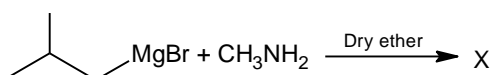


- Copper is extracted from copper pyrites by
  - Thermal decomposition
  - Reduction by coke
  - Electrometallurgy
  - Auto reduction
- Function of potassium ethylxanthate in froth floatation process is to make the ore
  - Lighter
  - Hydrophobic
  - Hydrophilic
  - Heavier
- Sulphide ore on roasting gives a gas  $X$ .  $X$  reacts with  $Cl_2$  in the presence of activated charcoal to give  $Y$ .  $Y$  is:
  - $SO_2Cl_2$
  - $S_2Cl_2$
  - $SCl_6$
  - $SOCl_2$
- Aqueous solution of a salt ( $A$ ) forms a dense white precipitate with  $BaCl_2$  solution. The precipitate dissolves in dilute  $HCl$  to produce a gas ( $B$ ) which decolourises acidified  $KMnO_4$  solution  
A and B respectively are:
  - $BaSO_3, SO_2$
  - $BaSO_4, H_2S$
  - $BaSO_3, H_2S$
  - $BaSO_4, SO_2$
- Bond angle in  $PH_4^+$  is more than that of  $PH_3$ . This is because
  - Lone pair-bond pair repulsion exists in  $PH_3$
  - $PH_4^+$  has square planar structure
  - $PH_3$  has planar trigonal structure
  - Hybridisation of  $P$  changes when  $PH_3$  is converted to  $PH_4^+$
- Incorrectly matched pair is:
  - $XeO_3$  - pyramidal
  - $XeF_4$  - tetrahedral
  - $XeF_6$  - disorted octahedral
  - $XeOF_4$  - square pyramidal
- Phosphorus pentachloride
  - On hydrolysis gives an oxo acid of phosphorus which is tribasic
  - On hydrolysis gives an oxo acid of phosphorus which is a good reducing agent
  - Has all the five equivalent bonds
  - Exists as an ionic solid in which cation has octahedral structure and anion has tetrahedral structure
- Identify the set of paramagnetic ions among the following:
  - $V^{2+}, Co^{2+}, Ti^{4+}$
  - $Ni^{2+}, Cu^{2+}, Zn^{2+}$
  - $Ti^{3+}, Cu^{2+}, Mn^{3+}$
  - $Sc^{3+}, Ti^{3+}, V^{3+}$

9. How many moles of acidified  $K_2Cr_2O_7$  is required to liberate 6 moles of  $I_2$  from an aqueous solution of  $I^-$  ?
- (a) 2 (b) 1 (c) 0.25 (d) 0.5
10.  $Cu_2Cl_2$  and  $CuCl_2$  in aqueous medium
- (a)  $CuCl_2$  is more stable than  $Cu_2Cl_2$   
 (b) Stability of  $Cu_2Cl_2$  is equal to stability of  $CuCl_2$   
 (c) Both are unstable  
 (d)  $Cu_2Cl_2$  is more stable than  $CuCl_2$
11. The Co-ordination number of  $Fe$  and  $Co$  in the complex ions,  $[Fe(C_2O_4)_3]^{3-}$  and  $[Co(SCN)_4]^{2-}$  are respectively:
- (a) 3 and 4 (b) 6 and 8 (c) 4 and 6 (d) 6 and 4
12. Number of stereoisomers exhibited by  $[Co(en)_2Cl_2]^+$  is
- (a) 4 (b) 2 (c) 5 (d) 3
13. Give the IUPAC name of  $[Pt(NH_3)_4][PtCl_4]$  is
- (a) Tetra ammine platinum (o) tetra chloride platinum (IV)  
 (b) Tetra ammine palatinate (II) tetra chlorido platinum (II)  
 (c) Tetra ammine palatinate (o) tetra chlorido platinum (IV)  
 (d) Tetra ammine platinum (II) tetra chlorido palatinate (II)
14. Prolonged exposure of chloroform in humans may cause damage to liver. It is due to the formation of the following compound
- (a)  $CCl_4$  (b)  $COCl_2$  (c)  $CH_2Cl_2$  (d)  $Cl_2$
15. Which of the following halide shows highest reactivity towards  $S_N1$  reaction?
- (a)  $C_6H_5CH_2Cl$  (b)  $CH_3-CH_2Cl$   
 (c)  $CH_3-CH_2-CH_2-CH_2I$  (d)  $C_6H_5Cl$

