PART II: INORGANIC CHEMISTRY

XII

SECTION I: SINGLE OPTION CORRECT

571. The extraction of Nickel involves:
(A) The formation of $Ni(CO)_4$
(B) The decomposition of $Ni(CO)_4$
(C) The formation and thermal decomposition of $Ni(CO)_4$
(D) The formation and catalytic decompostiion of $Ni(CO)_4$

572. Consider the following statements:
According the Werner's theory.
1. Ligands are connected to the metal ions by covalent bonds
2. Secondary valencies have directional properties
3. Secondary valencies are non-ionisable.
of these statements:
(A) 1, 2 and 3 are correct (B) 2 and 3 are correct
(C) 1 and 3 are correct (D) 1 and 2 are correct

573. Which compound have all the types of bonds are present and count how many H – bond is present
(A) White vitriol & 2 H – bond (B) Green vitriol & 6 H – bond
(C) Blue vitriol & 4 H – bond (D) Mohr salt & 5 H – bond

574. Van Arkel method of purification of metals involves converting the metal to a :
(A) Volatile stable compound (B) Volatile unstable compound
(C) non volatile stable compound (D) none of the above

575. What is the colour of $(NH_4)_2SnCl_6$?
(A) white (B) pink (C) red (D) yellow

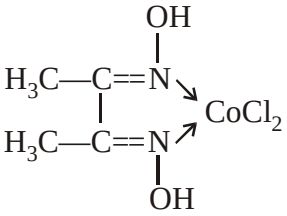
576 What is the coordination number of Cr in $K_3[Cr(ox)_3]$?
(A) 6 (B) 5 (C) 4 (D) 3

577. In the following precipitate reactions which one is not possible :
(A) $CdCl_2 + NaOH \xrightarrow{\Delta} Cd(OH)_2 + NaCl$
(B) $AgNO_3 + Na_3AsO_4 \xrightarrow{cold} Ag_3AsO_4 + NaNO_3$
(C) $Pb(NO_3)_2 + KI \xrightarrow{\Delta} PbI_2 + KNO_3$
(D) $AgNO_2 + Na_3AsSO_4 \xrightarrow{cold} Ag_3AsO_4 + NaNO_2$

578. When NH_4OH is added to solution of $NiCl_2$ the green colour precipitate is formed but when excess of NH_4OH is added in that precipitate., the complex is formed. What is the formula of that precipitate & complex :
(A) $Ni(OH)_2$, $[Ni(NH_3)_6]Cl_2$ (B) $Ni(OH)_3$, $[Ni(NH_3)_6]Cl_2$
(C) $NI(OH)_2$, $[Ni(NH_3)_4]Cl_2$ (D) $NI(OH)_3$, $[Ni(NH_3)_4]Cl_2$

579. A mixture of two salts is not soluble in water but dissolves completely in dil HCl to form a colourless solution. The mixture could be :
(A) $AgNO_3 + KBr$ (B) $BaCO_3 + ZnS$ (C) $FeCl_3 + CaCO_3$ (D) $Mn(NO_3)_2 + MgSO_4$

580. The correct IUPAC name of the complex :



is:

(A) Dichlorodimethylglyoximatocobalt (II) (B) Bis(dimethylglyoxime)dichlorocobalt (II)
(C) Dimethylglyoximecobalt(II) chloride (D) Dichlorodimethylglyoxime-N, N-cobalt (II)

581. Zinc white is a better white pigment than lead white because it :
(A) Has more covering power than lead white
(B) Is not blackened by the action of atmosphere
(C) Is soluble in water
(D) Becomes yellow when heated

582. The effective atomic number of cobalt in the complex $[Co(NH_3)_4]^{3+}$ is –
(A) 36 (B) 33 (C) 32 (D) 30

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

584. Iron , once dipped in concentration H_2SO_4, does not displace copper from sulphate solution because
(A) It is less reactive than copper (B) A layer of sulphate is deposited on it
(C) A layer of oxide is deposited on it (D) None

585. In $[Cr(C_2O_4)_3]^{3-}$, the isomerism shown is
(A) ligand (B) optical (C) geometrical (D) ionisation

586. Which statement about corrosive sublimate is incorrect :
(A) It is prepared by heating mercury & chlorine
(B) It reduces stannic chloride
(C) It oxidises stannous chloride
(D) It sublimes at readily

587 Consider the following isomerisms:
1. Ionization 2. Hydrate 3. Co-ordination 4. Geometrical
(5) Optical
Which of the above isomerisms are exhibited $[Cr(NH_3)_2(OH)_2Cl_2]^{-1}$?
(A) 1 and 5 (B) 2 and 3 (C) 3 and 4 (D) 4 and 5

589. In the metallurgy of iron when lime stone is added to the blast furnace, the calcium ion ends up in
(A) Slag (B) Gangue (C) Metallic calcium (D) Calcium carbonate

590. The oxidation of Fe in $Na_2[Fe(CN)_5NO]$ & $Na_4[Fe(CN)_5NOS]$ are:
(A) +2 & +3 (B) +2 & +2 (C) +3 & +3 (D) +3 & +2

591. From gold amalgam, gold may be recovered by:
(A) Addition of Zn metal (B) Electrolytic refining
(C) Distillation (D) Dissolving Hg in HNO_3

592. The purification method used for mineral $Al_2O_3.2H_2O$ is –
(A) Froth floatation (B) Leaching (C) Liquation (D) Magnetic separation

593. Which of the following is linear?
(A) XeF_2 (B) XeF_4 (C) SO_2 (D) ClF_3

594. Consider the following observation –

(A) $M^{n+} + HCl \longrightarrow$ white precipitate $\xrightarrow{\Delta}$ water solution

the metal ion M^{n+} will be –
(A) Hg^{2+} (B) Ag^{+} (C) Pb^{2+} (D) Sn^{2+}

595. Reaction of $K_2Cr_2O_7$ with NaCl and conc. H_2SO_4 gives –
(A) $CrCl_3$ (B) $CrOCl_2$ (C) CrO_2Cl_2 (D) Cr_2O_3

596. Preparation of looking mirrors involves the use of :
(A) red lead (B) ammonical silver nitrate
(C) ammonical $AgNO_3$ + red lead (D) ammonical $AgNO_3$ + red lead + HCHO

597. Which of the following oxides is amphoteric in nature ?
(A) N_2O_3 (B) P_2O_3 (C) Sb_2O_3 (D) Bi_2O_3

598. Which of the following salt liberate reddish brown gas on treatment with dilute H_2SO_4 ?
(A) $ZnBr_2$ (B) KBr (C) KNO_2 (D) KNO_3

599. In which of the following Xe atom is sp^3d^2 hybridised
(A) $[XeO_6]^{4-}$ (B) $[XeF_3]^{+}$ (C) XeO_4 (D) XeF_{26}

600. In a research lab a scientist is doing an experiment. He takes two test tubes one containing $Ba(NO_3)_2$ solution and other contains salts of chloride , fluoride and iodide . Now he mixed test tube Ist with test tube IInd. then what happens
(A) chloride is precipitate $BaCl_2$ form
(B) fluoride is precipitated in BaF_2 form
(C) iodide is precipitated in BaI_2 form
(D) all are precipitate in $BaCl_2$, BaF_2 and BaI_2 form

601. In comparison of ferrous salt, ferric salt is :
(A) More stable (B) Less stable (C) Equally stable (D) None of these

602. Salt (A) on decomposition gives basic gas, acidic gas , neutral gas along with H_2O . (A) is :
(A) $(NH_4)_2SO_4$ (B) $(NH_4)_2C_2O_4$ (C) $(NH_4)_2CO_3$ (D) $(NH_4)_2Cr_2O_7$

603. The chromyl chloride test is meant for which of the following ion ?
(A) Cl^- ions (B) SO_4^{--} ion (C) I^- ions (D) Cl^- and CrO_4^{2-} ions

604. Salt (A) gives black colour precipitate with H_2S in acidic medium . The precipitate dissolves in HNO_3 and gives solution (B) . (B) on reaction with $K_4[Fe(CN)_6]$ gives brown colour (C) . What is (B) ?
(A) CuS (B) $Cu(NO_3)_2$ (C) $Cu_2[Fe(CN)_6]$ (D) $CuSO_4$

605. A yellow turbidity, sometimes appears on passing H_2S gas even in the absence of the second group radicals. This happens because –
(A) sulphur is present in the mixture as in impurity
(B) the fourth group radicals are precipitated as sulphides
(C) the H_2S is oxidised by some acidic radicals present in solution
(D) the third group radicals are precipitated

606. Which is the hybridisation for Indian yellow .
(A) d^2sp^3 (B) dsp^3 (C) sp^3d^2 (D) sp^3d^3

607. Which of the following oxyacids of sulphur contain no sulphur – sulphur (S – S) bonds ?
(A) $H_2S_2O_4$ (B) $H_2S_2O_5$ (C) $H_2S_2O_7$ (D) $H_2S_2O_3$

608. Precipitate of AgCl dissolves in liquid ammonia due to the formation of –
(A) $[Ag(NH_4)_2]OH$ (B) $[Ag(NH_3)_2]Cl$ (C) $[Ag(NH_3)_2]OH$ (D) $[Ag(NH_3)_2]Cl$

SECTION II: MORE THAN ONE OPTION CORRECT

609. Which of the following is/are not yellow in colour?
(A) CdS (B) HgS (C) PbS (D) Bi_2S_3

610. Colour of which of the following is attributed to charge transfer spectrum?
(A) $KMnO_4$ (B) KO_2 (C) $K_2Cr_2O_7$ (D) AgI

611. $p\pi - d\pi$ bonding occurs between oxygen and
(A) phosphorus in P_4O_{10} (B) chlorine in $HClO_4$
(C) nitrogen in N_2O_5 (D) carbon in CO_2

612. Which of the following statement(s) is are correct when a mixture of NaCl and $K_2Cr_2O_7$ is gently warmed with concentrated H_2SO_4?
(A) A deep red vapour is evolved
(B) The vapour when passed into NaOH solution gives a yellow solution of Na_2CrO_4
(C) Chlorine gas is evolved
(D) Chromyl chloride is formed

613. Extraction of silver from argentiferrous lead (Pb +Ag) involves
(A) distillation method (B) cupellation
(C) froth flotation method (D) treatment with NaCl

614. Which of the following metals sulphides are soluble in hot and 50% HNO_3 ?
(A) HgS (B) Bi_2S_3 (C) CuS (D) all these

615. BiF_5 doesn't exist due to
(A) the inert pair effect (B) the stable +3 oxidation state
(C) high ionisation energy (D) higher polarisation power of cation

616. Which of the following option is/are correct for the given complex :
$K_2[Cr(NO)(NH_3)(CN)_4]$, μ = 1.73 BM
(A) The hybridization is d^2sp^3
(B) The hybridization is sp^3d^2
(C) The oxidation state of NO in this complex is +1
(D) The name of this complex is Potassiumamminetetracyanonitrosoniumchromate (I)

617. Potassium manganate (K_2MnO_4) is formed when
(A) chloride is passed into aqueous $KMnO_4$ solution
(B) manganese dioxide is fused with potassium hydroxide in air
(C) formaldehyde reacts with potassium permanganate in presence of a strong alkali
(D) potassium permanganate reacts with conc. sulphuric acid

618. The aqueous solutions of the following salts will be coloured in the case of
(A) $Zn(NO_3)_2$ (B) $LiNO_3$ (C) $Co(NO_3)_2$ (D) $CrCl_3$

619. Which of the following alloys contains(s) Cu and Zn?
(A) Bronze (B) Brass (C) Gun metal (D) Type metal

620. Which of the following statement (s) is/are true ?

(A) Ag^+ ions do not give white precipitate with concentrated HCl

(B) Cu^{2+} ions produce a white precipitate when KCN solution is added in a small quantity

(C) Hg^{2+} ions give deep blue precipitate with cobalt acetate and ammonium thiocyanate

(D) Black precipitate of BiI_3 turns orange when heated with water

621. Na_2SO_4 and Na_2S can be distinguished from each other by using :

(A) conc.H_2SO_4 (B) acidified $KMnO_4$ solution

(C) sodium nitroprusside solution (D) cadmium acetate solution

622. KI solution is the reagent for :

(A) Hg^{2+} (B) Pb^{2+} (C) Ag^+ (D) Cu^{2+}

623. The correct statement(s) is /are.

(A) titan yellow solution gives red colouration with a neutral solution containing Mg^{+2} ions

(B) solution of nitrite is decomposed by sulphamic acid.

