IIT - JEE 2005 Chemistry Question Paper (Screening)

1. Two forms of D-glucopyranose, are called

   (a) Enantiomers (b) Anomers (c) Epimers (d) Diastereomers

2. Cyclohexene is best prepared from cyclohexanol by which of the following:

   (a) conc. H_3PO_4 (b) conc. HCl / $ZnCl_2$ (c) conc. HCl (d) conc. HBr

3. Which gas is evolved when PbO_2 is treated with conc. HNO_3?

   (a) NO_2 (b) O_2 (c) N_2 (d) N_2O

4. But-2-one can be converted to propanoic acid by which of the following:

   (a) NaOH, NaI / H^+ (b) Fehling Solution (c) NaOH, I_2/H^+ (d) Tollen's reagent

5. When Phenyl Magnesium Bromide reacts with tert. butanol, which of the following is formed?

   (a) Tert, butyl methyl ether (b) Benzene (c) Tert, butyl benzene (d) Phenol

6. Which of the following pair is expected to exhibit same colour in solution?

   (a) $VOCl_2$; $FeCl_2$ (b) $CuCl_2$; $VOCl_2$ (c) $MnCl_2$; $FeCl_2$ (d) $FeCl_2$; $CuCl_2$

7. One mole of monoatomic ideal gas expands adiabatically at initial temperature T against a constant external pressure of 1 atm. from one litre to two litre. Find out the final temperature (R = 0.0821 lt. atm K^{-1} $mole^{-1}$)

   (a) T (b) $\frac{T}{\left(\frac{5}{3}-1\right)}$ (c) $T-\frac{2}{3\times}$ (d) $T+\frac{2}{3\times}$

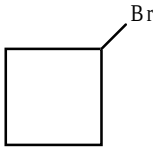
8. A metal nitrate gives black ppt. with KI and on adding excess of KI it gives orange colour. It is:

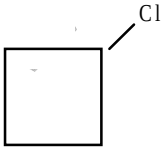
   (a) Hg^{+2} (b) Bi^{+3} (c) Sn^{+2} (d) Pb^{+2}

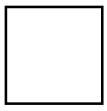
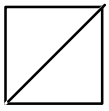
9. Which of the following ore contains both Copper and Iron?

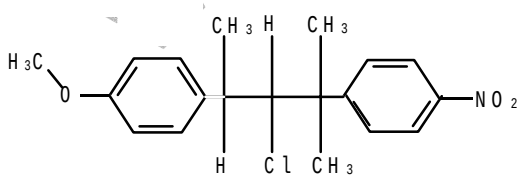
   (a) Cuprite (b) Chalcocite (c) Chalcopyrite (d) Malachite

10. 1-bromo-3-chlorocyclobutane when treated with two equivalents of Na in the presence of ether, which of the following will be formed?

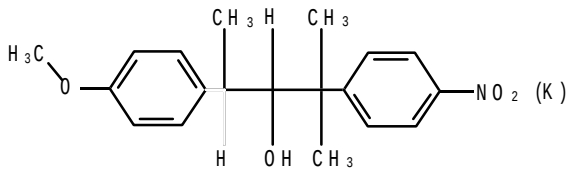
    (a) 

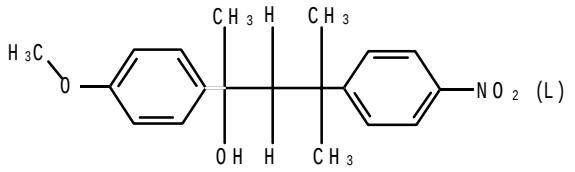
    (b) 

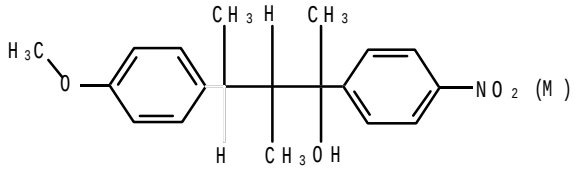
    (c) 
    (d) 

11. 

on hydrolysis in aqueous acetone gives,







It mainly gives:

(a) K and L (b) only K (c) L and M (d) only M

12. The half cell reactions for rusting of iron are:

$$2H^+ + \frac{1}{2}O_2 + 2e^- \rightarrow H_2O;\ E^0 = +1.23V, \qquad Fe^{2+} + 2e^- \rightarrow Fe_{(S)};\ E^0 = -0.44V$$

$\Delta G^0\,(\text{in kJ})$ for the reaction is:

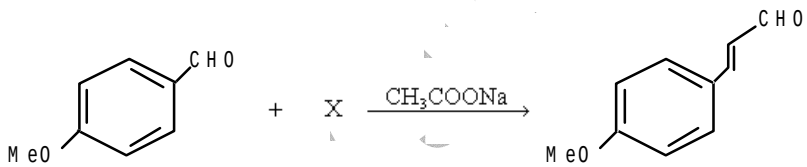
(a) -76 (b) -322 (c) -122 (d) -176

13. $CH_3.NH_2$ (0.1 mole, $K_b = 5 \times 10^{-4}$) is added to 0.08 moles of HCl and the solution is diluted to one litre, resulting hydrogen ion concentration is:

(a) $1.6 \times 10^{-}$ (b) $8 \times 10^{-}$ (c) $5 \times 10^{-}$ (d) $8 \times 10^{-}$

14. The number of radial nodes in 3s and 2p respectively are:

(a) 2 and 0 (b) 1 and 2 (c) 0 and 2 (d) 2 and 1

15. 

What is X?

(a) CH_3COOH (b) $BrCH_2.COOH$ (c) $(CH_3CO)_2O$ (d) CHO - COOH

16. Which of the following statement is incorrect about order of reaction?

(a) Order of reaction is determined experimentally

(b) It is the sum of power of concentration terms in the rate law expression

(c) It does not necessarily depend on stoichiometric coefficients

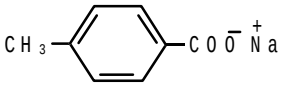
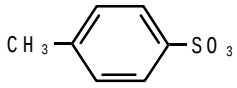
(d) Order of the reaction can not have fractional value.

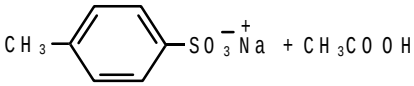
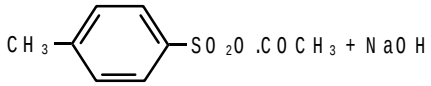
17. The elevation in boiling point, when 13.44 g of freshly prepared $CuCl_2$ are added to one kilogram of water, is [Some useful data, $K_b = 0.52$ kg K mol^{-1}, molecular weight of $CuCl_2 = 134.4$ gm].

(a) 0.05 (b) 0.1 (c) 0.16 (d) 0.21

Note: Based on the memory

18. Which of the following is obtained when 4 - Methylbenzenesulphonicacid is hydrolysed with excess of sodium acetate?

(a)  (b) 

(c)  (d) 

19. Which silicates is formed from $[SiO_4]^{4-}$, tetrahedral units by sharing 3 oxygen atoms?

(a) Sheet silicates (b) Pyro silicates (c) Linear chain silicates (d) 3 dimensional silicates

20. A pale blue liquid which obtained by equi molar mixture of two gases at - 30^0C is:

(a) N_2O (b) N_2O_3 (c) N_2O_4 (d) N_2O_5

21. If helium and methane are allowed to diffuse out of the container under the similar conditions of temperature and pressure, then the ratio of rate of diffusion of helium to methane is:

(a) 2.0 (b) 1.0 (c) 0.5 (d) 4.0

22. Which type of isomerism is shown by $Co(NH_3)_4Br_2Cl$?

(a) Geometrical and Ionisation (b) Optical and Ionisation

(c) Geometrical and Optical (d) Geometrical only

23. Which of the following contains maximum number of lone pairs on the central atom?

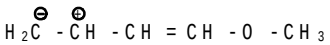
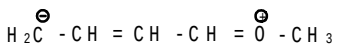
(a) ClO_3^- (b) XeF_4 (c) SF_4 (d) I_3^-

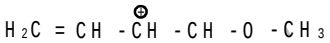
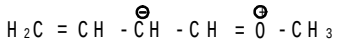
24. Which of the following is correct for lyophilic solutions?

(a) They are irreversible (b) They are formed by inorganic substances

(c) They are readily coagulated by addition of electrolytes (d) They are self stabilized

25. For 1-methoxy-1, 3-butadiene, which of the following resonating structure is the least stable?

(a)  (b) 

(c)  (d) 

26. Which of the following isomers of phosphorus is thermodynamically most stable?

(a) Red (b) White (c) Black (d) Yellow

27. Which of the following FCC structure contains cations in alternate tetrahedral voids?

(a) NaCl (b) ZnS (c) Na_2O (d) CaF_2

28. Which of the following will not be oxidised by O_3?

(a) KI (b) $FeSO_4$ (c) $KMnO_4$ (d) K_2MnO_4

Note: Based on the memory