CHEMISTRY

BOOKS - KALYANI CHEMISTRY (ENGLISH)

SELF ASSESSMENT PAPER 1

Questions

1. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(aromatic oxide, sp^3d^2, octahdral, minimum, Ferromagnetism, alkyl halide, ferrimagnetism decreases, sp^3d, pyramidal, maximum, increasing, aromatic hydride)

Q. Aromatic ether is prepared by heating ____with____.

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2. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(aromatic oxide, sp^3d^2, octahdral, minimum, Ferromagnetism, alkyl halide, ferrimagnetism decreases,sp^3d, pyramidal, maximum, increasing, aromatic hydride)

Q. SF_6 has____hybridization and ____structure.

3. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(aromatic oxide, sp^3d^2, octahdral, minimum, Ferromagnetism, alkyl halide, ferrimagnetism decreases,sp^3d, pyramidal, maximum, increasing, aromatic hydride)

Q. Solids with conductivities in the____range from 10^{-6} to $10^4 ohm^{-1}m^{-1}$ are called _____.

4. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

(aromatic oxide, sp^3d^2, octahdral, minimum, Ferromagnetism, alkyl halide, ferrimagnetism decreases,sp^3d, pyramidal, maximum, increasing, aromatic hydride)

Q. Degree of dissociation of a weak electrolyte is ____proportional to the ___of its molar concentration.

5. The molecular weight of sodium chloride determined by measuring the osmotic pressure of its aqueous solution is

1) double the theoretical value

2) same as the theoretical value

3) half the theoretical value

4) three times the theoretical value

A. Double the theoretical value

B. Same as the theoretical value

C. Half the theoretical value

D. Three times the theoretical value.

Answer:

6. In a molecule of tertiary haloalkanes, carbon atom is bonded to ____carbon atoms.

A. 3

B. 2

C. 4

D. 1

Answer:

7. Methyl phenyl ether can be obtained by reacting:

A. phenolate ions and methyl iodide

B. methoxide ions and bromobenzene

C. methanol and phenol

D. bromobenzene and methyl bromide

Answer:

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8. Froth flotation process may be used to increase the concentration of mineral in:

A. Chalcopyrite

B. Bauxite

C. Haematite

D. Calamine

Answer:

9. Write the reactions involved in the following reactions:

(i) Clemmensen reduction

(ii) Cannizzaro reaction

10. Ammonia reacts with dilute sulfuric acid to form

11. Ammonia reacts with nitric acid to form

12. Ammonia reacts with hydrogen chloride to form

13. The chemistry of actinoids is not so smooth as that of lanthanoids. Give reason.

14. Give one good chemical test to distinguish between the following pair of compounds: Methylamine and dimethylamine.

15. Name the type of isomerism shown by the following pair of compounds :

$[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NH_3)_4]Cl_2$

Give a chemical test to distinguish between the given pair of isomers.

16. What is a colligative properrty ? Give two examples.

17. In a first order reaction, 10% of the reactant is consumed in 25 minuts.

Calculate:

The half life of the reaction.

18. In a first order reaction, 10% of the reactant is consumed in 25 minuts.

Calculate:

The time required for complete 17% of the reaction.

19. What are biodegradable and non-biodegradable detergents? Give one example of each class.

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20. Nitration is an example of aromatic electrophilic substitution and its rate depends upon the group already present in the benzene ring. Out of benzene and phenol, which one is more easily nitrated and why ?

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21. Rearrange the compounds of each of the following sets in order of reactivity towards SN_2 displacement:

2-Bromo-2-methyl butane, 1-Bromo-pentane, 2-Bromopentane.

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22. Rearrange the compounds of each of the following sets in order of reactivity towards SN_2 displacement:

1-Bromo-2-methyl butane, 2-Bromo-2-methyl butane, 3-Bromo-2-methyl butane.
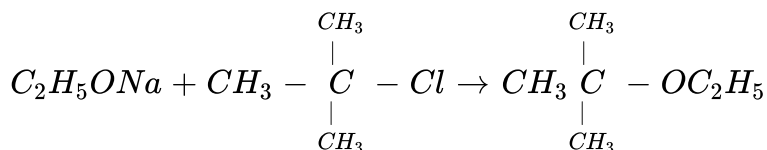
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23. How will you bring about the following conversion : acetaldehyde to acetamide ?

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24. What is the effect of denaturation on the structure of proteins?

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25. The following is not an appropriate reaction for the preparation of t-butyl ethyl ether.

$$C_2H_5ONa + CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - Cl \rightarrow CH_3 \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OC_2H_5$$
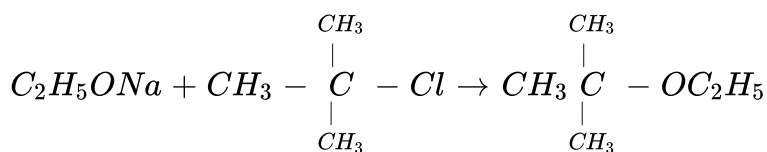
(i) What would be the major product of this reaction ?

(ii) Write a suitable reaction for the preparation of t-butylethyl ether.

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26. The following is not an appropriate reaction for the preparation of t-butyl ethyl ether.

$$C_2H_5ONa + CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - Cl \rightarrow CH_3 \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - OC_2H_5$$

(i) What would be the major product of this reaction ?

(ii) Write a suitable reaction for the preparation of t-butylethyl ether.