(C) Fe^{2+} ions give brown colour precipitate with $[Fe(CN)_6]^{3-}$ ions solution.

(D) Green precipitate of $Cr(OH)_3$ is soluble in Na_2O_2.

624. Which of the following statement(s) is /are false ?

(A) Fe^{3+} gives red precipitate with dimethyl glyoxime in alkaline solution.

(B) Cu^{2+} ion with excess KI gives a dirty white ppt. which turns white on adding hypo solution.

(C) A filter paper soaked in mercurous nitrate turns black in contact with ammonia gas.

(D) Ag^{2+} gives white precipitate with $BaBr_2$

625. Solution of (X) + dil HCl $\rightarrow$ yellow ppt + gas having smell of burnt sulphur

solution of (X) + KCN solution $\rightarrow$ (Y) + (Z)

(Y) + excess of dil HCl + $FeCl_3$ solution $\rightarrow$ blood red colouration

(Z) + $Pb(NO_3)_2$ solution $\rightarrow$ white ppt $\xrightarrow{\text{boiling}}$ white ppt (M)

Solution of (Y) + $Pb(NO_3)_2$ solution $\xrightarrow{\text{boiling}}$ black ppt :

(A) (X) is $Na_2S_2O_3$ (B) Y is SCN^- (C) Z is SO_3^{2-} (D) M is $PbSO_3$

626. In nitroprusside ion the iron and NO exist as Fe^{+2} and NO^+ rather than Fe^{+3} and NO. These forms can be differentiated by .

(A) estimating the concentration of iron

(B) measuring the concentration of. CN

(C) measuring the solid state magnetic moment

(D) thermally decomposing the compound.

627. Addition of high proportions of manganese makes steel useful in making rails of railroads, because manganese

(A) gives hardness to steel

(B) helps the formation of oxides of iron

(C) can remove oxygen and sulphur

(D) can show highest oxidation state of + 7

628. When a compound X reacts with ozone in aqueous medium, a compound Y is produced. Ozone also reacts with Y and produces compound Z. Z acts as an oxidising agent, then X, Y and Z will be

(A) X = HI, Y = I_2 and Z = HIO_3 (B) X = KI, Y = I_2 and Z = HIO_3

(C) X = KI, Y = I_2 and Z = HIO_4 (D) X = HI, Y = I_2 and Z = HIO_4

629. The species that undergo(es) disproportionation in an alkaline medium is/are

(A) Cl_2 (B) MnO_4^{2-} (C) NO_2 (D) ClO_4^-

630. Which of the following pairs of nitrates gives the same gaseous products on thermal decomposition?

(A) KNO_3 and $Pb(NO_3)_2$ (B) KNO_3 and $NaNO_3$

(C) $Pb(NO_3)_2$ and $Cu(NO_3)_2$ (D) $NaNO_3$ and $Ca(NO_3)_2$

631. Which of the following statements is/are correct regarding inter-halogen compounds of ABx types?

(A) x may be 1,3,5 and 7

(B) A is a more electronegative halogen than B

(C) FBr_3 cannot exit

(D) The structures of ClF_3 and IF_7 show deviation from normal structures and could be explained on the basis of VSEPR theory

632. $Al_2(SO_4)_3 + NH_4OH \longrightarrow X$, then

(A) X is a white coloured compound (B) X is insoluble in excess of NH_4OH

(C) X is soluble in NaOH (D) X cannot be used as an antacid

633. Which of the following sulphides dissolves only in aquaregia?

(A) CoS (B) NiS (C) CuS (D) HgS

634. Which of the following will give the same colour in oxidising flame as well as in the reducing flame in borax bead test (when cold) :

(A) Chromium (B) Copper (C) Cobalt (D) Nickel

635. Which of the following reduction reactions are actually employed in commerical extraction of metals?

(A) $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$

(B) $Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$

(C) $2Na[Au(CN)_2] + Zn \rightarrow Na_2[Zn(CN)_4] + 2Au$

(D) $Cu_2S + Pb \rightarrow Cu + PbS\downarrow$

636. The metal which gives amphoteric oxide is :

(A) Zn (B) Cu (C) Sn (D) Ga

637. Metallurgical process of zinc involves roasting of zinc sulphide followed by reduction. Metallic zinc distills over as it is volatile and impurities like Cu, Pd and Fe gets condensed. The crude metal obtained is called spelter, which may be purified by

(A) electrolysis process (B) fractional distillation

(C) polling (D) heating with iodine

638. Which of the statement is correct ?

(A) In PCl_5 hybridisation is sp^3d and it has trigonal bipyramidal structure.

(B) The angle between the P and Cl is 90º which is same for all the P and Cl present in PCl_5

(C) The bond length of P—Cl in axial position is higher than in equatorial position.

(D) PCl_5 is ionic in solid phase

639. The pairs of compounds which cannot exists together in aqueous solution are
(A) NaH_2PO_4 and Na_2HPO_4 (B) Na_2CO_3 and $NaHCO_3$
(C) NaOH and NaH_2PO_4 (D) $NaHCO_3$ and NaOH

640. Epsom salt is used
(A) As a purgative
(B) As a mordant is dyeing
(C) As a stimulant to increase the secretion of bile
(D) For removal of S from petroleum

641. Mark the wrong statement/s. Pure alumina is
(A) A good conductor of electricity (B) A bad conductor of electricity
(C) Volatile in nature (D) An electrovalent compound

642. In which of the following alloys Mg is present
(A) Electron (B) Magnalium (C) Duraluminium (D) Aluminium bronze

643. Which of the following pair of compounds is/are not an oxide?
(A) Felspar, sylvine (B) Magnesia, magnesite
(C) Lime, corundum (D) Sylvine, magnesite

645. Which of the following does not disproportionate?
(A) Cu^+ (B) Au^{3+} (C) Cu^{2+} (D) Au^+

646. During the extraction of Ag and Au using a KCN solution, cyanide ions react with metal ions as:
(A) A reducing agent (B) a complexing agent
(C) an oxidizing agent (D) a lewis acid

647. Which of the following complexes have tetrahedral geometry?
(A) $Ni(CO)_4$ (B) $Na_2[Zn(CN)_4]$ (C) $K_2[PtCl_4]$ (D) $[RhCl(PPh_3)_3]$

648. Hoop's process of purification of aluminium involves formation of layers during electrolysis. This is because :
(A) the three layers have same densities but different materials
(B) the three layers have different densities
(C) the upper layer is of pure aluminium which acts as a cathode
(D) the bottom layer is of impure aluminium which acts as an anode and middle layer consists of NaF, BaF_2 & AlF_3.

649. Which of the following option is/are correct?
(A) On fast cooling of pig iron we will get white cast iron & carbon impurity is present in form of cementite Fe_3C
(B) On slowly cooling of pig iron we will get grey cast iron 'C' impurity is present in form of graphite
(C) The M. Pt. of grey cast iron is more than pure iron due to presence of impurity
(D) Cast iron does not rust easily and neither be tempered. Due to high carbon content it is hard & brittle cannot be welded

650. Which options are true for pattinson's process
(A) This process is based on the fact that silver lead system has an eutectic mixture with 2.6% silver
(B) This eutectic mixture has M. Pt 303ºC where as pure Pb has M. Pt. 327ºC
(C) Further purification is done by cupellation process
(D) Argentiferous lead contain 2% Ag.

651. Bessemer convertor which is used for the extraction of copper -
(A) hot air acts as oxidising agent & Cu_2S acts as self reducing agent
(B) slag is $CaSiO_3$
(C) SiO_2 lining is used in Bessemer convertor
(D) the copper obtained in this process is blister copper.

652. Which of the following option is/are correct ?
(A) vapour phase of XeF_6 is covalent and hybridisation is sp^3d^3
(B) Solid phase of XeF_6 is ionic and hybridisation is sp^3d^2
(C) XeF_2 is linear in shape
(D) XeO_2F_2 follows bent rule and structure is see-saw.

653. For Dow's process which is/are correct?
(A) For extraction of Mg by sea water
(B) $Ca(OH)_2$ is used to ppt Mg
(C) Mg is precipitated in form of $Mg(OH)_2$
(D) ppt. of $Mg(OH)_2$ is treated with HCl & then electrolysis for extraction of 'Mg'

654. 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

655. Mercury is a liquid at 0°C because of
(A) very high ionisation energy (B) weak metallic bonds
(C) high heat of hydration (D) high heat of sublimation

656. Which of the following statements concern with transition metals?
(A) compounds containing ions of transition elements are usually coloured
(B) the most common oxidation state is +3
(C) they show variable oxidation states, which differ by two units only
(D) they easily form complexes

657. Correct statement(s) is/are
(A) an acidified solution of $K_2Cr_2O_7$ liberates iodine from KI
(B) $K_2Cr_2O_7$ is used as a standard solution for estimation of Fe^{2+} ions
(C) in acidic medium, M = N/6 for $K_2Cr_2O_7$
(D) $(NH_4)_2Cr_2O_7$ on heating decomposes to yield Cr_2O_3 through an endothermic reaction

658. Interstitial compounds are formed by
(A) Co (B) Ni (C) Fe (D) Ca

659. The catalytic activity of transition elements is related to their
(A) variable oxidation states (B) surface area
(C) complex formation ability (D) magnetic moment

660. In the equation: $M + 8CN^- + 2H_2O + O_2 \longrightarrow 4[M(CN)_2]^- + 4OH^-$, metal M is
(A) Ag (B) Au (C) Cu (D) Hg

661. To an acidified dichromate solution, a pinch of Na_2O_2 is added and shaken. What is observed:
(A) blue colour (B) Orange colour changing to green
(C) Copious evolution of oxygen (D) Bluish - green precipitate

662. Amphoteric oxide(s) of Mn is/are
(A) MnO_2 (B) Mn_3O_4 (C) Mn_2O_7 (D) MnO

SECTION III: COMPRHENSIONS

COMPREHENSION # 66
Paragraph for Questions Nos. 663 to 664

When hydrogen peroxide is added to an acidified solution of a dichromate gives a deep blue coloured compound 'A' in presence of organic solvent, which decomposes rapidly in aqueous solution into 'B' and dioxygen. Compound 'A' can be extracted by dimethyl ether forming the adduct 'C'.

