen acids	(ii) HI < HBr < HCl < HF
(C) Increasing order of thermal stability of halogen acids	(iii) HI < HCl < HBr < HF
(D) Increasing order of bond length of halogen acids	(iv) HF < HBr < HI < HCl

Q.47

Column A	**Column B**
(A) KI solution + chlorine water	(i) HOBr
(B) $KClO_3$ solution + Iodine gas	(ii) not possible
(C) The formation ClBr	(iii) I_2
(D) Hydrolysis of BrF gives	(iv) Cl_2

ANSWER KEY

EXERCISE # 1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	A	B,C	A,D	D	C	A	C	A	B	D	A	A	C	A	A	B	C	C	B	A
Q.No.	21	22	23	24	25	26														
Ans.	D	A	C	D	A	B														

27. True **28.** False **29.** False **30.** False **31.** True

32. unstable **33.** $F_2C=CF_2$, 2HCl **34.** $FeCl_3 + Br_2$ **35.** $ClO_2 + Cl_2$ **36.** $SnCl_4 + HI$

EXERCISE # 2

(Part-A)

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	C	D	A, B	C	C	C	B	B	B	C	C	C	C	D	D
Qus.	16	17	18	19	20	21	22	23	24	25					
Ans.	D	C	D	D	A	B	A	D	C	A					

(Part-B)

Qus.	26	27	28	29	30	31	32	33	34	35
Ans.	A,B,C	A,C	C	A	B,D	C,D	B,C,D	A,B,D	A,D	A,C,D

(Part-C)

Qus.	36	37	38	39	40	41	42	43
Ans.	C	C	C	C	C	C	A	C

(Part-D)

44. (A)- ii, (B)-iii, (C)-i, (D)-iv **45.** (A) - iii, (B)-iv, (C)-ii, (D)-i

46. (A) - ii, (B)-i, (C)-ii, (D)-i **47.** (A) - iii, (B)-iv, (C)-ii, (D)-i

8. NOBLE GAS

EXERCISE # 1

Question based on **Isolation of noble gases**

Q.1 Helium is obtained from which of the following –
(A) Natural gases trapped under rock formations
(B) Liquid air
(C) Radioactive decay
(D) Gasoline

Q.2 The inert gas abundantly found in atmosphere is –
(A) Xe (B) Kr (C) Ar (D) He

Q.3 The word argon means –
(A) Noble (B) Now
(C) Strange (D) Lazy

Q.4 Coconut charcoal at - 100ºC adsorbs a mixture of –
(A) He and Kr (B) Ar, Kr and Xe
(C) Xe and Kr (D) He and Ne

Q.5 Coconut charcoal at – 180ºC is used to separate a mixture of –
(A) Ar and Kr (B) Ne and Ar
(C) He and Kr (D) He and Ne

Q.6 Percentage of argon in air is about –
(A) 10 per cent
(B) 0.1 per cent
(C) Much less than 0.1 per cent
(D) 1 per cent

Question based on **Properties of Noble gases**

Q.7 Helium has which of the following properties –
(A) Has the lowest boiling point of any substance
(B) Does not freeze to a solid at any temperature
(C) Able to flow without viscosity below 2K
(D) Able to exist in more than one liquid phases

Q.8 Which of the following is most polarised among Noble gases –
(A) He (B) Xe (C) Kr (D) Rn

Q.9 Electron affinity for a noble gas is approximately equal to –
(A) That of halogens
(B) Zero
(C) That of oxygen family
(D) That of nitrogen family

Question based on **Compounds of Noble gases**

Q.10 Choose the correct statements about the compound XeF_4 –
(A) It was the first reported stable binary compound of a noble gas
(B) It is a Lewis base
(C) It has four unshared valence electrons
(D) It has twelve valence electrons in total

Q.11 Xenon fluorides are used –
(A) As powerful fluorinating agents
(B) To prepare a series of xenon oxides
(C) To prepare a series of xenon oxoacids
(D) To bring the oxidation number of xenon upto +8

Q.12 Pick out the incorrect statement for XeF_6–
(A) XeF_6 is hydrolysed partially to form $XeOF_4$
(B) It react with SiO_2 to form $XeOF_4$
(C) On complete hydrolysis, it forms XeO_3
(D) It acts as F^- acceptor when treated with alkali metal fluoride, but cannot act as F^- donor to form complexes

Q.13 Clatherates are the compounds obtained from noble gases and –
(A) Water (B) Alcohol
(C) Liquid ammonia (D) None of these

Q.14 What are the products formed in the reaction of XeF_6 with SiO_2 ?
(A) $XeSiO_4 + HF$ (B) $XeF_2 + SiF_4$
(C) $XeO_3 + SiF_4$ (D) $XeOF_4 + SiF_4$

Q.15 Which of the following pairs are isostructural ?
(A) XeF_2, IF_2^- (B) NH_3, BF_3
(C) CO_3^{2-}, SO_3^{2-} (D) PCl_5, ICl_5

Q.16 The noble gas which shows abnormal behaviour in liquid state and behave as superfluid is –
(A) Ne (B) He (C) Ar (D) Xe

Q.17 XeF_2 reacts with SbF_5 to form ?
(A) [XeF] [SbF_6] (B) [XeF_3] [SbF_4]
(C) $XeSbF_6$ (D) XeF_4

Q.18 Which of the following compounds is explosive ?
(A) XeF_2 (B) XeF_4
(C) XeO_3 (D) XeF_3

Q.19 In the Deware method of separation of noble gases, the mixture of noble gases is kept with coconut charcoal at 173 K. Which of the following gaseous mixture is not absorbed on the charcoal ?
(A) Ar, Kr (B) He, Ne
(C) Xe, Ar (D) Xe, Kr

Q.20 A radioactive element which can decay to give two noble gases; is –
(A) U^{238} (B) Th^{232}
(C) Ac^{239} (D) Ra^{226}

TRUE / FALSE TYPE QUESTIONS

Q.21 XeO_3 is an explosive compound.