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27. The rate of a reaction quadruples when the temperature changes from 293 K to 313 K. Calculate the energy of activation of the reaction assuming that it does not change with temperature

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28. The freezing point of nitrobenzene is 278.8 K. A 0.25 molal solution of a substance (molecular weight : 120) in nitrobenzene has a freezing point of 276.8 K. Calculate the molal depression constant of nitrobenzene.

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29. For a crystal of sodium chloride, state:

(i) The type of lattice in which it crystallizes.

(ii) The coordination number of each sodium ion and chloride ion in the crystal lattice.

(iii) The number of sodium ions and chloride ions present in a unit cell of

sodium chloride.

(iv) The structural arrangement of the sodium chloride crystal.

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30. Explain giving reasons why ionic solids conduct electricity in molten

state, but not in solid state.
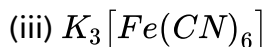
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31. What are lyophilic and lyophobic sols ? Give one example of each type.

Which one of these two types of sols is easily coagulated and why?

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32. Ethylene glycol is used as an antifreeze agent. Calculate the amount of

ethylene glycol to be added to 4 kg of water to prevent it from freezing at

$-6°C.$ $\left(K_f \ \text{for} \ HH_2O = 1.85 \ \text{K mol}^{-1}\text{kg}\right)$

33. Write the IUPAC name of the following :

(i) $\left[Co(NH_3)_6\right]Cl_3$

(ii) $\left[NiCl_4\right]^{2-}$

(iii) $K_3\left[Fe(CN)_6\right]$

34. Explain why transition metals form complex compounds.

35. Identify the reagents A,B,C,D,E and F required for the following conversion:

$$C_6H_5NO_2 \xrightarrow{A} C_6H_5NH_2 \xrightarrow{B} C_6H_5N_2 + Cl^- \xrightarrow{C} C_6H_5ClC_6H_5OH \xrightarrow{H_2S}$$

.
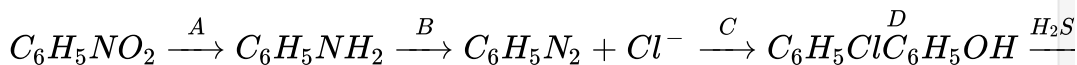
36. Give balanced chemical equation for the following reaction:

(i) Potassium iodide is treated with acidified potassium permanganate solution.

(ii) Sodium dichromate with calculate amount of potassium chloride.

(iii) Sulphur dioxide treated with acidified potassium permanganate.

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37. Account for the following facts:

(a) The reduction of a metal oxide is easier if the metal formed is in the liquid state at the temperature of reduction.

(b) Limestone is used in the manufacture of pig iron from haematite.

(c) Pine oil is used in the froth flotation process used to concentrate sulphide ores.

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**38.** (i) Specific conductance decreases with dilution whereas equivalent conductance increses with dilution. Why ?

(ii) State the Faraday's second law of electrolysis.

39. $0 \cdot 05$ M $NaOH$ solution offered a resistance of $31 \cdot 6$ ohm in a conductivity cell at 298 K. If the cell constant of the cell is $0 \cdot 367 cm^{-1}$ calculate the molar conductivity of the NaOH solution.

40. (A) Complete the following chemical reactions:

(i) $XeF_4 + SbF_5 \rightarrow$

(ii) $XeF_6 + 2H_2O \rightarrow$

(iii) $XeF_6 + 3H_2O \rightarrow$
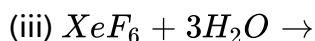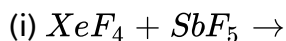
(B) Why could fluorine not be prepared for a long time from HF and metal fluorides either by electrolysis or by any chemical reaction ?

41. (A) Suggest a possible reason for the following observation:

(i) In the solid state, PCl_5 behaves as an ionic species.

(ii) H_2S is more acidic than water.

(iii) Fluorine forms the largest number of inter halogen compounds amongst the halogens.
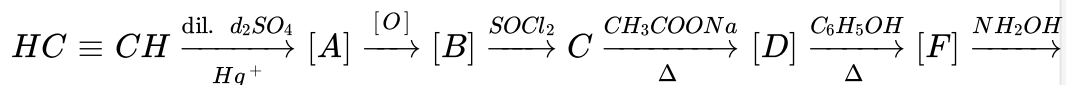
42. (i) An organic compound A with molecular formula C_7H_8 on oxidation by chromyl chloride in the presence of CCl_4 gives a compound B which gives positive Tollen's test. The compound B on treatment with NaOH followed by acid hydrolysis gives two product C and D. C on oxidation gives B which on further oxidation gives D. the compound D on distillation with sodalime gives a hydrocarbon E. Below $60°C$, concentrated nitric acid reacts with E in the presence of concentrated sulphuric acid forming a compound F. identify the compounds A,B,C,D,E

and F.

(ii) Give chemical test to distinguish : Formaldehyde and acetaldehyde.

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43. (i) Identify the compounds A,B,C,D,E and F.

$$HC \equiv CH \xrightarrow[Hg^+]{\text{dil. } d_2SO_4} [A] \xrightarrow{[O]} [B] \xrightarrow{SOCl_2} C \xrightarrow[\Delta]{CH_3COONa} [D] \xrightarrow[\Delta]{C_6H_5OH} [F] \xrightarrow{NH_2OH}$$

(ii) Write the relevant balanced equation and the name of the reaction involved in the conversion of acetyl chloride to acetaldehyde.

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