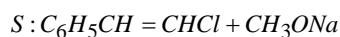
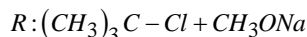
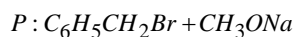
16. In the reaction



The number of possible isomers for the organic compound X is

- (a) 4 (b) 5 (c) 3 (d) 2

17. Which of the following on heating gives an ether as major products?



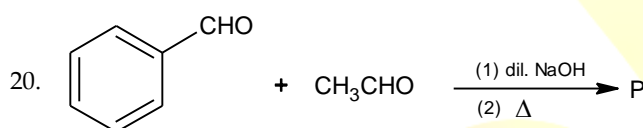
- (a) Both *R* and *S*      (b) Both *P* and *R*      (c) Both *Q* and *S*      (d) Both *P* and *Q*

18. The steps involved in the conversion of propan-2-ol to propan-1-ol are in the order

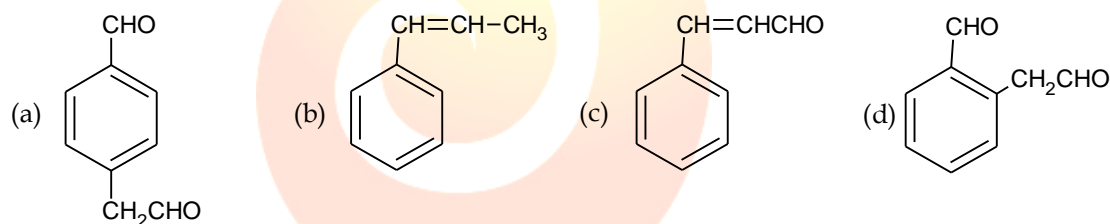
- (a) Dehydration, addition of *HBr*, heating with aq. *KOH*  
 (b) Heating with *PCl<sub>5</sub>*, heating with alc. *KOH*, acid catalysed addition of water  
 (c) Heating with *PCl<sub>5</sub>*, heating with alc. *KOH*, hydroboration oxidation  
 (d) Dehydration, addition of *HBr* in presence of peroxide, heating with alc. *KOH*

19. Which of the following is the strongest base?

- (a)  $CH_3COO^-$       (b)  $Cl^-$       (c)  $OH^-$       (d)  $CH_3O^-$



The product 'P' is

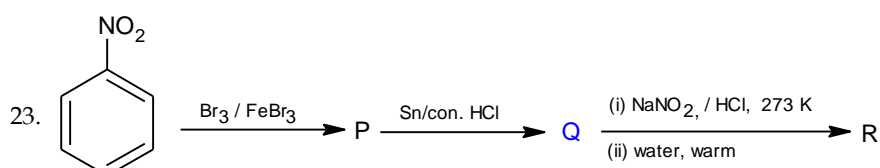


21. Which of the following has the lowest boiling point?

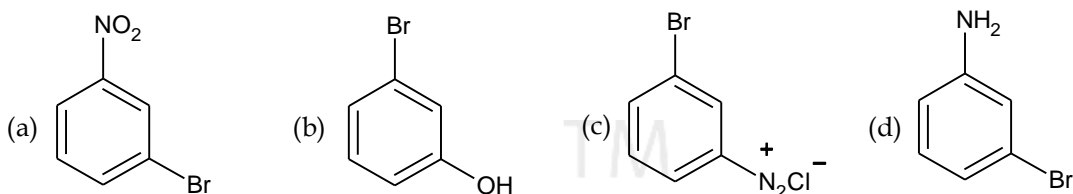
- (a)  $CH_3CH_2OH$       (b)  $CH_3 - CH_2 - NH_2$       (c)  $CH_3 - O - CH_3$       (d)  $HCOOH$