Q.22 Noble gases are paramagnetic in nature.

Q.23 Helium cannot be adsorbed by charcoal.

Q.24 All the noble gases are present in the atmosphere in very minute quantities.

Q.25 Argon can be isolated from natural gas.

FILL IN THE BLANKS

Q.26 $XeF_4 + H_2O \rightarrow$ ..... + ... + ... + ...

Q.27 $XeF_2 + H_2 \rightarrow$ ..... + ...

Q.28 $XeF_6 + NH_3 \rightarrow$ ..... + ... + ...

Q.29 $XeF_6 + SiO_2 \rightarrow$ ..... + ...

Q.30 The atomicity of noble gas is .....

EXERCISE # 2

PART-A (ONLY SINGLE CORRECT ANSWER TYPE QUESTIONS)

Q.1 The solubility of noble gases in water increases with the increase in–
(A) Ionization potential of noble gas
(B) Thermal conductivity of noble gas
(C) Atomic volume of noble gas
(D) Electron affinity of noble gas

Q.2 Which noble gas is the least polarisable–
(A) He (B) Ne (C) Kr (D) Rn

Q.3 The solubility of noble gases in water shows the order –
(A) He > Ar > Kr > Ne > Xe
(B) He > Ne > Ar > Kr > Xe
(C) Xe > Kr > Ar > Ne > He
(D) None

Q.4 The forces of cohesion in liquid helium are–
(A) Covalent (B) Ionic
(C) Vander waal's (D) Metallic

Q.5 Noble gases are –
(A) Colourless
(B) Odourless
(C) Tasteless and non inflammable
(D) All

Q.6 The oxidation state of Pt in $Xe^{+}[PtF_6]^{-}$ is–
(A) + 4 (B) + 5
(C) + 6 (D) None of these

Q.7 In XeO_3, Xe is –
(A) sp^3 - hybridised (B) sp^2 - hybridised
(C) sp - hybridised (D) sp^3d - hybridised

Q.8 The fluoride which does not exist is–
(A) CF_4 (B) SF_6
(C) HeF_4 (D) XeF_4

Q.9 Compound formed when the noble gases get entrapped in the cavities of crystal lattices of certain organic and inorganic compounds are known as –
(A) Interstitial compounds
(B) Clathrates
(C) Hydrates
(D) Picrates

Q.10 Geometry of $XeOF_4$ molecule is–
(A) Square planar
(B) Square pyramidal
(C) Triangular bipyramid
(D) Distorted octahedron

Q.11 Which compound is prepared by the following reaction–

$$Xe + 2F_2 \xrightarrow[673k,5-6atm]{Ni\ vessel}$$

(A) XeF_2 (B) XeF_6
(C) XeF_4 (D) $XeOF_2$

Q.12 Helium is used in gas balloons instead of hydrogen because –
(A) It is lighter than H_2
(B) It is non-combustible
(C) It is more abundant than H_2
(D) Its leakage can be detected easily

Q.13 Which characteristic of zero group element is common –
(A) Each of them has the same atomic number
(B) Each of them has the same atomic mass
(C) The outermost orbit of electron of each is saturated
(D) Each of them has the same number of electrons

Q.14 The compound that attacks pyrex glass is–
(A) XeF_2 (B) XeF_4
(C) XeF_6 (D) None

Q.15 XeF_6 on complete hydrolysis yields–
(A) XeO_2F_2 (B) XeO_2F_4
(C) XeO_3 (D) XeO_2

Q.16 The idea which prompted Bartlett to prepare first ever compound of noble gas was–
(A) High bond energy of Xe – F
(B) Low bond energy of F – F in F_2
(C) Ionisation energies of O_2 and xenon were almost similar
(D) None of these

Q.17 The vander Waals' forces are the greatest in–
(A) Neon (B) Argon
(C) Krypton (D) Xenon

Q.18 Which is incorrect statement for XeF_2 –
(A) It has linear structure
(B) It is hydrolysed rapidly in aqueous solution of a base
(C) It oxidizes Cl^- and I^- to Cl_2 and I_2 respectively
(D) It cannot act as F^- donor

Q.19 Pick out the incorrect statement for XeF_6–
(A) XeF_6 is hydrolysed partially to form $XeOF_4$
(B) It reacts with SiO_2 to form XeF_4
(C) On complete hydrolysis, it forms XeO_3
(D) It act as F^- acceptor when treated with alkali metal fluoride, but cannot acts asF^-

Q.20 The most polarisable noble gas is –
(A) Kr (B) Ne (C) Xe (D) Ar

PART- B (ONE OR MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

Q.21 XeF_6 on reaction with H_2 gives–
(A) Xe (B) HF (C) XeF_2 (D) XeF_4

Q.22 Which of the following compounds can not be prepared by direct reaction between the constituent elements–
(A) XeF_2 (B) XeF_4 (C) $XeOF_4$ (D) XeO_3

Q.23 Which of the following noble gases do not form any compound–
(A) He (B) Kr (C) Ne (D) Xe