663. The oxidation state of the metal ion in compound 'A' are
(A) 3+ (B) 10 + (C) 6+ (D) 4+

664. The magnetic moment of compound 'B' is:
(A) 2.8 B.M (B) 4.9 B.M (C) 0 (D) 3.8 B.M

COMPREHENSION # 67
Paragraph for Questions Nos. 665 to 667

(T) imparts violet colour $\xrightarrow{\text{compd (U) } + \text{conc.} H_2SO_4}$ (V)Red gas $\xrightarrow{NaOH + AgNO_3}$ (W)Red ppt. $\xrightarrow{NH_3 \text{ soln.}}$ (X)

(W) Red ppt. $\xrightarrow{\text{dil. HCl}}$ (Y) white ppt.

(U) $\xrightarrow[\text{sublimes on heating}]{NaOH}$ (Z) gas (gives white fumes with HCl)

665. The compound 'W' is
(A) CrO_3 (B) Ag_2CrO_4 (C) HgI_2 (D) $AgNO_2$

666. The compound 'T' & 'U' are
(A) $KMnO_4$, HCl (B) $K_2Cr_2O_7$, HCl
(C) $K_2Cr_2O_7$, NH_4Cl (D) K_2CrO_4, KCl

667. The compound 'V' is
(A) CrO_3 (B) Cl_2 (C) Br_2 (D) CrO_2Cl_2

COMPREHENSION # 68
Paragraph for Questions Nos. 668 to 670

There are some deposits of nitrates and phosphates in earth's crust. Nitrates are more soluble in water. Nitrates are difficult to reduce under the laboratory conditions but microbes do it easily. Ammonia forms large number of complexes with transition metal ions. Hybridization easily explains the ease of sigma donation capability of NH_3 and PH_3. Phosphine is a flammable gas and is prepared from white phosphorous.

668. Among the following, the correct statement is
(A) Phosphates have no biological significance in humans
(B) Between nitrates and phosphates, phosphates are less abundant in earth's crust
(C) Between nitrates and phosphates, nitrates are less abundant in earth's crust
(D) Oxidation of nitrates is possible in soil

669. Among the following, the correct statement is :

(A) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional

(B) Between NH_3 and PH_3, PH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional

(C) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional

(D) Between NH_3 and PH_3, PH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional

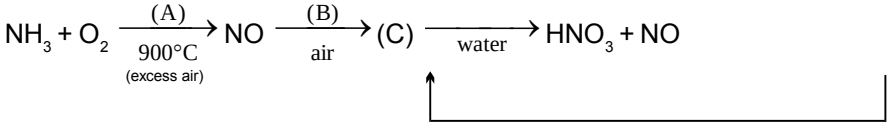
670. White phosphorus on reaction with NaOH gives PH_3 as one of the products. This is a

(A) dimerization reaction (B) disproportionation reaction

(C) condensation reaction (D) precipitation reaction

COMPREHENSION # 69
Paragraph for Questions Nos. 671 to 672

The following flow diagram represents the industrial preparation of nitric acid from ammonia:



Answer the questions given below:

671. Which line of entry describes the undefined reagents, products and reaction conditions?

	A	B	C
(A)	catalyst	R.T. (25°C)	NO_2
(B)	catalyst	R.T. (25°C)	N_2O
(C)	catalyst	high pressure	NO_2
(D)	high pressure	catalyst	N_2O_3

672. Formation of HNO_3 when (C) is dissolved in H_2O takes place through various reactions. Select the reaction not observed in this step.

(A) $NO_2 + H_2O \longrightarrow HNO_3 + HNO_2$ (B) $HNO_2 \longrightarrow H_2O + NO + NO_2$

(C) $NO_2 + H_2O \longrightarrow HNO_3 + NO$ (D) none of these

COMPREHENSION # 70
Paragraph for Questions Nos. 673 to 675

A is a colourless crystalline salt which is soluble in water to form a super saturated solution. Salt (A) reacts with salt (B) (which is sensitive to light & gets photo reduction to give its metal) it gives a white ppt (C) and with excess of salt (A), (C) gives a soluble complex (D). (C) in exposure in air and (D) on heating both produces same black coloured ppt (E). (A) is used in medicine and also in extraction of gold and decoloured I_2 in KI solution.

673. When salt (A) reacts with HCl solution it decompose to give

(A) brown coloured gas (B) rotten eggs smelled gas

(C) white turbidity (D) violet coloured gas

674. When salt (A) is heated to 223ºC the product obtained are

(A) Na_2SO_4, Na_2S_5 (B) PbO, SO_2 (C) CuO, SO_2 (D) $FeCl_2$, Cl_2

675. Identify (E)

(A) Hg_2O (B) Ag_2S (C) PbO_2 (D) CuS

COMPREHENSION # 71
Paragraph for Questions Nos. 676 to 678

(I) $FeCr_2O_4 + NaOH + air \longrightarrow (A) + Fe_2O_3$

(II) $(A) + (B) \longrightarrow Na_2Cr_2O_7$

(III) $Na_2Cr_2O_7 + X \xrightarrow{\Delta} Cr_2O_3$

(IV) $Cr_2O_3 + Y \xrightarrow{\Delta} Cr$

676. Compounds (A) and (B) are:

(A) Na_2CrO_4, H_2SO_4 (B) $Na_2Cr_2O_7$, HCl

(C) Na_2CrO_5, H_2SO_4 (D) $Na_4[Fe(OH)_6]$, H_2SO_4

677. (X) and (Y) are:

(A) C and Al (B) Al and C (C) C in both (D) Al in both

678. Na_2CrO_4 and Fe_2O_3 are separated by

(A) dissolving in conc. H_2SO_4 (B) dissolving in NH_3

(C) dissolving in H_2O (D) dissolving in dil. HCl

COMPREHENSION # 72
Paragraph for Questions Nos. 679 to 681

(i) A certain inorganic compounds (X) shows the following reactions on passing H_2S through acidified solution of (X) a brown ppt is obtained.

(ii) The ppt. obtained in (i) is dissolved in excess of yellow $(NH_4)_2S_2$.

(iii) On adding an aqueous solution of NaOH of solution of (X) first white ppt. is obtained, which dissolves in excess of NaOH.

(iv) the compound X reduces $FeCl_3$ solution.

679. The soluble complex which is obtained with excess of NaOH on oxidation produces -

(A) Na_2SnO_3 (B) Na_2MnO_4 (C) Na_2ZnO_2 (D) Na_2AlO_2

680. When salt X reacts with $AuCl_3$ we get –

(A) purple of cassius (B) liquid gold

(C) gold rush (D) candy fluid

681. The salt (X) gives grey mass and another compound (Z) with corrosive sublimate. (Z) on reaction with NH_4Cl gives (Y). Which is the correct statement about (Y).

(i) it is known as pink salt

(ii) it is used as mordant

(iii) it is used as moderator in nuclear reactors

(iv) it is known as scheele's salt

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

COMPREHENSION # 73
Paragraph for Questions Nos. 682 to 684

(i) A white solid (A) on heating with NaOH gives an alkaline gas (B) and solid (C). Both (A) and (C) gives ring test while (C) gives golden yellow flame. (A) on strong heating it decomposed to give a gas (D) & H_2O. (D) is a neutral oxide which does not burn but helps more than air in burning. (D) on heating at 920°C which gives two gases (E) and (F). The gas (E) when mixed with hydrogen at high temperature and pressure give gas (B). Gas (F) is essential for living system. (D) combines with 'C', 'S', 'P' to form their acidic oxides. (D) on heating with sodamide gives sodium azide & water.

682. What is compound (A) -

(A) N_3H (B) NH_4NO_2 (C) $(NH_4)_2Cr_2O_7$ (D) NH_4NO_3

683. The compound D is -

(A) N_2O (B) N_2 (C) CO (D) None of these

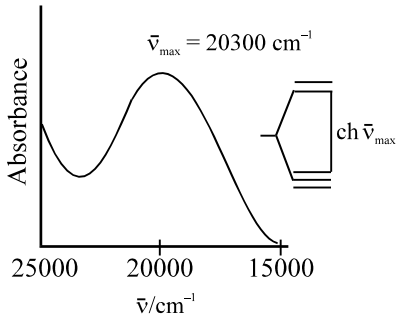
684. Hybridisation of central atom in cation and anion present in compound (A) respectively -

(A) sp^3, sp^2 (B) sp^3, sp^3 (C) sp^2, sp^3 (D) sp^3, sp

COMPREHENSION # 74
Paragraph for Questions Nos. 685 to 686

Read the following passage based on applications of crystal field theory to explain magnetic and spectral properties of complexes carefully and answer the questions .

With the help of CFT number of unpaired electrons in a compound can be calculated and we can calculate its paramagnetic moment (due to spin only(by the formula , u = $\sqrt{n(n+2)}$ Bohr magneton (BM) , where 'n' is the number of unpaired electron in the complex . For spectral analysis the separation between t_{2g} and e_g orbitals called ligand field splitting . Parameter Δ_0 (for octahedral complexes) should be known to us , which can be easily calculated by observing the absorption spectrum of one electron complex . Figure shows the optical absorption spectrum of the hexaaquatitanium (III) ion $[Ti(H_2O)_6]^{3+}$. The CFT assigns the first absorption maximum at 20,300 cm^{-1} to the transition $e_g \leftarrow t_{2g}$. For multielectronic $(d^2$ to $d^{10})$ system , the calculation of Δ_0 by absorption spectrum is not that easy as the absorption spectrum will also be affected by electron-electron repulsions .



(h = 6.6×10^{-34} Joule-sec , C = 3×10^8 m/sec, $N_0 = 6.023 \times 10^{23}$, 1 KCal= 4.2 KJ)

685. The magnetic moment of following arranged in increasing order will be :

[atomic number of Co = 27]

(i) Co^{3+} (octahedral complex with a strong field ligand)

(ii) Co^{3+} (octahedral complex with a weak field ligand)

(iii) Co^{2+} (tetrahedral complex)

(iv) Co^{2+} (square planar complex)

(A) i > ii > iii > iv (B) iii > ii > iv > i (C) ii > iii > iv > i (D) ii > iv > iii > i

686. The energy of transition for complex given in the passage , $[Ti(H_2O)_6]^{3+}$ will be :

(A) 243 KCal/mole (B) 58 KCal/mole (C) 97 KCal/mole (D) 143 KCal/mole

COMPREHENSION # 75
Paragraph for Questions Nos. 687 to 689

Because of the presence of vacant d-orbitals ,transition metals can accept ligands. Dependidng on the strengths of the ligands the complexes have different hybridization of the central atoms and consequently exhibit different magnetic properties. Thus strong ligands like CN^-, CO, NH_3, NO_2^- etc. cause maximum pairing of electrons and hence are diamagnetic ir have low spins. Weak ligands like F^-, Cl^-, Br^-, l^- etc. produce weak ligand field resulting in a large number of unpaired electrons in the complex. They are

referred to as high spin complexes.