22. The carbonyl compound that does not undergo aldol condensation is

- (a) Acetone      (b) Di chloro acetaldehyde  
 (c) Tri chloro acetaldehyde      (d) Acetaldehyde



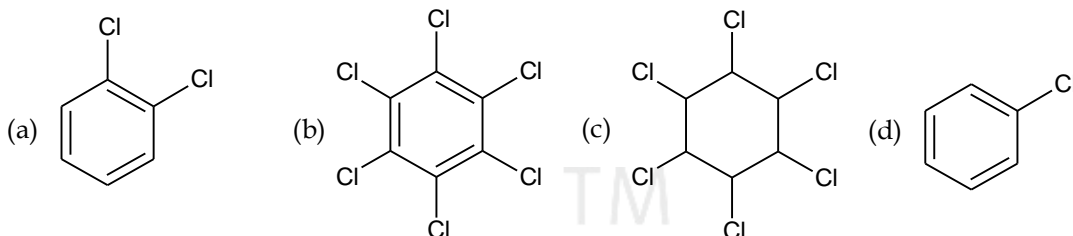
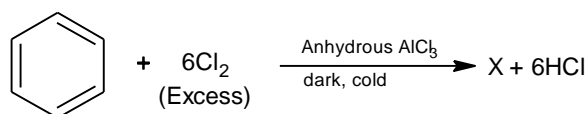
The final product *R* is



24. Hinsberg's reagent is  
 (a)  $(CH_3CO)_2O$  / pyridine (b)  $C_6H_5SO_2Cl$   
 (c)  $C_6H_5SO_2NH_2$  (d)  $CH_3COCl$  / pyridine
25. Which one of the following vitamins is not stored in adipose tissue?  
 (a) *A* (b) *B<sub>6</sub>* (c) *D* (d) *E*
26. Hypothyroidism is caused by the deficiency of  
 (a) Vitamin *B-12* (b) Adrenalin (c) Thyroxine (d) Glucocorticoid
27.  $C_1-C_4$  glycosidic bond is NOT found in  
 (a) Maltose (b) Sucrose (c) Lactose (d) Starch
28. Which of the following polymer has strongest intermolecular forces of attraction?  
 (a) Neoprene (b) Terylene (c) Polythene (d) Polystyrene
29. Which of the following monomers can undergo condensation polymerization?  
 (a) Styrene (b) Glycine (c) Isoprene (d) Propene
30. A food additive that acts as an antioxidant is  
 (a) BHA (b) Saccharin (c) Sugar syrup (d) Salt
31. 0.4g of dihydrogen is made to react with 7.1g of dichlorine to form hydrogen chloride. The volume of hydrogen formed at 273K and 1 bar pressure is  
 (a) 9.08L (b) 4.54L (c) 90.8L (d) 45.4L
32. With regard to photoelectric effect, identify the correct statement among the following  
 (a) Energy of  $e^-$  ejected increases with the increase in the intensity of incident light  
 (b) Number of  $e^-$  ejected increases with the increase in the frequency of incident light  
 (c) Number of  $e^-$  ejected increases with the increase in work function  
 (d) Number of  $e^-$  ejected increases with the increase in the intensity of incident light