Q.24 XeF_6 on hydrolysis gives–
(A) $XeOF_4$ (B) XeO_2F_2
(C) XeO_3 (D) XeO_4

Q.25 Which among the following statements is/are correct –
(A) XeF_4 and SbF_5 combine to form salt
(B) He and Ne donot form clathrates
(C) He has lowest b.pt. in its groups
(D) Its diffuses throunsn rubber and polyvinyl chloride

Q.26 The first IE of Na, NO, Xe and O_2 follows the order Na < NO < Xe $\simeq$ O_2. O_2 reacts with powerful oxidising agent, PtF_6, to yield $O_2^+[PtF_6]$. If PtF_6 is allowed to react with other mentioned species, then product is/are–
(A) $Na^+[PtF_6]^-$ (B) $NO^+[PtF_6]^-$
(C) $Xe^+[PtF_6]$ (D) $[PtF_6]O_2$

Q.27 Which of the following is / are correct–
(A) He is used in gas cooled nuclear reactor.
(B) He is used as a cryogenic agent for carrying out experiments at low temperature.
(C) He is used to produce and sustain super conduction magnets.
(D) He is used to fill gas balloons instead of H_2 because it is lighter and non flamable.

Q.28 XeF_2 is isostructural with–
(A) TeF_2 (B) ICl_2^-
(C) $SbCl_3$ (D) $BaCl_2$

Q.29 Which of the following is correctly matched–
(A) XeF_4 .... tetrahedral
(B) XeO_3 ..... trigonal pyramidal
(C) $XeOF_4$ ..... square pyramidal
(D) $XeOF_4$ ..... tetrahedral

Q.30 Which noble gas is least polarisable–
(A) He (B) Ne (C) Kr (D) Rn

PART-C (ASSERTION & REASONING TYPE QUESTIONS)

The following questions 31 to 37 consists of two statements each, printed as Assertion and Reason. While answering these questions you are to choose any one of the following five responses.

(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
(B) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.
(C) If Assertion is true but the Reason is false.
(D) If Assertion is false but Reason is true.
(E) If Assertion & Reason are false.

Q.31 **Assertion :** Helium and neon do not form clathrates.
Reason : Both have smallest atomic size among all the elements of group 18.

Q.32 **Assertion :** The elements of group 18 are called inert gases.
Reason : The elements of group 18 are mono atomic in nature.

Q.33 **Assertion :** Noble gases have highest ionisation energies in their respective periods
Reason : The outermost shell of the noble gases is completely filled.

Q.34 **Assertion :** Noble gases can combine with fluorine to form respective fluorides under specific conditions.
Reason : Fluorides of He, Ar and Ne are unstable in nature.

Q.35 **Assertion :** Noble gases are diamagnetic atoms.
Reason : The atomic numbers of noble gases are even and all the orbitals are doubly occuped by the electrons.

Q.36 **Assertion :** On dissolution of Xe nates, $[HXeO_4^-]$ in alkaline solution perxenate and Xe are obtained
Reason : Xenates, $[HXeO_4^-]$ shows disproportionation in alkaline solution.

Q.37 **Assertion :** A mixture of noble gas can be separated by using coconut charcoal.
Reason : Activated coconut charcoal adsorbs different noble gases at different temperatures.

PART-D (COLUMN MATCHING)

Match the items of column A to those of column B :

Q.38

Column A	**Column B**
(A) He	(i) $1s^2\ 2s^2\ 2p^6$
(B) Ne	(ii) Hidden one
(C) Kr	(iii) Stranger
(D) Xe	(iv) Element of sun

Q.39

Column A	**Column B**
(A) $Xe + F_2$ at 1 : 2 mole ratio at 400ºC	(i) $[Xe\ F_5]^+\ [AsF_6]^-$
(B) $Xe + F_2$ at 1 : 10 mole ratio at 400ºC	(ii) XeF_6
(C) $Xe + F_2$ at 1 : 20 mole ratio at 300ºC	(iii) XeF_4
(D) $XeF_6 + AsF_5$	(iv) XeF_2

Q.40

Column A **Lone Pairs of electrons**	**Column B**
(A) 3	(i) XeO_4
(B) 2	(ii) XeO_3
(C) 1	(iii) XeF_2
(D) 0	(iv) $XeOF_2$

ANSWER KEY

EXERCISE # 1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	A,C	C	D	B	D	D	A,B,D	D	B	A,B,C,D	A,B,C,D	D	A	D	A	B	A	C	B	D

21. True **22.** False **23.** True **24.** False **25.** False

26. $Xe + XeO_3 + HF + F_2$ **27.** Xe + HF **28.** $Xe + NH_4F + N_2$

29. $XeO_3 + SiF_4$ **30.** one

EXERCISE # 2

(Part-A)

Qus.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	C	A	C	C	D	B	A	C	B	B	C	B	C	C	C
Qus.	16	17	18	19	20										
Ans.	C	D	D	D	C										

(Part-B)

Qus.	21	22	23	24	25	26	27	28	29	30
Ans.	A, B	C, D	A, C	A, B, C	A, B, C, D	A, B, C	A, B, C	B	B, C, D	A

(Part-C)

Qus.	31	32	33	34	35	36	37
Ans.	A	B	C	D	A	A	A

(Part-D)

38. (A)- iv, (B)-i, (C)-ii, (D)-iii **39.** (A) - iv, (B)-iii, (C)-ii, (D)-i

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

9. TRANSITION ELEMENTS

EXERCISE # 1

Question based on General properties of transition elements

Q.1 The magnetic moment (B.M.)of $[Fe(CN)_6]^{4-}$ & $[Fe(H_2O)_6]^{2+}$ Cl^- respectively are -
(A) $\sqrt{24}$, zero (B) $\sqrt{24}$, $\sqrt{24}$
(C) Zero, $\sqrt{24}$ (D) zero, zero