687. They hybridization in the complexes $\left[Ni(CN)_4\right]^{2-}$ and $\left[Cu(NH_3)_4\right]^{2+}$ are respectively

(A) sp^3, sp^3 (B) sp^3, dsp^2 (C) dsp^2, sp^3 (D) dsp^2, dsp^2

688. The species that is paramagnetic is

(A) $\left[Fe(CN)_6\right]^{4-}$ (B) $\left[Cr(CN)_6\right]^{-3}$ (C) $\left[Ni(CO)_4\right]$ (D) $\left[Co(CN)_6\right]^{-3}$

689. Three moles of $AgNO_3$ solution is added to 1 mole of CrCl3.6H2O and mixed thoroughly. It was found that 1 mole $AgNO_3$ remained in solution. The formula of the complex can be represented as

(A) $\left[Cr(H_2O)_6\right]Cl_3$ (B) $\left[CrCl(H_2O)_5\right]Cl_2.H_2O$

(C) $\left[CrCl_3(H_2O)_3\right]3H_2O$ (D) $\left[CrCl_2(H_2O)_6\right]Cl.2H_2O$

COMPREHENSION # 76
Paragraph for Questions Nos. 690 to 691

Questions given below are based on electronic configurations of the elements. The three elements X, Y and Z with the electronic configurations shown below all form hydrides:

Element	Electronic configuration
X	$1s^2, 2s^2, 2p^2$
Y	$1s^2, 2s^2, 2p^6, 3s^1$
Z	$1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4s^2, 4p^5$

690. Which line of properties (A, B, C, or D) correctly lists properties of the hydrides of these elements?

	Hydride of X	Hydride of Y	Hydride of Z
(A)	Colourless gas insoluble in H_2O	Silver/grey solid, reacts with H_2O to form an alkaline solution	Colourless gas form a strong acid in H_2O
(B)	Colourless liquid, no reaction with H_2O	Silver/grey solid, forms H_2O	Ionic solid with formula ZH
(C)	Colourless gas found naturally	Does not conduct electricity in the molten state	Colourless gas, reacts with Cl_2
(D)	Non-polar compound reacts with Cl_2 in light	Silver/grey ionic solid with formula YH_2	Forms when water is added to phosphorus and element Z

691. Which of the following exists as gas?

(A) X_2 (B) Y_2 (C) Z_2 (D) all of the above

COMPREHENSION # 77
Paragraph for Questions Nos. 692 to 694

Pyrolusite on heating with KOH in the presence of air gives a dark green compound (A). The solution of (A) on treatment with H_2SO_4 gives a purple coloured compound (B), which gives following is reactions:

(i) KI on reaction with alkaline solution of (B) changes into a compound (C)

(ii) The colour of compound (B) disappears on treatment with the acidic solution of $FeSO_4$.

(iii) With conc. H_2SO_4 compound (B) gives (D) which can decompose to yield (E) and oxygen.

692. The compound (C) is

(A) I_2 (B) I_2O_5 (C) KIO_3 (D) KIO_4

693. The comopund (E) is:

(A) MnO (B) MnO_2 (C) Mn_2O_3 (D) Mn_3O_4

694. Oxidation state of manganese of the compound (A) is

(A) +2 (B) +4 (C) + 7 (D) +6

COMPREHENSION # 78
Paragraph for Questions Nos. 695 to 697

A salt (A) on reaction with NaOH gives a gas (B) , which gives black coloured water insoluble compound with Hg_2Cl_2. After completely expelling the gas (B) from the solution, zinc dust is added and boiled. Appearance of gas (B) again observed. The salt (A) on heating gives a gaseous product (C) which supports combustion.

695. The gas (C) reacts with $NaNH_2$ to obtain

(A) Na_2CO_3 (B) $NH_2–NH_2$ (C) NaN_3 (D) Na_2CN_2

696. The gas (B) reacts with excess of Cl_2. The product obtained is

(A) N_2 (B) NCl_3 (C) $COCl_2$ (D) NOCl

697. The gas (B) reacts with corrosive sublimate to obtain

(A) $HgNH_2Cl$ (B) $HgNH_2Cl–Hg$ (C) Hg_2Cl_2 (D) K_2HgI_4

COMPREHENSION # 79
Paragraph for Questions Nos. 698 to 700

A green coloured compound (A) gave the following reactions :

(i) (A) dissolves in water to give a green solution. The solution on reaction with $AgNO_3$ gives a white ppt.(B) which dissolves in NH_4OH solution and reappears on addition of dil HNO_3.It on heating with $K_2Cr_2O_7$ and conc. H_2SO_4 produced a red gas which dissolves in $NaOH$ to give a yellow solution (C). Addition of lead acetate solution to (C) gives a yellow ppt. which is used as a paint

(ii) The hydroxide of cation of (A) in borax bead test gives brown colour in oxidising flame and grey colour in reducing flame.

(iii) Aqueous solution of (A) gives a block ppt. on passing H_2S gas. The block ppt. dissolves in aquaregia and gives back (A).

(iv) (A) on boiling with $NaHCO_3$ and Br_2 water gives a block ppt. (D).

(v) (A) on treatment with KCN gives a light green ppt. (E) with dissolves in excess of KCN to give (F).(F) on heating with alkaline bromine water gives the same black ppt. as (D).

698. Thye hybridization & magnetic behaviour of comnpound F' is

(A) dsp^2, dia (B) $sp^3, para$ (C) $dsp^3, para$ (D) sp^3, dia

699.. The cpd A, D & E respectively are

(A) $COCl_2, C_2O_3, CO(CN)_2$ (B) $NiCl_2, CO_2O_3CO(CN)_2$

(C) $NiCl_2, Ni_2O_3, Ni(CN)_2$ (D) $Ni(NO_3)_2\, NiCl_2\, Ni(CN)_2$

700. The cpd B & C respectively are & the Maximum OX state shown by the fromation metal in cpd 'C' is

(A) $AgCl, pbCrO_4 \& +6$ (B) $AgBr, NaCro \& +4$

(C) $MnCl_2, NariO_4 \& +7$ (D) $NiCl_2, K_2(Ni(CN)_4) + 2$

COMPREHENSION # 80
Paragraph for Questions Nos. 701 to 703

Some observations related to an unknown inorganic substance **A** are presented below.

1 A is a yellowish – white deliquescent solid and it sublimes on heating. It has a molecular weight of 267.

2 A reacts violently with water, forming solution B.

3 When a solution of NH_4Cl and NH_4OH is added to solution B, a white gelatinous precipitate is obtained

4 A sample of B also gives a curdy white precipitate C on addition of dilute nitric acid and silver nitrate solution. This white precipitate C readily dissolves when dilute NH_4OH is added, though a gelatinous white precipitate D is formed in its place with excess NH_4OH.

5 Precipitate D is filtered off and is dissolved in excess NaOH to give a clear solution E.

6 When CO_2 is passed through solution E, compound D is reprecipitated.

7 Substance A unchanged in dry ether, when this solution is reacted with excess LiH, it transforms to G.

701. Compound **A** is likely to be

(A) Dimer of $FeCl_3$ (B) Dimer of $AlCl_3$ (C) Dimer of $SnCl_2$ (D) Dimer of $CrCl_3$

702. The curdy white ppt (C) is

(A) $Al(OH)_3$ (B) $Sn(OH)_2$ (C) $Cr(OH)_3$ (D) AgCl

703. The compound (G) reacts with boran trichloride to form

(A) acidic oxide of boron (B) compound containing 3c-2e bond

(C) boran nitride (D) lithium borohydride

COMPREHENSION # 81
Paragraph for Questions Nos. 704 to 707

A white crystalling solid (a) on dehydration gave a poisonous pseudohalogen gas (B). Compound (A) when boiled with alkali gave a clourless gas (C). Which froms white fume with HCl. The fume condenses to a white solid (D) on cooling. (B) dissolves in caustic potash solution to gave two compounds (pseudo halides) (E) and (F). Compound (F) gives white precipitate (G) with $AgNO_3$ solution but the precipitate dissolves in excess of (E) When (F) is heated together with (D) a well known fertilizer (H) is obtained. identify (A) to (H) and write the reaction involved.

704. The hybridzaition shown by cpd 'B' (pseudo halides)

(A) Sp^3d (B) Sp^3d^2 (C) Sp^2 (D) Sp

705. The ppt dissolves in excess of (E) due to formations of complex. The nature complex is

(A) Parra, colourless (B) Dia, colourless

(C) Dia, coloured (D) Parra, coloured

706. The hybridization shown by the cation & anions of compound ' A' are

(A) Sp^2, Sp^3 (B) Sp^2, Sp^2 (C) Sp^3, Sp^3 (D) Sp^3, Sp^2

707. How many σ and π bonds present in between 2 C atoms of cyanogen gas and their hybridization?

(A) 1 σ , 0 π ; sp , sp (B) 1 σ , 2 π ; sp , sp

(C) 1 σ , 0 π ; sp^3 , sp^3 (D) 1 σ , 1 π ; sp , sp

COMPREHENSION # 82

Paragraph for Questions Nos. 708 to 707

A white solid (A) on heating with NaOH gives an alkaline gas (B) & a solid (C) . Both (A) and (C) gives ring test while (C) gives golden yellow flame.(A) on strong heating is decomposed to give a gas (D) & H_2O . (D) is a neutral oxide it does not burn but helps more than air in burning.(D) on heating at 920 °C which gives two gases (E) and (F) . The gas (E) when mixed with hydrogen at high temperature and pressure give gas (B) . Gas (F) is essential for living system.(D) combines with 'C' , 'S' , 'P' to form their acidic oxides . (D) on heating with sodamide gives sodium azide & water.

708. Gas (B) is used in clock in Washington due to:

(A) flipping (B) gaseous form (C) liquid (D) rotation

709. The hybridization of central metal atom in cation and anion of compound (A) are respectively :

(A) sp^3 & sp^3 (B) sp^3 & sp^2 (C) sp^2 & sp^2 (D) sp & sp^2

710. Bond order of compound (D) is :

(A) 2.73 & 1.6 (B) 1.73 & 1.25 (C) 3 & 2 (D) 3.5 & 2.5

COMPREHENSION # 83

Paragraph for Questions Nos. 711 to 713

A , B, and C are three complexes of chromium (III) with the empirical formula $H_{12}O_6Cl_3Cr$. All the three complexes have water and chloride ions as ligands . Complex A does not react with concentrated H_2SO_4, whereas complexes B and C loss 6.75% and 13.5% of their original weight respectively, on treatment with concentrated H_2SO_4.

