IIT-JEE-Chemistry-Screening-2005

1. Which species has the maximum number of lone pair of electrons on the central atom?
(a) [ClO3-]
(b) XeF4
(c) SF4
(d) [I3-]

2. Which kinds of isomerism is exhibited by octahedral Co(NH3)4 Br2Cl?
(a) Geometrical and ionization
(b) Geometrical and optical
(c) Optical and ionization
(d) Geometrical only

3. Which is the most thermodynamically stable allotropic form of phosphorus?
(a) red
(b) white
(c) black
(d) yellow

4. Which ore contains both Iron and Copper?
(a) Cuprite
(b) Chalcocite
(c) Chalcopyrite
(d) Malachite

5. Which of the following is not oxidised by O3?
(a) KI
(b) FeSO4
(c) KMnO4
(d) K2MnO4

6. Which one of the following statement for order of reaction is not correct?
(a) Order can be determined experimentally
(b) Order of reaction is equal to sum of the power of concentration terms in differential rate law
(c) It is not affected with stiochiometric coefficient of the reactants
(d) Order can not be fractional

7. How will you convert butan-2-one to propanoic acid?
(a) Tollen's reagent
(b) Fehling solution
(c) NaOH/I2/H+
(d) NaOH/NaI/H+

8. Which blue-liquid is obtained on reacting equimolar amounts of two gases at −30oC?
(a) N2O

(b) N2O3
(c) N2O4
(d) N2O5

9. Which of the following resonating structures of 1-methoxy-1, 3-butadiene is least stable?
(a) CH2—CH=CH—CH=O—CH3
(b) CH2=CH2—CH—CH=O—CH3
(c) CH2—CH—CH=CH—O—CH3
(d) CH2=CH—CH—CH—O—CH3

10. The ratio of the rate of diffusion of helium and methane under identical condition of pressure and temperature will be:
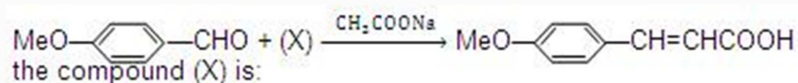(a) 4
(b) 2
(c) 1
(d) 0.5

11. When PbO2 reacts with conc. HNO3 the gas evolved is:
(a) NO2
(b) O2
(c) N2
(d) N2O

12. In which of the following crystals alternate tetrahedral voids are occupied?
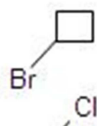(a) NaCI
(b) ZnS
(c) CaF2
(d) Na2O

13.

$$MeO-\bigcirc-CHO + (X) \xrightarrow{CH_3COONa} MeO-\bigcirc-CH=CHCOOH$$
the compound (X) is:

(a) CH3—COOH
(b) BrCH2—COOH
(c) (CH3CO)2O
(d) CHO—COOH

14. The elevation in boiling point of a solution of 13.44 g of CuCI2 in 1 kg of water using the following information will be:
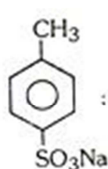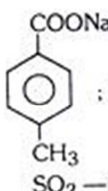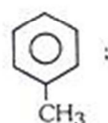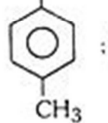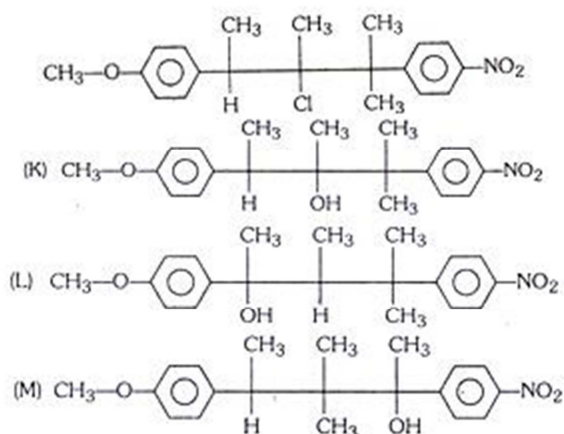(Molecular weight of CuCI2 = 134.4 and Kb = 0.52 K molal−1)
(a) 0.16
(b) 0.05
(c) 0.1
(d) 0.2

15. What would be the product formed when 1-bromo-3-chloro cyclobutane reacts with two equivalents of metallic sodium in ether?

