38. The molecular formula of Rhombic (S_α) and monoclinic (S_β) sulphur, respectively, is
A. S_8 and S_8 B. S_6 and S_8
C. S_8 and S_6 D. S_6 and S_6

39. Which of the following is a spontaneous process $\Delta S > 0$
A. $CaO_{(s)} + CO_2 \rightleftharpoons CaCO_3$
B. $NaNO_{3(s)} \rightleftharpoons Na^+_{(aq)} + Cl_{(aq)}$
C. $NaCl_{(aq)} \rightleftharpoons NaCl_{(s)}$
D. $N_{2(g)} + 3H_2 \rightleftharpoons 2NH_{3(g)}$

40. The enthalpy of combustion of cyclohexane, cyclohexane and H2 are -3920, 3800, and -241 KJ/mol, respectively. The heat of hydrogenation of cyclohexane is
A. 121.0 KJ/mol B. -121.0 KJ/mol
C. 242.0 KJ/mol D. -242.0 KJ/mol

41. The product formed when methylisocynide reacts with chlorine is
A. $CH_3NClCCl_2$ B. CH_3CN
C. CH_3NCCl_2 D. CH_3CH_2OH

42. Which of the following is a double salt
A. Curammonium sulphate
B. Cobalthexammine chloride
C. Potassium ferricyanide
D. Mohr's salt

43. A + $NaNO_2$ + HCl → N-nitroso amine derivative is produced, the reactant A is
A. CH_3NH_2 B. $C_6H_5NH_2$
C. $(CH_3)_2NH$ D. $(CH_3)_3N$

44. The standard electrode reduction potential of Zn, Ag and Cu are -0.76, 0.80 and 0.34 Volt respectively, then
A. Ag can reduce Zn^+ and Cu^+
B. Ag can oxidize Zn and Cu
C. Zn can reduce Ag^+ and Cu^+
D. Cu can oxidize Zn and AG

45. $C_6H_5N_2^+ + CuCl \rightarrow C_6H_5Cl + N_2 + Cu^+$, the reaction is known as
A. Gattermann's reaction
B. Sandmeyer's reaction
C. Dehydrogenation reaction
D. Esterification reaction

46. IUPAC name of $[Pt(NH_3)_3Br(NO_2)Cl]Cl$ is
A. Triamminechlorobromonitroplatinum(IV)chloride
B. Triamminebromonitrochloroplatinum(IV)chloride
C. Triamminebromochloronitroplatinum(IV)chloride
D. Triamminenitrochlorobromoplatinum(IV)chloride

47. $N_{2(g)} + O_{2(g)} \rightleftharpoons 2\,NO_{(g)}$ ΔH= -180.7 Kj. If the temperature of the reaction is increased, the production of NO is
A. Independent of temperature
B. Inversely proportional to temperature
C. Directly proportional to temperature
D. Partially dependent on temperature

48. The maximum valency of halogen group with respect to oxygen is
A. 1 B. 7
C. 5 D. 6

49. The process of conversion of carbonate ores into oxides by heating in limited air is known as
A. Calcination
B. Roasting
C. Detoxification
D. Corrosion

50. The shape of $[Cu(H_2O)_6]^{2+}$ is
A. Distorted octahedral
B. Distorted tetrahedral
C. Distorted pentagonal
D. Octahedral

1. What is the average life of radium, when its Half-life is 15 years
   A. 2.275×10^3 yrs B. 2.25×10^4 yrs
   C. 8.825×10^2 yrs D. 1.832×10^3 yrs

2. When zinc is plated on steel, anode is made up of
   A. Oxygen B. Zinc
   C. Steel D. Carbon

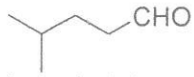
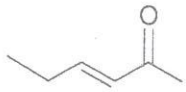
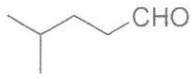
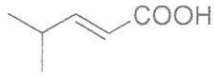
3. Which of the following statements is true
   A. H_3PO_3 is dibasic and non-reducing
   B. H_3PO_4 is tribasic and reducing
   C. H_3PO_4 is dibasic and non-reducing
   D. H_3PO_3 is dibasic and reducing

4. A hydrocarbon "A" with molecular formula C5H10 doesn't reacts with chlorine in dark but yields monochloro compound C5H9Cl in bright sunlight. Identify "A"
   A. Methylcyclobutane
   B. 2-pentene
   C. Cyclopentane
   D. 2-methyl-2-butene