711. Complex A is :

(A) $[Cr(H_2O)_5Cl]Cl_2.H_2O$ (B) $[Cr(H_2O)_6]Cl_3$

(C) $[Cr(H_2O)_4Cl_2]Cl.2H_2O$ (D) none of these

712. Which of the following statement is correct? **[State T for true and F for false]**

(i) The effective atomic number of the complex B is 33

(ii) H_2SO_4 is act in above question is used as a dehydrating agent

(iii) The number of ions provided by complex B is 3

(A) TTT (B) FTF (C) TTF (D) FFF

713. In the above complexes, which of the following complex is maximum hydrated ?

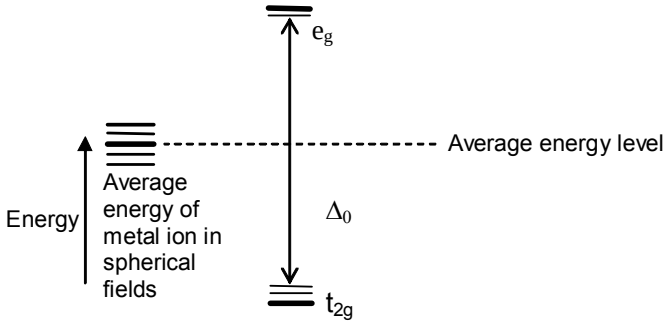
(A) Complex C (B) Complex B

(C) Complex A (D) All are equally hydrated

COMPREHENSION # 84
Paragraph for Questions Nos. 714 to 716

In octahedral complexes the filling of t_{2g} orbitals decreases the energy of a complex , that is makes it more stable by $-0.4\Delta_0$ per electron . Filling the e_g orbitals increases the energy by $+0.6\Delta_0$ per electron . The total crystal field stabilisation energy is given by

CFSE (octahedral) = $-0.4\Delta_0(t_{2g}) + 0.6\Delta_0(e_g)$



The CFSE increases the thermodynamic stability of the complexes i.e it affects the actual lattice energy over the theoretically calculated energy that does not take CFSE it into account. In studying tetrahedral complexes a regular tetrahedron is related to a cube . One atom is at the centre and four of eight corners are occupied by the ligands . The directions of x , y , z point to the centres of the faces of the cube . The directions of the approach of the ligands does not coincide exactly with the atomic orbitals .

In these complexes the e_g orbitals are more stable compared to the t_{2g} orbitals.

714. In an octahedral complex X the central metal ion has 24 electrons . If its pairing energy is $+0.8\Delta_0$ (where Δ_0 is the difference in energy between the t_{2g} and the e_g orbitals). Will it obey Hund's rule and what is its spin magnetic moment

(A) Yes , 2.83 (B) No , 2.83 (C) Yes , 4.89 (D) No , 4.89

715. During the formation of a tetrahedral complex the angle between the e_g orbital and the central metal is X° and that of t_{2g} orbital and the central metal is Y° then X^0-Y^0 is.

(A) 24.3° (B) 19.3° (C) 35.36° (D) 21.24°

716. Considering Mn^{2+} if the measured lattice energy is X kJ / mol and the calculated lattice energy is Y kJ/mol then their relation between X and Y in a strong and a weak ligand field respectively is

(A) $X > Y$, $X = Y$ (B) $X > Y$, $X < Y$ (C) $X < Y$, $X > Y$ (D) $X < Y$, $X = Y$

COMPREHENSION # 85
Paragraph for Questions Nos. 717 to 718

Four elements P, Q, R & S have ground state electronic configuration as:

P $\rightarrow$ $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^3$ Q $\rightarrow$ $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^1$

R $\rightarrow$ $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^{10}$ $4s^2$ $4p^3$ S $\rightarrow$ $1s^2$ $2s^2$ $2p^6$ $3s^2$ $3p^6$ $3d^{10}$ $4s^2$ $4p^1$

717. Comment which of the following option represent the correct order of true (T) & false (F) statement.

I size of P < size of Q
II size of R < size of S
III size of P < size of R (appreciable difference)
IV size of Q < size of S (appreciable difference)

(A) TTTT (B) TTTF (C) FFTT (D) TTFF

718. Order of IE_1 values among the following is
(A) P > R > S > Q (B) P < R < S < Q (C) R > S > P > Q (D) P > S > R > Q

COMPREHENSION # 86
Paragraph for Questions Nos. 719 to 721

Compounds containing M-C bonds are called organometallic compounds of which carbonyls constitute an important part. Synergic effect in bonding in the metal carbonyls makes them stable species, metal carbonyls abide by the effective atomic number (EAN) rule.

719. Which of the following is not an organ metallic compound ?

(A) $Al\left(C_2H_5O\right)_3$ (B) $Fr\left(C_5H_5\right)_2$

(C) $\left[PtCl_3\left(C_2H_2\right)\right]^-$ (D) $Cr\left(Co\right)_6$

720. The value of x in $\left[Mn\left(Co\right)_5\right]^{x-}$ is
(A) 3 (B) 2 (C) 1 (D) 0

721. Which of the following is true for the synergic bonding in metal carbonyls ?
(A) The C-O bond length increases (B) The bond order of CO increases
(C) The C-O bond length does not change (D) None of these

COMPREHENSION # 87
Paragraph for Questions Nos. 722 to 724

The following "cycle of copper" experiment is performed in some general chemistry laboratories. The series of reactions starts with copper and ends with metallic copper. The steps are as follows : (1) A piece of copper wire of known mass is allowed to react with concentrated nitric acid [The products are copper (II) nitrate, nitrogen dioxide, and water]. (2) The copper (II) nitrate is treated with a sodium hydroxide solution to form copper (II) hydroxide precipitate. (3) On heating copper (II) hydroxide decomposes to yield copper (II) oxide. (4) The copper (II) oxide is reacted with concentrated sulphuric acid to yield copper (II) sulphate. (5) Copper (II) sulphate is treated with an excess of zinc metal to form metallic copper. (6) the remaining zinc metal is removed by treatment with hydrochloric acid and metallic copper is filtered, dried, and weighted.

722. Assuming that a student started with 65.6 g of copper, calculate the theoretical yield of copper sulphate.
(A) 165 g (B) 82.4 g (C) 90 g (D) 100.2 g

723. Copper obtained at the end of the cycle is..... amount originally taken.
(A) less than (B) greater than
(C) nearly equal (D) only copper salts are obtained.

724. $CuSO_4$ solution thus formed is subjected to electrolysis. To deposit all the copper formed at the end, a current of 50 A will have to be used for approximately :
(A) 10 hours (B) 1 hour (C) 5 hours (D) 0.5 hours

COMPREHENSION # 88
Paragraph for Questions Nos. 725 to 726

At high temperature carbon reacts with water to produce a mixture of carbon monoxide, CO and hydrogen, H_2.

$$C + H_2O \xrightarrow{\text{red heat}} CO + H_2$$

CO is separated from H_2 and then used to separate nickel from cobalt by forming a volatile compound, nickel tetracarbonyl, $Ni(CO)_4$.

$$Ni + 4\,CO \rightarrow Ni(CO)_4$$

725. How many moles of $Ni(CO)_4$ could be obtained from the CO produced by the reaction of 75.0 g of carbon ? Assume 100% reaction and 100% recovery in both steps.
(A) 6.25 (B) 1.563 (C) 3.125 (D) 25.0

726. Formation of volatile $NI(CO)_4$ and its subsequent heating gives pure Ni. process is called :
(A) Hall (B) Dow (C) Serpeck (D) Mond

COMPREHENSION # 89
Paragraph for Questions Nos. 727 to 729

Valence bond theory explains the magnetic bahaviour of coordination species Depending upon the magnetic behaviour one can understand whether the inner d- orbitals or outer d- orbitals are being used in a particular hybrid station However, the colours of coordination species can he explained by the crystal filed theory.

727. Which of the following compounds is diamagnetic as well as coloured

(A) $\left[Fe(CN)_6\right]^{4-}$ (B) $\left[Ni(CN)_4\right]^{2-}$ (C) $\left[Co(NH_3)_6\right]^{3+}$ (D) All of these

728. Though NH_3 is a strong filed ligand, in which of the following compounds, the d-electrons are not paired

(A) $\left[Cr(NH_3)_6\right]^{3+}$ (B) $\left[Ni(NH_3)_6\right]^{2+}$ (C) $\left[CrCl_3(NH_3)_3\right]$ (D) All of these

729. The correct order of paramagnetic moment is given by

(A) $\left[Cu(NH_3)_4\right]^{2+} < \left[FeF_6\right]^{3-} < \left[Cr(NH_3)_6\right]^{3+}$

(B) $\left[FeF_6\right]^{3-} < \left[Cu(NH_3)_4\right]^{2+} < \left[Cr(NH_3)_6\right]^{3+}$

(C) $\left[Cu(NH_3)_4\right]^{2+} < \left[Cr(NH_3)_6\right]^{3+} < \left[FeF_6\right]^{3-}$

(D) $\left[Cr(NH_3)_6\right]^{3+} < \left[Cu(NH_3)_4\right]^{2+} < \left[FeF_6\right]^{3-}$

COMPREHENSION # 90
Paragraph for Questions Nos. 730 to 734

Magnesium is a valuable, light weight metal used as a structural material as well as in alloys, in batteries, and in chemical synthesis. Although magnesium is plentiful in Earth's crust, it is cheaper to "mine" the metal from seawater. Magnesium forms the second most abundant cation in the sea (after sodium); there are about 1.3 g of magnesium in a kilogram of sea-water. The process from obtaining magnesium from sea - water employs all three types of reactions precipitation, acid-base, and redox reactions.

730. Precipitation reaction involves formation of :
(A) insoluble $MgCO_3$ by adding Na_2CO_3 (B) insoluble $Mg(OH)_2$ by adding $Ca(OH)_2$
(C) insoluble $MgSO_4$ by adding Na_2SO_4 (D) insoluble $MgCl_2$ by adding NaCl

731. Acid-base reaction involves reaction between:
(A) $MgCO_3$ and HCl (B) $Mg(OH)_2$ and H_2SO_4
(C) $Mg(OH)_2$ and HCl (D) $MgCO_3$ and H_2SO_4

732. Redox reaction involves reaction between :
(A) in the electrolytic cell when fused $MgCl_2$ is subjected to electrolysis.
(B) when fused $MgCl_2$ is heated.
(C) when fused $MgCO_3$ is strongly heated
(D) in none of the above.

733. Instead of calcium hydroxide, why don't we simply add sodium hydroxide to seawater to precipitate magnesium hydroxide ?

(A) Solubility of $Ca(OH)_2$ is smaller than that of NaOH so that $Mg(OH)_2$ is precipitated.
(B) NaOH may dissolve $Mg(OH)_2$ formed.
(C) NaOH may also precipitate other species, being a strong electrolyte
(D) NaOH, being a weak electrolyte will not coagulate $Mg(OH)_2$

734. Which is the best source of the given process in the metallurgical process?

(A) Magnesite (B) Kieserite (C) Epsomite (D) Dolomite

COMPREHENSION # 91
Paragraph for Questions Nos. 735 to 738

An inorganic salt (A) is decomposed at about 523 K to give products (B) and (C). Compound (C) is a liquid at room temperature and is neutral to litmus paper while oxide (B) on burning with white phosphorous, given a dehydrating agent (D).