(a) [cyclobutane square with Br and Cl substituents]

(b) [cyclobutane square with Cl substituent]

(c) [cyclobutane square]

(d) [bicyclobutane - square with diagonal]

16. 4-methyl benzene sulphonic acid reacts with sodium acetate to give :

(a) [benzene ring with CH₃ at top and SO₃Na at bottom] : CH_3COOH

(b) [benzene ring with COONa at top] : SO_3

(c) [benzene ring with SO₃ and CH₃ at bottom] : SO_3

(d) [benzene ring with SO₂—O—COCH₃ at top and CH₃ at bottom] : $NaOH$

17. The following on hydrolysis in aqueous acetone will give :

[Structure showing CH₃—O—benzene ring—C(CH₃)(H)—C(CH₃)(Cl)—C(CH₃)(CH₃)—benzene ring—NO₂]

(K) CH₃—O—[benzene ring]—C(CH₃)(H)—C(CH₃)(OH)—C(CH₃)(CH₃)—[benzene ring]—NO₂

(L) CH₃—O—[benzene ring]—C(CH₃)(OH)—C(CH₃)(H)—C(CH₃)(CH₃)—[benzene ring]—NO₂

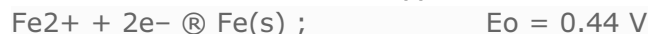(M) CH₃—O—[benzene ring]—C(CH₃)(H)—C(CH₃)(CH₃)—C(CH₃)(OH)—[benzene ring]—NO₂

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

18. 0.1 mole of CH_3NH_2 ($K_b = 5 \times 10^{-4}$) is mixed with 0.08 mole of HCI and diluted to one litre. What will be the H+ concentration in the solution?
(a) 8×10^{-2} M
(b) 8×10^{-11} M
(c) 1.6×10^{-11} M
(d) 8×10^{-5} M

19. The rusting of iron takes place as follows :
$2H^+ + 2e^- + 1/2O_2$ ® H_2O (l) ; $E^o = + 1.23$ V
$Fe^{2+} + 2e^-$ ® Fe(s) ; $E^o = 0.44$ V

Calculate DGo for the net process
(a) −322 kJ mol^{-1}
(b) −161 kJ mol^{-1}
(c) −152 kJ mol^{-1}
(d) −76 kJ mol^{-1}

20. Name of the structure of silicates in which three oxygen atoms of $[SiO_4]^{4-}$ are shared is :
(a) pyrosilicate
(b) sheet silicate
(c) linear chain silicate
(d) three dimensional silicate

21. Lyophilic sols are :
(a) irreversible sols
(b) they are prepared from inorganic compounds
(c) coagulated by adding electrolytes
(d) self-stabilizing

22. Which pair of compounds is expected to show similar colour in aqueous medium?
(a) $FeCI_3$ and $CuCI_2$
(b) $VOCI_2$ and $CuCI_2$
(c) $VOCI_2$ and $FeCI_2$
(d) $FeCI_2$ and $MnCI_2$

23. The two forms of D-glucopyranose obtained from the solution of D-glucose are called :
(a) isomer

(b) anomer
(c) epimer
(d) enantiomer

24. The number of radial nodes of 3s, and 2p orbitals are respectively :
(a) 2, 0
(b) 0, 2
(c) 1, 2
(d) 2, 1

25. A metal nitrate reacts with KI to give a black precipitate which on addition of excess of KI convert into orange colour solution. The cation of metal nitrate is:
(a) Hg^{2+}
(b) Bi^{3+}
(c) Pb^{2+}
(d) Cu^+

26. When phenyl magnesium bromide reacts with t-butanol, the product would be:
(a) benzene
(b) phenol
(c) t-butyl benzene
(d) t-butyl phenyl ether

27. The best method to prepare cyclohexene from cyclohexanol is by using :
(a) conc. HCI + ZnCI2
(b) conc. H3PO4
(c) HBr
(d) conc. HCI

28. When one mole of monoatomic ideal gas at T K undergoes adiabatic change under a constant external pressure of 1 atm changes volume from 1 litre to 2 litre. The final temperature in kelvin would be :
(a) T/2(2/3)
(b) T + 2/(3×0.0821)
(c) T
(d) T − 2/(2×0.0821)