Q.2 Arrange the following in increasing order of their magnetic moment
$[Fe\ (CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$, $[Ni\ (CN)_4]^{2-}$ & $[\ Ni\ (\ H_2O)_4\ ]^{2+}$
(A) $[\ Fe\ (CN)_6]^{4-}$, $[\ Ni\ (CN)_4]^{2-}$, $[Ni\ (H_2O)_4]^{2+}$, $[Fe(CN)_6]^{3-}$
(B) $[\ Ni\ (H_2O)_4]^{2+}$, $[\ Ni\ (CN)_4]^{2-}$, $[Fe\ (CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$
(C) $[\ Fe\ (CN)_6]^{3-}$, $[\ Fe\ (CN)_6]^{4-}$, $[Ni\ (CN)_4]^{2-}$, $[Ni(H_2O)_4]^{2+}$
(D) $[\ Fe\ (CN)_6]^{4-}$=$[Ni\ (CN)_4]^{2-}$, $[Fe\ (CN)_6]^{3-}$, $[Ni(H_2O)_4]^{2+}$

Q.3 What will be the charge on Fe^{x+} if the magnetic moment is $\sqrt{24}$ -
(A) + 2 (B) + 3
(C) Zero (D) None of these

Q.4 Which of the following ions are colourless-
(A) V^{3+} (B) Mn^{2+} (C) Sc^{3+} (D) Ti^{2+}

Q.5 Match the geometry with the complex ion -

	X	Y
(a)	Octahedral	(I) $[\ Ni(CN)_4]^{2-}$
(b)	Square Planer	(II) $[\ Fe(CN)_6]^{4-}$
(c)	Tetrahedral	(III) $Ni(CO)_4$

	a	b	c
(A)	I	II	III
(B)	II	III	I
(C)	II	I	III
(D)	I	III	II

Q.6 Which of the following oxids is basic?
(A) Mn_2O_3 (B) MnO
(C) MnO_2 (D) Mn_2O_7

Q.7 The ability of d- block elements to form complexes is due to -
(A) small and highly charged ions
(B) Vacant low energy orbital to accept lone pair of electrons from ligands
(C) Both A & B are correct
(D) None is correct

Q.8 AgCl and NaCl are colourless NaBr & NaI are also colourless but AgBr and AgI are coloured. This is due to -
(A) Ag^+ has half filled d- orbital
(B) Ag^+ polarises Br^- & I^-
(C) Ag^+ depolarises Br^- & I^-
(D) None is correct

Q.9 Match the catalyst in column X with their use in column Y.

	Column X		Column Y
(a)	$TiCl_3$	I.	Fenton's reagents for oxidizing R- OH to RCHO
(b)	$FeSO_4/H_2O_2$	II.	Wacker process for converting C_2H_4 to CH_3CHO
(c)	Xanthine oxidase (Mo)	III.	Photosynthesis
(d)	Ferredoxin	IV.	Ziegler - Natta catalyst in production of polythene
(e)	$PdCl_2$	V.	Metabolism of purines

	a	b	c	d	e
(A)	I	IV	V	III	II
(B)	IV	I	V	III	II
(C)	II	IV	III	V	I
(D)	IV	II	V	III	I

Q.10 When placed in magnetic field, a paramagnetic substance experiences-
(A) Increase in weight
(B) Decrease in height
(C) Weightlessness
(D) No change in weight

Question based on $K_2Cr_2O_7$ and $KMnO_4$

Q.11 The yellow colour of chromates changes to orange on acidification due to the formation of-
(A) Cr^{3+} (B) Cr_2O_3 (C) $Cr_2O_7^{2-}$ (D) CrO_4^-

Q.12 Manganese show oxidation state from + 2 to + 7. The most oxidizing state known in aqueous solution is
(A) + 7 (B) + 4 (C) + 3 (D) + 2

Q.13 When conc. H_2SO_4 is added to $KMnO_4$, explosion take place and the product formed is-
(A) Mn_2O_7 (B) MnO_2
(C) $MnSO_4$ (D) Mn_2O_3

Q.14 When $(NH_4)_2Cr_2O_7$ is subjected to heat, compound formed are-
(A) NH_3, Cr_2O_3 (B) H_2O, $(NH_4)_2CrO_4$
(C) N_2, Cr_2O_3 (D) All of these

Question based on Compounds of Iron and Copper

Q.15 In the reaction $4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$; which of the following statement is incorrect -
(A) It is a redox reaction
(B) Metallic iron is reduced to Fe^{3+}
(C) Fe^{3+} is an oxidizing agent
(D) Metallic iron is a reducing agent

Q.16 Anhydrous ferric chloride is prepared by -
(A) Dissolving ferric hydroxide in dilute HCl.
(B) Dissolving ferric hydroxide in conc. HCl.
(C) By passing dry Cl_2 gas over heated scrap iron
(D) By passing dry HCl gas over heated scrap iron

Q.17 Mohr's salt is a -
(A) Normal salt (B) Acid salt
(C) Basic salt (D) Double salt

Q.18 On heating $Cu(NO_3)_2$ strongly, the material finally obtained is-
(A) Cu (B) Cu_2O
(C) $Cu(NO_2)_2$ (D) $Cu(NO_3)_2$

Q.19 In solid copper sulphate, copper is coordinated to -
(A) Five water molecules
(B) four water molecules
(C) One sulphate ion
(D) One water molecules