735. Compound (A) is

(A) NH_4NO_3 (B) N_2O (C) H_2O (D) P_2O_5

736. Compound (B) is

(A) NH_4NO_3 (B) N_2O (C) H_2O (D) P_2O_5

737. Compound (C) is

(A) NH_4NO_3 (B) N_2O (C) H_2O (D) P_2O_5

738. Compound (D) is

(A) NH_4NO_3 (B) N_2O (C) H_2O (D) P_2O_5

COMPREHENSION # 92
Paragraph for Questions Nos. 739 to 741

There are some deposits of nitrates and phosphates in earth's crust. Nitrates are more soluble in water. Nitrates are difficult to reduce under the laboratory conditions but microbes do it easily. Ammonia forms large number of complexes with transition metal ions. Hybridization eaily explains the ease of sigma donation capability of NH_3 and PH_3. Phosphine is a flammable gas and is prepared from white phosphorus.

739. Among the following, the correct statement is –

(A) Phosphates have no biological significance in humans
(B) Between nitrates and phosphates, phosphates are less abundant in earth's crust
(C) Between nitrates and phosphates, nitrates are less abundant in earth's crust
(D) Oxidation of nitrates is possible in soil

740. Among the following, the correct statement is –

(A) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional.
(B) Between NH_3 and PH_3, PH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional.
(C) Between NH_3 and PH_3, NH_3 is a better electron donor because the lone pair of electrons occupies sp^3 orbital and is more directional.
(D) Between NH_3 and PH_3, PH_3 is a better electron donor because the lone pair of electrons occupies spherical 's' orbital and is less directional.

741. White phosphorus on reaction with NaOH gives PH_3 as one of the products. This is a –

(A) dimerization raection (B) disproportionation reaction
(C) condensation reaction (D) precipitation reaction

COMPREHENSION # 92
Paragraph for Questions Nos. 742 to 744

A white crystalling solid (A) on dehydration gave a poisonous pseudohalogen gas (B). Compound (A) when boiled with alkali gave a clourless gas (C). Which froms white fume with HCl. The fume condenses to a white solid (D) on cooling. (B) dissolves in caustic potash solution to gave two compounds (pseudo halides) (E) and (F). Compound (F) gives white precipitate (G) with $AgNO_3$ solution but the precipitate dissolves in excess of (E) When (F) is heated together with (D) a well known fertilizer (H) is obtained. identify (A) to (H) and write the reaction involved.

742. The hybridzaition shown by cpd 'B' (pseudo halides)
(A) sp^3d (B) sp^3d^2 (C) sp^2 (D) sp

743. The ppt dissolves in excess of (E) due to formations of complex. The nature complex is
(A) Parra, colourless (B) Dia, colourless (C) Dia, coloured (D) Parra, coloured

744. The hybridization shown by the cation & anions of compound ' A' are
(A) sp^2, sp^3 (B) sp^2, sp^2 (C) sp^3, sp^3 (D) sp^3, sp^2

COMPREHENSION # 93
Paragraph for Questions Nos. 745 to 749

A sulphate of a metal (A) on heating evolves two gases (B) and (C) and an oxide (D). Gas (B) turns $K_2Cr_2O_7$ paper green while gas (C) forms a trimer in which there is no S – S bond. Compound (D) with HCl, forms a Lewis base (E) which exists as a dimer.

745. Compound (A) is
(A) $FeSO_4$ (B) SO_2 (C) SO_3 (D) Fe_2O_3

746. Compound (B) is
(A) $FeSO_4$ (B) SO_2 (C) SO_3 (D) Fe_2O_3

747. Compound (C) is
(A) $FeSO_4$ (B) SO_2 (C) SO_3 (D) Fe_2O_3

748. Compound (D) is
(A) $FeSO_4$ (B) SO_2 (C) SO_3 (D) Fe_2O_3

749. Compound (E) is
(A) $FeCl_3$ (B) SO_2 (C) SO_3 (D) Fe_2O_3

COMPREHENSION # 94
Paragraph for Questions Nos. 750 to 753

$$\underset{\text{(organic compound)}}{A} + O_2 \longrightarrow X + Y + Z$$

Compound (A) in pure form does not give ppt. with $AgNO_3$ solution. A mixture containing 70% of (A) and 30% of ether is used as an anaesthetic. Compound (X) and (Y) are oxides while (Z) is a pungent smelling gas. (X) is a neutral oxide which turns cobalt chloride paper pink. Compound (Y) turns lime water milky and produces an acidic solution with water.

750. Compound (A) is –
(A) $CHCl_3$ (B) H_2O (C) CO_2 (D) Cl_2

751. Compound (X) is –
(A) $CHCl_3$ (B) Cl_2 (C) CO_2 (D) H_2O

752. Compound (Y) is –

(A) $CHCl_3$ (B) H_2O (C) CO_2 (D) Cl_2

753. Compound (Z) is –

(A) $CHCl_3$ (B) H_2O (C) CO_2 (D) Cl_2

COMPREHENSION # 95
Paragraph for Questions Nos. 754 to 756

A crystalline solid (A) reacts with hydrogen gas to form a monoatomic gas (B) and a highly associated liquid (C). (A) is soluble in water and undergoes hydrolysis slowly to form (B), (C) and a diatomic gas (D). When pure and dry (D) is subjected to a silent electric discharge an another pale blue gas (E) is produced which like (A) also acts as a strong oxidising agent. (E) dissolves in potassium hydroxide forming an orange coloured solid which is paramagnetic in nature. (A) reacts with IF_5, SbF_5, PF_5 etc to form the addition compounds. (C) forms an addition compound (F) with KF which when electrolysed in molten state forms a most reactive gas (G). (B) and (G) (taken in 2 : 1 ratio) when heated in nickel tube at 400ºC and 6 atm. pressure forms (A). The IE_1 of (B) is fairly close to (D).

754. Gas (G) is produced by reacting K_2MnF_6 with :

(A) SbF_5 (B) MnF_3 (C) $KSbF_6$ (D) MnF_5

755. Which of the following statement is correct for (A)?

(A) The central atom of (A) is sp^3d hybridised with three lone pairs of electrons

(B) (A) reacts with S_8 molecules in presence of (C) to form a compound in which the S atom is sp^3d^2 hybridised.

(C) (A) reacts with SbF_5 as a lewis base.

(D) All of these

756. Which is correct choice for (D) and (E)

(A) (E) reacts with dry iodine to form I_2O_5

(B) A filter paper soaked in alcoholic benzidine becomes brown when brought in contact with (E)

(C) (D) is prepared by Brin's process

(D) (B) and (C) both

COMPREHENSION # 96
Paragraph for Questions Nos. 757 to 760

Look at the location of elements A,B,C and D in the following periodic table and answer the questions given below :

757. Which of the elements indicated by A,B, C and D is expected to be found in native state

(A) A (B) B (C) C (D) D

758. Which is found as its sulphide?

(A) A (B) B (C) C (D) D

759. Which is found as its carbonate?

(A) A (B) B (C) C (D) D

760. Imagine a planet with an atmosphere that contains O_2 and SO_2 but no. CO_2 . What is the chemical composition of the mineral you would expect to find for the alkaline earth metals (M) on such a planet ?

(A) MO_2, M_2O_2 (B) MSO_3, MSO_4

(C) $M(HSO_3)_2\ M(HSO_4)_2$ (D) All of the above

COMPREHENSION # 97
Paragraph for Questions Nos. 761 to 765

The chief ore of zinc is the sulphide, ZnS. The ore is concentrated by flotation process and then heated in air, which converts the ZnS to ZnO.

$$2ZnS + 3O_2 \xrightarrow{90.6\%} 2ZnO + 2SO_2 \quad .....(1)$$

The ZnO is then treated with dilute H_2SO_4

$$ZnO + H_2SO_4 \xrightarrow{100\%} 2ZnSO_4 + H_2O \quad .....(2)$$

to produce $ZnSO_4$(aq.) which produces Zn metal on electrolysis.

$$2\,ZnSO_4 + 2H_2O \xrightarrow{98.2\%} 2Zn + 2H_2SO_4 + O_2 \quad .....(3)$$

761. What mass of Zn will be obtained from an ore containing 225 kg of ZnS ? Efficiencies of the process have been indicated above the arrow mark. (Zn = 65, S = 32, O=16, H=1)
(A) 134 kg (B) 112 kg (C) 102 kg (D) 130 kg

762. What amount of current is required (with 100% efficiency) in step (3) if it takes one month ?
(A) 10.2 A (B) 15.4 A (C) 17.0 A (D) 154.0 A

763. ZnO is step (i) can also be dissolved in NaOH forming :
(A) $Zn(OH)_2$ (B) Na_2ZnO_2 (C) Na_2O_3 (D) $NaZn(OH)_4$

764. How many kilomoles of NaOH are required to dissolve all the ZnO of step (1) assuming 100% yield ?
(A) 2.32 (B) 1.16 (C) 4.64 (D) 9.28

765. What valume of 98% H_2SO_4 (by weight, density 1.8 g/mL) is required in step (2) ?
(A) 130 L (B) 140 L (C) 120 L (D) 150 L

COMPREHENSION # 98
Paragraph for Questions Nos. 766 to 768

The Carbon–metal bond in carbonyls may be represented as M $\leftarrow$ C $\equiv$ O. A stronger second bond is formed by back bonding. This arises form sideways overlap of $\overset{*}{\Pi}$ 2Py orbital of carbon with full dxy orbital of the metal.

766. Because of back bonding 'CO' is called as:
(A) Π – acceptor ligand (B) Π – donar ligand
(C) σ – acceptor base (D) σ – donor ligand

767. In metal carbonyls the C–O bond length
(A) Decreases from double bond length to triple length.
(B) Increases from triple bond length to double bond length.
(C) Remain as triple bond length.
(D) Cannot be predicted.

768. Which pair of carbonyl is correctly matched with shape.
(A) Nickel carbonyl – Square planar (B) Iron carbonyl – Pentagonal bipyramidal
(C) Vanadium carbonyl – Tetrahedral (D) Chromium carbonyl – Octahedral

COMPREHENSION # 99
Paragraph for Questions Nos. 769 to 771

Coordination compounds can also exhibit ionization and limeage isomerism types along with other isomerism types. In ionization isomerism type, the exchange of ions between coordination sphere and ionic sphere is observed. On the other hand, is linkage isomerism, the change in the donar atom of a ligand is observed.