5. Which of the following has dipole moment $\mu\neq0$
   A. BF_3 B. CO_2
   C. NF_3 D. BeF_2

6. Which of the following statements is correct
   A. $Bond\ Order \propto Bond\ Energy \propto {}^{1}/_{Bond\ Length} \propto Bond\ Stability$
   B. $Bond\ Order \propto {}^{1}/_{Bond\ Energy} \propto Bond\ Length \propto Bond\ Stability$
   C. $Bond\ Order \propto Bond\ Energy \propto {}^{1}/_{Bond\ Stability} \propto Bond\ Length$
   D. $Bond\ Energy \propto {}^{1}/_{Bond\ Order} \propto Bond\ Length \propto Bond\ Stability$

7. The density of a gas at 300K and 1 atm is 'd', if pressure remains constant, at what temperature, will its density become 0.75d
   A. -48.15 °C B. 127 °C
   C. 300K D. 255K

8. Below each structure is the IUPAC name of the compound. Find the one whose given name is incorrect.
   A. 
   4-methyl-1-pentanal
   B. 
   3-hexen-5-one
   C. 
   4-methyl-1-pentanal
   D. 
   4-methy-2-penten-1-oic acid

9. 2-notrobenzoic acid is more acidic than 4-nitrobenzoic acid due to
   A. Inductive and mesomeric effect
   B. Inductive and resonance effect
   C. Inductive effective and hydrogen bonding
   D. Inductive and ortho effect

10. When NaCl crystal is doped with $MdCl_2$, the nature of defect produced is
    A. Interstitial defect
    B. Schottky defect
    C. Frenkel defect
    D. None of these

11. $C_2H_5Cl + H_2 \xrightarrow{Pd/C}$ Product, the product formed is
    A. Ethene B. Ethane
    C. 2-butene D. Butane

12. Consider that 1.0 mole of I_2 is introduced into 1.0 litre flask at 1000K, it leads to dissociation (at equilibrium $K_C = 10^{-6}$). Which one of the following is correct

A. $[I_2(g)] > [I^-]$ B. $[I_2(g)] < [I^-]$

C. $[I_2(g)] = [I^-]$ D. $[I_2(g)]\ 1/2[I^-]$

13. $CH_3CH_2CH_2CH_3 \xrightarrow[\text{Sunlight}]{Br_2}$ A (Major Product)

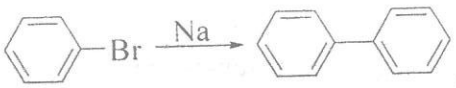
identify A

A. $CH_3CH_2CH_2CH_2Br$

B. $CH_3CH_2CH(Br)CH_3$

C. $CH_3CH(CH_3)CH_2Br$

D. $(CH_3)_3CBr$

14.  , the reaction is known as

A. Wurtz B. Fittig

C. Wurtz-Fittig D. Grignard

15. $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_2CH_2OH \xrightarrow[\text{Pyridine Cold}]{CrO_3}$?

A. $CH_3\overset{\displaystyle O}{\overset{||}{C}}CH_2\overset{\displaystyle O}{\overset{||}{C}}-OH$

B. $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_2\overset{\displaystyle O}{\overset{||}{C}}-OH$

C. $CH_3\underset{\displaystyle OH}{\underset{|}{C}}HCH_2\overset{\displaystyle O}{\overset{||}{C}}-H$

D. $CH_3\overset{\displaystyle O}{\overset{||}{C}}CH_2\overset{\displaystyle O}{\overset{||}{C}}-H$

16. Find the heat of combustion of

$CS_2 + 3O_2 \rightarrow CO_2 + 2SO_2$, if

$C + 2S \rightarrow CS_2,\ \Delta H_{f^o} = +117.0\ KJ/mol$

$C + O_2 \rightarrow CO_2,\ \Delta H_{f^o} = -393.0\ KJ/mol$

$S + O_2 \rightarrow SO_2,\ \Delta H_{f^o} = -287.0\ KJ/mol$

A. +807 KL/mol B. -807 KJ/mol

C. + 1104 KJ/mol D. -1104 KJ/mol

17. Phenol when treated with excess of bromine water gives a white colour precipitate product. Name the product

A. 2-bromophenol

B. 2- and 4-bromophenol

C. 2,4-dibromophenol

D. 2,4,6-tribromophenol

18. When ethyl isopropyl ether is cleaved with concentrated HI, the products are

A. Iodoethane and isopropylalcohol

B. Ethanol and 2-iodopropane

C. Ethanol and 2-methylpropane

D. Iodoethaneand 2-methylpropane

19. An element (density = 7.2 g/cc) exists in the body centred cubic structure whose cell edge is 2.88 A. The number of atoms in 104g of elements is