Question based on Compounds of Zinc, Mercury and Silver

Q.20 Zinc Oxide is-
(A) A basic oxide
(B) An amphoteric oxide
(C) An acidic
(D) A neutral

Q.21 The compound which give off Oxygen on moderate heating is-
(A) Cupric oxide (B) Mercuric oxide
(C) Zinc Oxide (D) Aluminium oxide

Q.22 Red precipitate is obtained when silver nitrate is added to -
(A) K_2CrO_4 (B) KI
(C) KBr (D) $Na_2S_2O_3$

Q.23 Preparation of looking mirror involve the use of-
(A) Red lead
(B) Ammonical silver nitrate
(C) Ammonical $AgNO_3$ + Red lead
(D) Ammonical $AgNO_3$ + Red lead + HCHO

Q.24 Which of the following forms with an excess of CN^-, a complex of coordination number two ?
(A) Cu^{2+} (B) Ag^+ (C) Ni^{2+} (D) Fe^{2+}

Q.25 $AgNO_3$(s) produce black stain on the skin because of the reaction –
(A) $2AgNO_3 \rightarrow 2Ag + 2NO_2 + O_2$
(B) $2AgNO_3 \rightarrow Ag_2O + NO_2 + \frac{1}{2} O_2$
(C) Both of these
(D) None of these

TRUE / FALSE TYPE QUESTIONS

Q.26 $HgCl_2$ can be separated from Hg_2Cl_2 by boiling water.

Q.27 Zn dissolves in Conc. HNO_3 but Hg does not

Q.28 Cuprous compounds are more stable than cupric compounds.

Q.29 Blister copper is 98% pure copper.

Q.30 Silver is found in nature both in native and combined state.

FILL IN THE BLANKS

Q.31 The actual reducing agent of haematite in blast furnace is .....

Q.32 ..... is the purest form of iron.

Q.33 Lithopone is a mixture of $BaSO_4$ and .....

Q.34 The magnetic moment for an ion having d^8 configuration is ..... BM

Q.35 Iunar coustic is .....

EXERCISE # 2

PART-A (ONLY SINGLE CORRECT ANSWER TYPE QUESTIONS)

Q.1 V_2O_5 is red or orange in colour. It is a/an..... oxide –
(A) Acidic (B) Basic
(C) Amphoteric (D) Neutral

Q.2 Amongst TiF_6^{2-} , CoF_6^{3-}, Cu_2Cl_2 and $NiCl_4^{2-}$ (At. No. Ti = 22, Co = 27, Cu = 29, Ni = 28), the colourless species are –
(A) TiF_6^{2-} & Cu_2Cl_2 (B) Cu_2Cl_2 & $NiCl_4^{2-}$
(C) TiF_6^{2-} & CoF_6^{3-} (D)CoF_6^{3-} & $NiCl_4^{2-}$

Q.3 Which of the following is ionic in nature ?
(A) CuF_2 (B) $CuCl_2$
(C) $CuBr_2$ (D)None of the above

Q.4 Which is not true statement about FeO –
(A) It is non- stoichiometric and is metal deficient
(B) It is basic oxide
(C) It's aqueous solution changes to $Fe(OH)_3$ and then to Fe_2O_3 $(H_2O)_n$ by atmospheric oxygen
(D) It give red colour with KCNS

Q.5 Stability of Cu^+ and Ag^+ halide complex is in order–
(A) I > Br > Cl > F (B) F > Cl > Br > I
(C) Br > I > Cl > F (D) Cl > F > I > Br

Q.6 The melting point of Cu,Ag and Au follow the order–
(A) Cu > Ag > Au (B) Au > Ag > Cu
(C) Cu > Au > Ag (D) Ag > Au > Cu

Q.7 Water soluble salt among $AgNO_3$, AgF & $AgClO_4$ are –
(A) AgF, $AgNO_3$
(B) AgF
(C) AgF, $AgNO_3$, $AgClO_4$
(D) None of these

Q.8 Out of $[Fe(CN)_6]^{4-}$, $[Ni(CN)_4]^{2-}$ and $[Ni(CO)_4]$:
(A) All have identical geometry
(B) All are paramagnetic
(C) All are diamagnetic
(D) $[Fe(CN)_6]^{4-}$ is diamagnetic but $[Ni(CN)_4]^{2-}$ & $[Ni(CO)_4]$ are paramagnetic

Q.9 In $[Fe(CN)_5 (NO^+)]^{2-}$, Fe has + 3 state, It can be decided by –
(A) Magnetic measurement
(B) Colligative property
(C) Colour
(D) Hybridization

Q.10 Potassium manganate can be converted into potassium permanganate by oxidation–
(A) with chlorine
(B) with ozone
(C) with carbon monoxide
(D) Electrolytically

Q.11 $Cr_2O_7^{2-} \xrightarrow{PH=X} CrO_4^{2-} \xrightarrow{PH=Y} Cr_2O_7^{2-}$. pH value of X & Y–
(A) 4 and 5 (B) 4 and 8
(C) 8 and 4 (D) 8 and 9

Q.12 In alkaline solution MnO_4^- changes to–
(A) MnO_4^{2-} (B) MnO_2
(C) Mn_2O_3 (D) MnO

Q.13 Cl_2 gas is obtained by various reaction but not by –
(A) $KMnO_4$ + Conc.HCl $\xrightarrow{\Delta}$
(B) KCl + $K_2Cr_2O_7$ + Conc.H_2SO_4 $\xrightarrow{\Delta}$
(C) MnO_2 + Conc. HCl $\xrightarrow{\Delta}$
(D) KCl + F_2 $\longrightarrow$

Q.14 Which is not true statement about $KMnO_4$?
(A) Its solution is unstable in acidic medium
(B) Its small quantity added to conc. H_2SO_4, a green coloured solution containing MnO_3^+ ion is formed
(C) MnO_4^- changes to Mn^{2+} in basic solution
(D) It is self- indicator in Fe^{2+} or $C_2O_4^{2-}$ titration.