769. Which one of the following is correct with respect to SCN^- ion ?

(A) metal - S bonds are stable in solvent with low dielectrtic constant
(B) metal - N bonds are stable in solvent with high dielectric constant
(C) metal - S bonds are stable in solvent with high dielectric constant
(D) in any solvent metal - S and metal - N bonds are stable

770. Which one of the following is not an example for ionization isomerism:

(A) $\left[(NH_3)_5 Co\ ^{18}OH\right] + NO_2 \rightarrow \left[(NH_3)_5 Co(NO_2)\right] +^{18} OH$

(B) $\left[(NH_3)_4 Co(H_2O)Cl\ \right] + 2Br \rightarrow \left[(NH_3)_4 Co(Br_2)\ \right] + Cl\ .H_2O$

(C) $\left[(NH_3)_5 Co(SO_4)\right] + NO_3 \rightarrow \left[(NH_3)_5 Co(NO_3)\right] + SO_4$

(D) $\left[(NH_3)_4 Co(NO_2)Cl\right] + Cl \rightarrow \left[(NH_3)_4 CoCl_2\right] + NO_2$

771. How many ways are possible to represent a coordination complex with a molecular formula $\left[M^{m\pm}a_4b_2\right]^{n\pm}$ (when m may or may not be equal to n) in - terms of geometrical isomerism

(A) 12 Cis forms and 3 trans forms
(B) 6 Cis forms and 6 trans forms
(C) 4 Cis forms and 4 trans forms
(D) 8 Cis and 4 trans formss

COMPREHENSION # 100
Paragraph for Questions Nos. 772 to 774

A metal complex having composition $Cr(NH_3)_4Br_2I$ was isolated in two forms (x) and (y). Form (x) reacts with $AgNO_3$ to give a pale yellow precipitate which is partially soluble in excess of NH_4OH . Whereas (y) gives a greenish yellow precipitate which is insoluble in NH_4OH .

772. (A) The formula of (x) and (y) are $[Cr(NH_3)_4IBr]Br$ and $[Cr(NH_3)_3Br_2I]NH_3$

(B) The formula of (x) and (y) are $[Cr(NH_3)_4IBr]Br$ and $[Cr(NH_3)_4Br_2]I$ respectively

(C) The formula of (x) and (y) are both $[Cr(NH_3)_4Br]BrI$

(D) The formula of (x) and (y) are $[Cr(NH_3)_2IBr_2](NH_3)_2$

773. Both the (x) form and (y) form show

(A) linkage isomerism
(B) Co-ordination isomerism
(C) ionization isomerism
(D) none of these

774. The oxidation state and co-ordination number of the central atom in the complex is

(A) +6, 6
(B) +6, 5
(C) +3, 5
(D) +3, 6

SECTION III: MATCH TYPE

775. Match the following columns

	Column I		**Column II**
(a)	$V(CO)_6$	(P)	Paramagnetic with 1 unpaired electron
(b)	$[NiCl_2(PPh_3)_2]$	(Q)	Paramagnetic with 2 unpaired electrons
(c)	$[Ni(NH_3)_4]^{2+}$	(R)	sp^3 hybridization
(d)	$Ni(CO)_4$	(S)	Diamagnetic

776.

	Column-I		**Column-II**
(A)	$Zn(OH)_2$ precipitate dissolves in	(P)	Potassium cyanide
(B)	$Cr(OH)_3$ precipitate dissolves in	(Q)	Ammonia
(C)	AgCl precipitate dissolves in	(R)	Sodium hydroxide
(D)	CuS precipitate dissolves in	(S)	Sodium peroxidse

777.

	Column-I		**Column-II**
(A)	Highest density	(P)	Os
(B)	Colourless salts	(Q)	Cr
(C)	Maximum magnetic moment	(R)	Zn
(D)	Variable oxidation state	(S)	Mn

778.

	Column-I		**Column-II**
(A)	Bi^{3+} gives black ppt with	(P)	H_2S (saturated solution in water)
(B)	Cu^{2+} gives black ppt with	(Q)	Potassium thiocyanate solution
(C)	Zn^{2+} gives white ppt with	(R)	Potassium iodide solution
(D)	Ag^{+} gives white ppt with	(S)	Potassium ferrocyanide solution

779.

	Column-I		**Column-II**
(A)	Coloured ion	(P)	Cu^{+}
(B)	μ = 1.73 B.M.	(Q)	Cu^{2+}
(C)	d^{10} configuration	(R)	Fe^{2+}
(D)	More than 3 unpaired electrons	(S)	Mn^{2+}

780. Match the following

	Reactants		**Products**
(a)	anhydrous form of blue vitirol + $P_4 + H_2O \xrightarrow{\text{Cold}}$	(P)	H_3PO_4
(b)	anhydrous form of blue vitirol + $P_4 + H_2O \xrightarrow{\text{Hot}}$	(Q)	Cu_3P (black)
(c)	anhydrous form of blue vitirol + $PH_3 + H_2O \longrightarrow$	(R)	Cu
(d)	anhydrous form of blue vitirol + $H_3PO_2 + H_2O \longrightarrow$	(S)	Cu_2H_2 (Red)

781. Match the following :

	Column A		**Column B**
(i)	$NaI + Cl_2$ (water) + CCl_4 - shake	(a)	yellow ppt
(ii)	$CH_3COO^- + FeCl_3 + H_2O$ - boil	(b)	green mass
(iii)	$CoCl_2 + KNO_2 + CH_3COOH$ - warm	(c)	black ppt
(iv)	$MnCl_2 + KOH + KClO_3$ - fusion	(d)	purple colour
(v)	$MnCl_2 + NaOH + Br_2$ (water)	(e)	red brown ppt
(vi)	$FeCl_3 + KSCN$	(f)	blood red colour

782.

	Name		% of C
[1]	Wrought iron/Meleable	(a)	0.25 to 2.0
[2]	Steel	(b)	2.6 to 4.3
[3]	Pig Iron	(c)	0.1 to 0.25
[4]	Cast Iron	(d)	2.3 to 4.6

783.

	Column-I		**Column-II**
(A)	Zn	(P)	d-block metal
(B)	Cu	(Q)	Coinage metal
(C)	Ag	(R)	Native metal
(D)	Fe	(S)	Transitional metal

784. Match the following columns

	List I		**List II**
(a)	NH_3	(P)	sp^3 hybridisation
(b)	XeF_6	(Q)	1 lone pair are present
(c)	B_2H_6	(R)	multi centre bond are present
(d)	NH_4^+	(S)	pyramidal shape

785. Match the geometry (given in column A) with the complex (given in column B).

	Column (A)		**Column (B)**
i)	Tetrahedral	(a)	$[Cu(NH_3)_4]^{2+}$
ii)	Octahedral	(b)	$[Ag(NH_3)_2]^+$
iii)	Square planar	(c)	$Fe(CO)_5$
iv)	Trigonal bipyramidal	(d)	$[Cr(H_2O)_6]^{3+}$
v)	Linear	(e)	$[NiCl_4]^{2-}$

(A) (i)-(e), (ii)-(d), (iii)-(a), (iv)-(c) ,(v)-(b)
(B) (i)-(d), (ii)-(e), (iii)-(a), (iv)-(c) ,(v)-(b)
(C) (i)-(d), (ii)-(e), (iii)-(b), (iv)-(a) ,(v)-(c)
(D) (i)-(c), (ii)-(e), (iii)-(b), (iv)-(a) ,(v)-(d)

786. Match column - I with column - II

	Column - I (Property)		**Column - II (Element/compound)**
(A)	Explosive	(P)	Cu
(B)	Self-reduction	(Q)	Fe_3O_4
(C)	Magnetic material	(R)	$Cu(CH_3COO)_2.Cu(OH)_2$
(D)	Verdigris	(S)	$Pb(NO_3)_2$

787. Match column - I and column - II and select the correct answer using the codes given below the lists:

	Column - I		**Column - II**
(A)	Cyanide process	(P)	Ultrapure Ge
(B)	Floatation process	(Q)	Dressing of HgS
(C)	Electrolytic reduction	(R)	Extraction of Al
(D)	Zone refining	(S)	Extraction of Au

788.

	Column I		**Column II**
1.	White crystalline precipitate	(a)	$K_3[Co(NO_2)_6]$
2.	Reddish brown precipitate	(b)	$Cr(OH)_3$
3.	Yellow precipitate	(c)	$Fe(OH)_3$
4.	Green precipitate	(d)	$PbCl_2$

789.

	Column I		**Column II**
1.	$2NiS + 2HNO_3 + 6HCl$ – Evaporate to dryness	(a)	Black ppt & imparts greenish blue flame
2.	$CoCl_2 + 4NH_4CNS$ + amyl alcohol – Shake & allow to stand	(b)	Blue colour in organic layer
3.	$CuCl_2$ + NaOH – Heat strongly	(c)	White ppt insoluble in conc HNO_3 & HCl
4.	$Sr(CH_3COO)_2 + (NH_4)_2C_2O_4$ – Mix	(d)	Yellow residue turns green in water
5.	$H_2SO_4 + BaCl_2$ – Mix	(e)	Yellow ppt soluble in NaOH
6.	$Na_2CrO_4 + (CH_3OO)_2Pb$ – Mix	(f)	Scarlet red ppt
7.	$HgCl_2 + KI$ – Mix	(g)	White ppt & imparts crimson red flame

790.

	Column (A)		**Column (B)**
(a)	Fe^{3+}, Zn^{2+} & Cu^{2+} can be differentiated by	(i)	KI solution
(b)	PbS, CuS and CdS dissolve in	(ii)	Alkaline Na_2SnO_2 solution
(c)	Pb^{2+} gives yellow precipitate with	(iii)	50% HNO_3
(d)	Bi^{3+} gives a black precipitate with	(iv)	K_2CrO_4 solution
(e)	$[Ag(NH_3)_2]Cl$ gives back precipitate with	(v)	Aqueous NH_3 .

791.

	Column – I		**Column – II**
(a)	$FeO + SiO_2 \longrightarrow FeSiO_3$	(i)	Calcination
(b)	$MgCl_2.6H_2O \xrightarrow[\Delta]{DryHCl} MgCl_2$	(ii)	Leaching
(c)	$Cu_2S + 2Cu_2O \xrightarrow{\Delta} 6Cu + SO_2$	(iii)	Smelting
(d)	$Fe_2O_3 + 3C \longrightarrow 2Fe + 3CO$	(iv)	Roasting
(e)	$2Na[Ag(CN)_2] + Zn \longrightarrow Na_2[Zn(CN)_4] + 2Ag$	(v)	Bessemerisation

792. Match the various sequences with the appropriate orders:

	Sequences		**Orders**
(I)	Na^+ Mg^{+2} Al^{+3}	(a)	increasing size of ion in gaseous state
(II)	I^- S^{2-} N^{3-}	(b)	decreasing size of ion in gaseous state
(III)	O O^- O^{-2}	(c)	increasing size of ions aqueous state.
(IV)	N F O (IE_2)	(d)	decreasing size of ions aqueous state.
		(e)	increasing order of IE_2
		(f)	decreasing order of electron affinity

793.