A. 2.0×10^{23}

B. 1.209×10^{24}

C. 2.418×10^{24}

D. 6.045×10^{23}

20. The reagent used for the separation of acetaldehyde from acetophenone is

A. $NaOH/I_2$

B. $C_6H_5NHNH_2$

C. $NaHSO_3$

D. NH_2OH

21. Which of the following statements is not true with reference to lyophobic sol.

A. It carries charge

B. Its coagulation is irreversible

C. It can be easily solvated

D. It is less stable in solvent

22. $CH_3COCH_3 \xrightarrow{C_2H_5OH/HCl}$?

A. $(CH_3)_2C(OC_2H_5)_2$

B. $CH_3CH_2CH_2COCH_3$

C. $(CH_3)_2C(OH)OC_2H_5$

D. $CH_3CH_2CH_2COCH_2CH_2CH_3$

23. The value of vanderwaals constant 'a' for gases N_2, O_2, NH_3, and CH_4 are 1.39, 1.36, 4.37 and 2.253 atm mol^{-1}, respectively. The gas which can be liquefied most easily will be
A. NH_3 B. O_2
C. CH_4 D. N_2

24. In which of the following sets the central atom of each member involves sp^3 hybridization?
A. IO_4^-, ICl_4^-, IF_4^+
B. SO_3, SO_3^{2-}, SO_4^{2-}
C. XeO, XeO, XeF
D. PCl_4^+, BF_4^-, ClO_4^-

25. Ethyl acetate when treated with methyl magnesium bromide yields
A. Tertiary alcohol
B. Secondary alcohol
C. Primary alcohol
D. Carboxylic acid

26. The correct equation for Freundlich absorption isotherm equation is
A. $\frac{x}{m} \propto P^{1/n}$ B. $\frac{m}{x} \propto P^{1/n}$
C. $\frac{x}{m} \propto P^{n}$ D. $\frac{m}{x} \propto P^{n}$

27. Which of the following is the weakest acid?
A. Acetic acid B. Formic acid
C. Benzoic acid D. Phenol

28. In a 0.2 molal aqueous solution of a weak acid HX, the degree of ionization is 0.3. Taking K_f for water as 1.85, the freezing point of the solution will be nearest to
A. +0.360 °C B. -0.360 °C
C. +0.480 °C D. -0.480 °C

29. Nylon is a
A. Thermoplastic Plastics
B. Polysaccharide
C. Polyamides
D. Polyester

30. On addition of NH_4OH to a copper sulphate solution, a deep blue colour is obtained due to the formation of
A. $[Cu(NH_3)_4]^{2+}$
B. $[Cu(NH_3)_4]^{1+}$
C. $[Cu(NH_3)_3OH]^{2+}$
D. $[Cu(NH_3)_3OH]^{1+}$

31. Be^{2+} is isoelectronic with
A. H^+ B. Na^+
C. Li^+ D. Mg^{2+}

32. A mole of N2H4 loses ten moles of electrons to form a new compound Y. Assuming that all nitrogen appears in Y, and the oxidation number of hydrogen remains same. Find the oxidation number of nitrogen in compound Y
A. -1 B. -3
C. +3 D. +5

33. Which of the following is a non-reducing sugar
A. Glucose B. Fructose
C. Lactose D. Sucrose

34. In cyclic metaphosphoric acid, the number of P-O-P bonds is
A. One B. Two
C. Three D. None of the above

35. The electronegativity of O, F, Cl and Br in the order
A. F > O >Cl> Br B. F >Cl> Br > O
C. O > F >Cl> Br D. Br >Cl> F > O

36. The azeotropic mixture of water (B.P. 100 °C) and HCl (B. P. 85 °C) boils at 108.5 °C. when this mixture is distilled, it is possible to obtain
A. Pure HCl B. Pure water
C. Pure water and HCl D. None of these

37. Glycine and proline are the most abundant amino acids in the structure of
A. Collagen B. Insulin
C. Myoglobin D. Hemoglobin