Q.15 $FeSO_4$ solution give brown colour ring in testing nitrates or nitrites. This is–
(A) $[Fe(H_2O)_5 NO]^{2+}$
(B) $[Fe(H_2O)_5 (NO)_2]^{2+}$
(C) $[Fe(H_2O)_4 (NO)_2]^{2+}$
(D) $[Fe(H_2O)_4 NO]^{2+}$

Q.16 Fe is made passive by –
(A) Dil.H_2SO_4 (B) Dil.HCl

(C) Aqua regia (D) Conc.H_2SO_4

Q.17 In Solid $CuSO_4.5H_2O$, copper is coordinated to –
(A) five water molecule
(B) Four water molecules
(C) One sulphate ion
(D) One water molecule

Q.18 Lucas reagent is –
(A) $ZnCl_2$ + HCl Conc.
(B) $MnO_2 + H_2O$
(C) H_2SO_4 + HCl
(D) NO+ H_2O

Q.19 Mercury on heating with aqua regia gives–
(A) $Hg(NO_3)_2$ (B) $HgCl_2$
(C) $Hg(NO_2)_2$ (D) Hg_2Cl_2

Q.20 When (A) NH_4VO_3 is heated. (B) $(NH_4)_2Cr_2O_7$ is heated :
(A) in both cases N_2 is formed
(B) in both cases NH_3 is formed
(C) in (A) NH_3 and in (B) N_2 are formed
(D) in (A) N_2 and in (B) NH_3 are formed

Q.21 Pyrolusite is MnO_2 used to prepare $KMnO_4$, steps are $MnO_2 \xrightarrow{I} MnO_4^{2-} \xrightarrow{II} MnO_4^-$ I and II are–
(A) fuse with KOH/ air, electrolytic oxidation
(B) fuse with KOH/air, electrolytic reduction
(C) fuse with conc. HNO_3/air, electrolytic reduction
(D) all correct

Q.22 $AgNO_3$ reacts with some reagent and produce coloured compounds match the reagents and the coloures of the product formed –

Reagent	**Colours**
(a) Na_2S	(i) Yellow
(b) NaCNS	(ii) black
(c) Na_2CrO_4	(iii) Red
(d) Na_3PO_4	(iv) white

	a	**b**	**c**	**d**
(A)	(ii)	(iii)	(iv)	(i)
(B)	(ii)	(iv)	(iii)	(i)
(C)	(i)	(ii)	(iv)	(iii)
(D)	(iv)	(i)	(ii)	(iii)

Q.23 Amongst TiF_6^{2-}, CoF_6^{3-}, Cu_2Cl_2 and $NiCl_4^{2-}$ (At. nos. Ti = 22, Co = 27, Cu = 29, Ni = 28), the colourless species are–
(A) TiF_6^{2-} and Cu_2Cl_2
(B) Cu_2Cl_2 and $NiCl_4^{2-}$
(C) TiF_6^{2-} and CoF_6^{3-}
(D) CoF_6^{3-} and $NiCl_4^{2-}$

Q.24 Out of $SiCl_4$, $TiCl_4$, PO_4^{3-}, SO_4^{2-}, CrO_4^{2-}, CCl_4 isostructural are –
(A) $SiCl_4$, $TiCl_4$ (B) SO_4^{2-}, CrO_4^{2-}
(C) both (A) and (B) (D) None

Q.25 Chromite ore has a spinel structure and is the chromium analogue of magnetite, Fe_3O_4. This ore, when fused with molten NaOH in presence of air, forms–
(A) Cr_2O_3 (B) $Na_2Cr_2O_7$
(C) Na_2CrO_4 (D) CrO_7

Q.26 $FeCr_2O_4$ (chromite) is converted to Cr by following steps :
Chromite $\xrightarrow{I}$ Na_2CrO_4 $\xrightarrow{II}$ Cr_2O_3 $\xrightarrow{III}$ Cr, I , II and III are –

	I	II	III
(A)	Na_2CO_3/ air, Δ	C	C
(B)	NaOH / air, Δ	C, Δ	Al, Δ
(C)	NaOH/ air, Δ	C, Δ	Mg, Δ
(D)	conc. H_2SO_4, Δ	NH_4Cl,	C, Δ

Q.27 $TiCl_4$ fumes strongly in moist air and is hydrolyzed to give –
(A) Ti (B) $TiOCl_2$
(C) TiO_2 (D) $Ti(OH)_4$

Q.28 If NaOH is added to an aqueous solution of Zn^{+2}, a white precipitate appears and on adding excess of NaOH the precipitate dissolves. In the solution Zn exists in the –
(A) Cationic part
(B) Anionic part
(C) in both the parts
(D) there is no Zn is solution

Q.29 Generally transition metals act as catalyst because of –
(A) free valencies
(B) large surface area
(C) unpaired d- electrons
(D) all of these

Q.30 Zn and Hg belong to the same group, they differ in many of their properties. The property that is shared by both is –
(A) they form oxide readily

(B) they react with steam readily
(C) they react with hot conc. H_2SO_4
(D) they react with hot NaOH