	Column-I		**Column-II**
(A)	Containing carbonate radicals	(P)	Anglesite
(B)	Soluble in dilute H_2SO_4	(Q)	Cerussite
(C)	Insoluble in dilute H_2SO_4	(R)	Azurite
(D)	Substance containing lead	(S)	Calamine

794. Match **Column-I** with **Column-II** and select the correct answer using the codes given below .

	Column-I (Metals)		**Column-II (Method used for refining)**
(A)	Iron & copper	(P)	Poling
(B)	Zirconium & Titanium	(Q)	Bessemerisation
(C)	Lead & Tin	(R)	Van-Arkel
(D)	Copper & Tin	(S)	Liquation

795. Match the following:

1.	Double salt	(a)	$[Co(NH_3)_3Cl_3]$
2.	Zeise's salt	(b)	Hexadentate
3.	Neutral molecule	(c)	bidentate
4.	EDTA	(d)	Paramagnetic
5.	$Ni(CO)_4$	(e)	$FeSO_4.(NH_4)SO_4.6H_2O$
6.	$[Cr(NH_3)_6]^{3+}$	(f)	$K_4Fe(CN)_6$
7.	Low spin complex	(g)	Diamagnetic
8.	Glycine	(h)	An organometallic compound

(A) (1–e); (2–h); (3–a); (4–b); (5–g); (6–d); (7–f); (8–c).
(B) (1–h); (2–e); (3–a); (4–b); (5–g); (6–d); (7–f); (8–c).
(C) (1–h); (2–e); (3–a); (4–b); (5–d); (6–g); (7–c); (8–f).
(D) (1–h); (2–a); (3–e); (4–b); (5–d); (6–g); (7–f); (8–c)

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

	List I (Complex)		**List II(Geometry)**
A.	$[Ni(CN)_4]^{2-}$	1.	Tetrahedral
B.	$[ZnCl_4]^{2-}$	2.	Tetragonal
C.	$[Co(en)_3]^{3+}$	3.	Square planar
D.	$[Cu(NO_2)_6]^{4-}$	4.	Square pyramidal
		5.	Octahedral

Code	A	B	C	D
(A)	1	2	3	4
(B)	3	1	5	2
(C)	2	3	4	5
(D)	3	1	5	4

797. Match the following columns

	List I		**List II**
(a)	Arsenic	(P)	highest electron affinity (among list I)
(b)	Chlorine	(Q)	strongest reducing agent (among list I)
(c)	Fluorine	(R)	p-block element (among list I)
(d)	Lithium	(S)	highest ionisation energy (among list I)

798. **Match the following**

(a)	chalcopyrites (or) copper pyrites	(P)	$CuCO_3.Cu(OH)_2$
(b)	Chalcocite (or) copper glance	(Q)	Cu_3FeS_3
(c)	Bornite	(R)	Cu_2S
(d)	Cuprite (red)	(S)	Cu_2O
(e)	Malacite (green)	(T)	$CuFeS_2$
(f)	Azurite (blue)	(U)	$2CuCO_3.Cu(OH)_2$

799. Match column (I) (process) with column (II) (electrolyte)

	Column (I) (process)		**Column (II) (electrolyte)**
(A)	Downs cell	(P)	fused $MgCl_2$
(B)	Dow sea water process	(Q)	fused (Al_2O_3 + Na_3AlF_6 + CaF_2)
(C)	Hall-Heroult	(R)	fused (40% NaCl + 60% $CaCl_2$)
		(S)	($A\ell N$ + C + N_2)

800. Match column - I with column - II and select the correct answer using the codes given below the lists:

	Column - I		**Column - II**
(A)	Van Arkel method	(P)	Manufacture of caustic soda
(B)	Solvay process	(Q)	Purification of titanium
(C)	Cupellation	(R)	Manufacture of Na_2CO_3
(D)	Poling	(S)	Purification of copper
		(T)	Refining of silver

801.

	Column-I		**Column-II**
(A)	Reduction of oxides with Al	(P)	Ti
(B)	Reduction of chlorides with Mg at higher temperature	(Q)	Cu
(C)	Auto reduction of Sulphides during reduction	(R)	Cr
(D)	Strong heating of metal oxides	(S)	Ag

802.

	Column – I		**Column – II**
(a)	$K_2MgCl_4.6H_2O$	(i)	Thomas slag
(b)	Al_2O_3	(ii)	Azurite
(c)	$Ca_3(PO_4)_2$	(iii)	Calamine
(d)	$3Ag_2S.Sb_2S_3$	(iv)	Langbeinite
(e)	$2CuCO_3.Cu(OH)_2$	(v)	Carnallite
(f)	$PbSO_4$	(vi)	Pyrargyrite
(g)	$K_2Mg_2(SO_4)_3$	(vii)	Corundum
(h)	$ZnCO_3$	(viii)	Anglesite

803.

	Column – I		**Column – II**
(A)	$4\,Au + 8\,NaCN + 2\,H_2O + O_2\,(air) \longrightarrow 4\,Na\,[Au\,(CN)_2] + 4\,NaOH$	(P)	Leaching
(B)	$CuFeS_2 + 2\,H_2SO_4 \longrightarrow CuSO_4 + FeSO_4 + 2\,H_2S$	(Q)	Smelting
(C)	$Fe_3O_4 + 4\,CO \xrightarrow{823\,K} 3\,Fe + CO$	(R)	Hydrometallurgy
(D)	$MgCl_2.\,6\,H_2O \xrightarrow[Dry\ HCl(g)]{\Delta} MgCl_2 + 6\,H_2O$	(S)	Calcination
		(T)	Dow's process

804. Match the column –

	Column I		**Column II**
(A)	N_2O_4	(p)	Produces mixed acids on reaction with water as final product
(B)	Cl_2O_6	(q)	Exists as ion pair in the solid state
(C)	SO_2Cl_2	(r)	Paramagnetic in monmeric form
		(s)	Stronger dehydrating agent compared to conc. H_2SO_4

805. Match the column –

	Column I		**Column II**
(A)	Cl_2O	(p)	Exists in equilibrium with monomer
(B)	ClO_2	(q)	Paramagnetic
(C)	Cl_2O_6	(r)	Strongest acidic oxide
(D)	Cl_2O_7	(s)	Maximum steric on crowding

806. Match the column correctly –

	Column I		**Column II**
(A)	Best reductant	(p)	Fluorine
(B)	Arracks glass	(q)	F^-
(C)	Highest. hydrated halide ion	(r)	HF
(D)	Tri-iodide ion	(s)	HI
(E)	Does not show +1 oxidation state	(t)	Linear species

807. Match List–I with List–II and select the correct answer using codes given below in the list –

	List – I		**List – II**
(a)	Cyanide process	(P)	Ultrapure Ge
(b)	Floation process	(Q)	Pine oil
(c)	Electrolytic reduction	(R)	Extraction of Al
(d)	Zone refining	(S)	Extraction of Au

SECTION V: INTEGER TYPE

808. The oxidation state of Fe in brown ring complex $[Fe(H_2O)_5NO]SO_4$ is

809. The most common oxidation state of Lanthanoids is

810. Total number of inner transition elements in the periodic table is

811. How many statements are incoorect from the following:

(i) In the testing of v group radical NH_4OH is added to convert NH_4HCO_3 to $(NH_4)_2CO_3$ so that Ba^{2+}, Sr^{2+} and Ca^{2+} precipitate completely.

(ii) In the fusion test for Mn^{2+} ions, purple mass obtained turns green on adding NaOH solution (fusion with $KClO_3$ + KOH).

(iii) The addition of zinc dust during the testing of S^{2-} by dil H_2SO_4 enhances the evolution of H_2S gas.

(iv) Nonluminous flame is called oxidising flame and luminous flame is called reducing flame.

(v) $Cr_2(SO_4)_3 + 3B_2O_3 \xrightarrow{\Delta} 2Cr(BO_2)_3$ (blue bead) + $3SO_3$

812. Consider the following complex : $[Co(NH_3)_5CO_3]ClO_4$

The coordinations number, oxidation number, number of d-electrons and number of unpaired d-electrons on the metal are respectively –

813. Benitoite is represented as $BaTi[Si_3O_n]$, the value of n iS?

814. A metal complex of co-ordination number six having three different types of ligands *a*, *b* and *c* of composition $Ma_2b_2c_2$ can exist in several geometrical isomeric forms; the total number of such isomers is

815. Effective atomic number of Fe in the complex $K_4[Fe(CN)_6]$ is

816. % of silver in 'german silver' is

817. From the following information

$A^- (g) \longrightarrow A^{+2} (g) + 3e^-$ $\quad \Delta H_1 = 1400$ kJ

$A (g) \longrightarrow A^{+2} (aq) + 2e^-$ $\quad \Delta H_2 = 700$ kJ

ΔH_{EG} $[A^+(g)] = -350$ kJ /mol

$(IE_1 + IE_2)$ for $A(g) = 950$ kJ/mol

Find IE_2 (kJ/mol) of A

818. f-Sub shell of which principle quantum no. is filled up progressively in actinoids?

819. How many of the following statements are correct

(i) All the lone pairs are not necessarily used in coordinate bonding.
(ii) Tetrahedral complex of coordination no. of '4' show geometrical isomerism
(iii) A polydentate ligands have flexidentate character.
(iv) Geometrical isomerism is not noticed in complex coordination no. 2 and 3 .
(v) EDTA has six lone pairs but it will be less than 6 lone pair s can be used in some coordinate complexes.
(vi) Perfect complexes are those in which complex ion is fairly stable.
(vii) It can be considered as undissociated and doesn't give the individual tests for cations and anions.
(viii) For the complex $K_4[Fe(CN)_6]$ it will give $4K^+$ and $[Fe(CN)_6]^{4-}$ but will not give individual test for Fe^{2+} & $6CN^-$.
(ix) Square planar complexes of coordination no. of '4' shows geometrical isomerism
(x) Octahedral complexes of coordination no. of '6' showing geometrical isomerism
(xi) It is either not dissociated or feebly dissociated in solution state.
(xii) Ambidentate ligands are those in which only one donor atom is attached to metal atom

820. What is the oxidation state of lead in litharge?

821. When Fe(s) is dissolved in aqueous hydrochloric acid in a closed vessel, the work done is?

822. Theoritically the No. of geometrical isomers expected for octahedral complex [Mabcdef] is :

823. The magnetic moment of a transition metal ion is found to be 3.87 BM. The number of unpaired electrons present in the ion is

824. Inorganic graphite is B_XN_Y, the value of X+Y is?

825. An ornament of gold has 75% of gold, then it is of how many carat?

826. In an alkaline medium, the equivalent mass of $KMnO_4$ is $\left(\frac{M}{x}\right)$. Then x is?

827. The number of unpaired electron in the complex ion $[CoF_6]^{3-}$ is

828. The possible number of optical isomers in $[Co(en)_2Cl_2]^+$ are

829. The number of milli-moles of acidified $KMnO_4$ required to convert one mole of sulphite ion into sulphate ion is

830. Colemanite has the formula : $Ca_2B_6O_{11}\cdot xH_2O$. What is x?

831. The atomic number of an element is 22. The highest oxidation state exhibited by it in its compounds is]

832. Out of the following the number of process(es) which uses a catalyst is/are?
(I) Contact process
(II) Thermite process
(III) Ostwald's process
(IV) Haber's process

833. The mononuclear complex salt having the molecular composition $[Co(en)_2 (SCN) (NO_2)]Br$ can exist in a number of isomeric forms. The total number of possible isomer of all type is

834. Number of equivalent Cr —O bonds in the dichromate dianion are?