33. The last element of the p-block in 6<sup>th</sup> period is represented by the outer most electronic configuration
- (a)  $7s^2 7p^6$  (b)  $5f^{14} 6d^{10} 7s^2 7p^5$  (c)  $4f^{14} 5d^{10} 6s^2 6p^4$  (d)  $4f^{14} 5d^{10} 6s^2 6p^6$
34. The conjugate base of  $NH_3$  is
- (a)  $NH_4^+$  (b)  $NH_4OH$  (c)  $NH_2OH$  (d)  $NH_2^-$
35. A gas mixture contains 25%  $He$  and 75%  $CH_4$  by volume at a given temperature and pressure. The percentage by mass of methane in the mixture is approximately \_\_\_\_
- (a) 75% (b) 25% (c) 92% (d) 8%
36. The percentage of  $s$ -character in the hybrid orbitals of nitrogen in  $NO_2^+$ ,  $NO_3^-$  and  $NH_4^+$  respectively are
- (a) 33.3%, 50%, 25% (b) 33.3%, 25%, 50%  
(c) 50%, 33.3%, 25% (d) 25%, 50%, 33.3%
37. The formal charge on central oxygen atom in ozone is
- (a) -1 (b) 0 (c) +2 (d) +1
38. When the same quantity of heat is absorbed by a system at two different temperatures  $T_1$  and  $T_2$ , such that  $T_1 > T_2$ , change in entropies are  $\Delta S_1$  and  $\Delta S_2$  respectively. Then
- (a)  $\Delta S_1 < \Delta S_2$  (b)  $\Delta S_1 = \Delta S_2$  (c)  $S_2 > S_1$  (d)  $\Delta S_2 < \Delta S_1$
39. The oxidation number of nitrogen atoms in  $NH_4NO_3$  are
- (a) +5, +5 (b) -3, +5 (c) +3, -5 (d) -3, -3
40. A Lewis acid 'X' reacts with  $LiAlH_4$  in ether medium to give a highly toxic gas. This gas when heated with  $NH_3$  gives a compound commonly known as inorganic benzene. The gas is
- (a)  $B_2O_3$  (b)  $B_2H_6$  (c)  $B_3N_3H_6$  (d)  $BF_3$
41. The oxide of potassium that does not exist is
- (a)  $K_2O$  (b)  $KO_2$  (c)  $K_2O_2$  (d)  $K_2O_3$
42. The metal that products  $H_2$  with both  $dil HCl$  and  $NaOH(aq)$  is
- (a)  $Zn$  (b)  $Mg$  (c)  $Ca$  (d)  $Fe$
43. Which of the following is NOT a pair of functional isomers?
- (a)  $C_2H_5OC_2H_5$  and  $C_3H_7OCH_3$  (b)  $CH_3CH_2OH$  and  $CH_3OCH_3$   
(c)  $CH_3CH_2NO_2$  and  $H_2NCH_2COOH$  (d)  $CH_3COOH$  and  $HCOOCH_3$

44. Identify 'X' in the following reaction



45. Which of the following is NOT a greenhouse gas?

- (a) CFC (b) CO<sub>2</sub> (c) O<sub>2</sub> (d) NO<sub>2</sub>

46. A metal exists as an oxide with formula  $M_{0.96}O$ . Metal  $M$  can exist as  $M^{+2}$  and  $M^{+3}$  in its oxide  $M_{0.96}O$ . The percentage of  $M^{+3}$  in the oxide is nearly

- (a) 8.3% (b) 4.6% (c) 5% (d) 9.6%

47. A metal crystallises in face centred cubic structure with metallic radius  $\sqrt{2}\text{\AA}$ . The volume of the unit cell (in  $\text{m}^3$ ) is

- (a)  $4 \times 10^{-10}$  (b)  $6.4 \times 10^{-29}$  (c)  $4 \times 10^{-9}$  (d)  $6.4 \times 10^{-30}$

48. Silicon doped with gallium forms

- (a)  $n$ -type semiconductor (b) both  $n$  and  $p$  type semiconductor  
(c) an intrinsic semiconductor (d)  $p$ -type semiconductor

49. The pair of electrolytes that possess same value for the constant ( $A$ ) in the Debye - Huckel - Onsagar equation,  $\lambda_m = \lambda_m^\circ - A\sqrt{C}$  is

- (a)  $\text{MgSO}_4, \text{NaSO}_4$  (b)  $\text{NH}_4\text{Cl}, \text{NaBr}$  (c)  $\text{NaBr}, \text{MgSO}_4$  (d)  $\text{NaCl}, \text{CaCl}_2$