Q.31 Match the compounds of column X with oxidation state of column Y–

Column X	**Column Y**
I. $[Cr(H_2O)_6]Cl_3$	5
II. CrO_5	4
III. K_3CrO_8	6
IV. $(NH_4)_3\ CrO_4$	3

	I	**II**	**III**	**IV**
(A)	3	6	5	4
(B)	3	4	5	6
(C)	4	5	6	3
(D)	6	5	4	3

Q.32 TiI_4 on heating gives –
(A) $TiI_2 + I_2$ (B) $Ti + 2I_2$
(C) $TiI_3 + \frac{1}{2} I_2$ (D) None of these

Q.33 A pale green crystalline salt of M dissolves freely in water. It gives a brown precipitate on addition of aqueous NaOH. The metal salt solution also gives a black precipitate on bubbling H_2S in acid medium. An aqueous solution of the metal salt decolourises the pink colour of the permanganate solution. The metal in the metal salt solution is–
(A) Cu (B) Al (C) Pb (D) Fe

Q.34 That the electronic configuration of ytterbium (Z = 70) is $4f^{14}\ 5s^2$ and that of lutetium (Z = 71) is $4f^{14}\ 5d^1\ 6s^2$ can be explained on the basis of–
(A) the extra stability of the half- filled orbitals cones
(B) the extra stability of the completely filled orbitals
(C) the usual rules for the arrangement of electrons in their orbits
(D) None of these

Q.35 $TiCl_3$ on heating gives –
(A) Ti
(B) $TiCl_2$
(C) $TiCl_4$
(D) mixture of $TiCl_2$ & $TiCl_4$

Q.36 For Ni and Pt different I.P. values are given below–

	$(IP)_1 + (IP)_2$	$(IP)_3 + (IP)_4$
Ni	2.49	8.80
Pt	2.60	6.70

Hence :
(A) nickel (II) compounds tend to be thermodynamically more stable than platinum (II)
(B) platinum (IV) compounds tend to be more stable than nickel (IV)
(C) both correct
(D) None is correct

Q.37 Which of the following reactions is not correct?
(A) $2Na_2CrO_4 + H^+ \rightarrow Na_2Cr_2O_7 + 2Na^+ + H_2O$
(B) $2MnO_2 + 4KOH + O_2 \rightarrow 4KMnO_4 + 2H_2O$
(C) $MnO_4^- + 8H^+ + 5Fe^{2+} \rightarrow 5Fe^{3+} + Mn^{2+} + 4H_2O$
(D) $2MnO_4^- + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 10CO_2 + 8H_2O$

Q.38 When excess of $Na_2S_2O_3$ is added to dil.$AgNO_3$, a soluble compound 'X' is formed. However, when dil. $Na_2S_2O_3$ is added to conc. $AgNO_3$ solution, a white precipitate, turning yellow and finally black precipitate of 'Y' is formed. Which is correct pair –
(A) 'X' is Ag_2S and 'Y' is $Na_3\ [Ag(S_2O_3)_2]$
(B) 'X' is $Na_3\ [Ag(S_2O_3)_2]$ and 'Y' is Ag_2S
(C) 'X' is $Ag_2S_2O_3$ and 'Y' is Ag_2S
(D) 'X' is $Ag_2S_2O_3$ and 'Y' is $Na_3[Ag(S_2O_3)_2]$

Q.39 Ferric chloride is used for etching copper and silver metals. This is due to –
(A) oxidizing action of Fe^{3+} ions
(B) reducing action of Fe^{3+} ions
(C) both oxidizing and reducing actions of Fe^{3+} ions
(D) reducing action of Fe^{2+} ions

Q.40 All the following species are strong oxidizing agents. Their strength as oxidizing agents in acidic solution is such that –
(A) $S_2O_8^{2-} > Cr_2O_7^{2-} > MnO_4^-$
(B) $MnO_4^- > Cr_2O_7^{2-} > S_2O_8^{2-}$
(C) $S_2O_8^{2-} > MnO_4^- > Cr_2O_7^{2-}$
(D) $MnO_4^- > S_2O_8^{2-} > Cr_2O_7^{2-}$

PART- B (ONE OR MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

Q.41 Which of the following compounds are coloured due to charge transfer spectra ?

(A) $K_2Cr_2O_7$
(B) $KMnO_4$
(C) $[Fe(H_2O)_5NO]\ SO_4$
(D) MnO_2

Q.42 catalysts used in contact process of manufacture of sulphuric acid are –
(A) NO (B) V_2O_5
(C) Mo (D) Platinised asbestos

Q.43 Mercurous ion can be represented as –
(A) Hg^+ (B) Hg^+—Hg^+
(C) Hg_2^{2+} (D) Hg^{2+}

Q.44 Which of the following elements is/are the member(s) of 3d series ?
(A) Ti (B) Ag (C) V (D) Pd

Q.45 Which metals are present in german silver ?
(A) Cu (B) Ni (C) Zn (D) Ag

Q.46 The complex formation tendency of a transition metal depends upon –
(A) availability of a number of vacant d-orbitals.
(B) high ionisation energy
(C) small size of its cation or high charge density
(D) variable oxidation state

Q.47 Fe^{3+} and Cr^{3+} ions can be distinguished by –
(A) By taking excess of NH_4OH solution
(B) By increasing concentration of NH_4^+ ion.
(C) By decreasing concentration of OH^- ions.
(D) By addition of NaOH solution

Q.48 Excess of KI reacts with $CuSO_4$ solution and then $Na_2S_2O_3$ solution is added to it. which of the following is/are correct –
(A) Evolved I_2 is reduced
(B) CuI_2 is formed
(C) $Na_2S_2O_3$ is oxidised
(D) Cu_2I_2 is precepitated

Q.49 For making good quality mirrors, plates of float glasses are used. These are obtained by floating moltan glass over a liquid metal which does not solidify before glass. The metal used can be –
(A) Na (B) Mg (C) Hg (D) Sn

Q.50 Auric chloride on reaction with $FeSO_4$ changes to –
(A) Au (B) AuCl
(C) Au_2SO_4 (D) $Au_3(SO_4)_2$

PART-C (ASSERTION & REASONING TYPE QUESTIONS)

The following questions 51 to 60 consists of two statements each, printed as Assertion and Reason. While answering these questions you are to choose any one of the following five responses.
(A) If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.
(B) If both Assertion and Reason are true but Reason is not correct explanation of the Assertion.
(C) If Assertion is true but the Reason is false.
(D) If Assertion is false but Reason is true.
(E) If Assertion & Reason are false.

Q.51 **Assertion :** Tungsten has a very high melting point.
Reason : Tungsten is a covalent compound.

Q.52 **Assertion :** $TiCl_4$ is colourless compounds.
Reason : Ti^{4+} has no unpaired electron.

Q.53 **Assertion :** Mn atom losses ns electrons first during ionisation as compared to (n – 1)d electrons.
Reason : The effective nuclear charge experienced by (n – 1)d electrons is greater than that by ns electrons.

Q.54 **Assertion :** $KMnO_4$ is oxidising agent in neutral, acidic and basic medium.
Reason : Equivalent mass of $KMnO_4$ in acidic medium is 31.6.

Q.55 **Assertion :** All the members of actinide series are radioactive in nature.
Reason : The electrons are gradually accommodated in 5f-energy subshell.

Q.56 **Assertion :** The spin only magnetic moment of Sc^{3+} is 1.73 B. M.
Reason : The spin only magnetic moment of an ion equal to $\sqrt{n(n+2)}$, where n is the number of unpaired electrons.

Q.57 **Assertion :** Ionisation of transition metals involve loss of ns electrons before (n – 1) d electrons.
Reason : Filling of ns orbitals take place before the filling of (n – 1)d orbitals–

Q.58 **Assertion :** The reaction
$Hg_2F_2 + 2H_2O \longrightarrow 2HF + HgO + Hg + H_2O$
represents hydrolysis and disproportionation reaction.
Reason : The reaction occurs as
$Hg_2F_2 \ 2H_2O \xrightarrow{\text{hydrolysis}} 2Hg + Hg_2(OH)_2$ (unstable)
$Hg_2(OH)_2 \longrightarrow HgO + Hg + H_2O$

Q.59 **Assertion :** CrO_3, a bright orange solid is acidic in nature.
Reason : On dissolution in water it forms chromic acid.

Q.60 **Assertion :** Oxidation number of Cr in K_3CrO_8 is +6.
Reason : It contains tetraperoxo species, $[Cr(O_2)_4]^{3-}$

PART-D (COLUMN MATCHING)

Match the items of column A to those of column B :

Q.61

Column A	Column B
(A) Cu^{2+}	(i) Form amphoteric oxide
(B) Zn^{2+}	(ii) Diamagnetic and colourless compounds
(C) Cr^{3+}	(iii) Form complex with NH_3
(D) Sc^{3+}	(iv) Form complex with KCN

Q.62

Column A	Column B
(A) Fe^{3+}	(i) White ppt with NaCl
(B) Fe^{2+}	(ii) Blood red colour with KCNS
(C) Cu^{2+}	(iii) prussian blue
(D) Ag^{+}	(iv) Turnbull's blue
	(v) chocolate brown ppt. with $K_4[Fe(CN)_6]$

Q.63

Column A	Column B
(A) Ag^{+} (iso electronic) with	(i) Diamagnetic
(B) Zn^{2+}	(ii) Cd^{2+}
(C) Element with lowest density	(iii) Sc
(D) Cr	(iv) paramagnetic

Q.64

Column A	Column B
(A) Nessler's reagent	(i) An ore of Zinc
(B) Calamine	(ii) An ore of mercury
(C) Cinnabar	(iii) An ore of copper
(D) Malachite	(iv) K_2HgI_4 + KOH

ANSWER KEY

EXERCISE # 1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Ans.	C	D	A	C	C	B	C	B	B	A	C	A	A	C	B	C	D	B	B	B	B	A
Q.No.	23	24	25																			
Ans.	D	B	A																			

26. True **27.** False **28.** False **29.** True **30.** True

31. CO **32.** Wrongth iron **33.** ZnS **34.** 2.82 **35.** $AgNO_3$

EXERCISE # 2

(Part-A)

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	A	A	A	D	A	C	C	C	A	A,B,D	C	B	B	C	A	C	B	A	B	C
Q.No.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Ans.	A	B	A	C	C	B	C	B	D	A,C	A	B	D	C	D	C	B	B	A	C

(Part-B)

Qus.	41	42	43	44	45	46	47	48	49	50
Ans.	A,B,C	B	B,C	A,C	A,B,C	A,C	B,C,D	A,C,D	C	A

(Part-C)

Qus.	51	52	53	54	55	56	57	58	59	60
Ans.	C	A	A	B	B	D	B	A	B	D

(Part-D)

61. (A)- iii, iv, (B)-i, ii, iii, (C)-i, iii, iv, (D)-ii **62.** (A) - ii, iii, (B)-iv, (C)-v, (D)-i

63. (A)- i, ii (B)-i, (C)-iii, (D)-iv **64.** (A) - iv, (B)-i, (C)-ii, (D)-iii