50. Which of the following pair of solutions is isotonic?

- (a) 0.01M  $\text{BaCl}_2$  and 0.015M  $\text{NaCl}$  (b) 0.001M  $\text{Al}_2(\text{SO}_4)_3$  and 0.01M  $\text{BaCl}_2$   
(c) 0.001M  $\text{CaCl}_2$  and 0.001M  $\text{Al}_2(\text{SO}_4)_3$  (d) 0.01M  $\text{BaCl}_2$  and 0.001M  $\text{CaCl}_2$

51. Solute 'X' dimerises in water to the extent of 80%. 2.5g of 'X' in 100g of water increases the boiling point by  $0.3^\circ\text{C}$ . The molar mass of 'X' is  $[K_b = 0.52\text{K kg mol}^{-1}]$

- (a) 13 (b) 52 (c) 65 (d) 26

52. Given  $E_{Fe^{+3}/Fe^{+2}}^{\circ} = +0.76V$  and  $E_{I_2/I^{-}}^{\circ} = +0.55V$ . The equilibrium constant for the reaction taking place in galvanic cell consisting of above two electrodes is  $\left[ \frac{2.303RT}{F} = 0.06 \right]$
- (a)  $1 \times 10^7$                       (b)  $1 \times 10^9$                       (c)  $3 \times 10^8$                       (d)  $5 \times 10^{12}$
53. If an aqueous solution of  $NaF$  is electrolyzed between inert electrodes, the product obtained at anode is
- (a)  $F_2$                               (b)  $H_2$                               (c)  $Na$                               (d)  $O_2$
54. In which of the following cases a chemical reaction is possible?
- (a)  $ZnSO_4(aq)$  is placed in a copper vessel  
(b)  $AgNO_3$  solution is stirred with a copper spoon  
(c) Conc.  $HNO_3$  is stored in a platinum vessel  
(d) gold ornaments are washed with *dil HCl*
55. The time required for 60% completion of a first order reaction is 50min. The time required for 93.6% completion of the same reaction will be
- (a) 100min                      (b) 83.8min                      (c) 50min                      (d) 150min
56. For an elementary reaction  $2A + 3B \longrightarrow 4C + D$  the rate of appearance of  $C$  at time ' $t$ ' is  $2.8 \times 10^{-3} \text{ molL}^{-1} \text{ s}^{-1}$ . Rate of disappearance of  $B$  at ' $t$ ' will be
- (a)  $\frac{4}{3}(2.8 \times 10^{-3}) \text{ molL}^{-1} \text{ s}^{-1}$                       (b)  $\frac{3}{4}(2.8 \times 10^{-3}) \text{ molL}^{-1} \text{ s}^{-1}$   
(c)  $2(2.8 \times 10^{-3}) \text{ molL}^{-1} \text{ s}^{-1}$                       (d)  $\frac{1}{4}(2.8 \times 10^{-3}) \text{ molL}^{-1} \text{ s}^{-1}$
57. The rate constant of a reaction is given by  $k = P Z e^{-E_a/RT}$  under standard notation. In order to speed up the reaction, which of the following factors has to be decreased?
- (a)  $Z$                               (b) Both  $Z$  and  $T$                       (c)  $E_a$                               (d)  $T$
58. A sol of  $AgI$  is prepared by mixing equal volumes of 0.1M  $AgNO_3$  and 0.2M  $KI$ , which of the following statement is correct ?
- (a) Sol obtained is a negative sol with  $NO_3^-$  adsorbed on  $AgI$   
(b) Sol obtained is a positive sol with  $Ag^+$  adsorbed on  $AgI$   
(c) Sol obtained is a positive sol with  $K^+$  adsorbed on  $AgI$   
(d) Sol obtained is a negative sol with  $I^-$  adsorbed on  $AgI$

59. During Adsorption of a gas on a solid

(a)  $\Delta G < 0, \Delta H < 0, \Delta S < 0$

(b)  $\Delta G > 0, \Delta H > 0, \Delta S > 0$

(c)  $\Delta G < 0, \Delta H < 0, \Delta S > 0$

(d)  $\Delta G < 0, \Delta H > 0, \Delta S > 0$

TM

