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Class: 11
Subject: Chemistry
Topic: Organic chemistry
No. of Questions: 25

Q1. What types of reactions alkynes undergo?

Sol. Majority of the reactions of alkynes are the examples of addition reaction.

Q2. What is R_f value?

Sol. Distance moved by the substance from the base line to the distance moved by the solvent from the base line is known as the R_f value.

Q3. What is the Prussian blue color due to in the test for nitrogen?

Sol. In the test of nitrogen the Prussian blue color formed is of ferriferrocyanide.

Q4. Explain the principle of paper chromatography.

Sol. In paper chromatography, chromatography paper is used. This paper contains water trapped in it, which acts as the stationary phase. On the base of this chromatography paper, the solution of the mixture is spotted. The paper strip is then suspended in a suitable solvent, which acts as the mobile phase. This solvent rise up the chromatography paper by capillary action and in the procedure, it flows over the spot. The components are selectively retained on the paper (according to their differing partition in these two phases). The spots of different components travel with the mobile phase to different heights. The paper so obtained (shown in the given figure) is known as a chromatogram.

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Q5. What are polar reactions?

Sol. Organic reactions which proceed through heterolytic bond cleavage are called polar reactions.

Q6. What are free radical reactions?

Sol. Organic reactions that proceed by hemolytic fission are called free radical reactions.

Q7. Which technique one can employ to separate crude oil in petroleum industry?

Sol. Fractional distillation technique can be used to separate crude oil in petroleum industry.

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Q8. What is geometrical isomerism?

Sol. When the same molecular formula represents two compounds which differ in the spatial arrangement of atoms or groups around C-C double bond, such isomers are called as geometrical isomers. Geometrical isomerism is due to the restricted or hindered rotation around the double bond.

Q9. What is adsorption chromatography?

Sol. Adsorption chromatography is based on the fact that different compounds are adsorbed on an adsorbent to different degrees. Commonly used adsorbents are silica gel and alumina. When a mobile phase is allowed to move over a stationary phase the components of a mixture move by varying distances over the stationary phase.

Q10. What are the different categories of chromatography?

Sol. The different categories of chromatography are: Adsorption and Partition chromatography.

Q11. What are optically active and optically inactive compounds?

Sol. When plane polarized light is passed through a substance, it may or may not rotate the plane of the plane polarized light. The substance which does not rotate the plane of the plane polarized light is known as optically inactive compound, while a substance which rotates the plane of the plane polarized light is known as optically active substance.

Q12. What are the methods to estimate nitrogen?

Sol. Methods to estimate nitrogen are Dumas Method and Kjeldahls Method.

Q13. What is Mesmerism?

Sol. Metamerism arises due to different alkyl chains on either side of the functional group in the molecule.

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Q14. What is fractional distillation process?

Sol. When the difference in boiling points of two liquids is not much, simple distillation cannot be used to separate them. The vapours of such liquids are formed within the same temperature range and are condensed simultaneously. The technique of fractional distillation is used in such a process.

Q15. How can you separate aniline from aniline-water mixture?

Sol. Steam distillation technique is applied to separate substances which are steam volatile and are immiscible with water like aniline from aniline-water mixture.

Q16. What is a homolytic cleavage?

Sol. In homolytic cleavage one of the electrons of the shared pair in a covalent bond goes with each of the bonded atoms. Thus in this movement of a single electron Takes place instead of an electron pair.

Q17. What are the different types of organic reactions?

Sol. Different types of organic reactions are: Substitution, addition, elimination and rearrangement reactions.

Q18. Write the structure of diphenylamine.

Sol. Structure of diphenylamine is $C_6H_5NHC_6H_5$.

Q19. What is heterolytic cleavage?

Sol. In the heterolytic cleavage the bond breaks in a way that the shared pair of electrons remains with one of the fragments.

Q20. Write the different possible types of stereoisomers.

Sol. Different possible types of stereoisomers are geometrical isomers and optical isomers.

Q21. What is the order of rate of reaction of alkanes with halogens F_2, Cl_2, Br_2 and I_2?

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Sol. The order of rate of reaction of alkanes with halogens is $F_2 > Cl_2 > Br_2 > I_2$.

Q22. What is a substitution reaction? Give an example.

Sol. When one or more hydrogen atoms of alkanes are replaced by halogens, nitro group or sulphonic acid group it is a type of substitution reaction. Halogenation reaction is a type of substitution reaction.

Q23. Write the IUPAC name of the compound $CH_3CH=CH-CH_2Br$.

(A) 1 bromobutyne
(B) 1 bromo-but- 2-ene
(C) 1 bromobutane
(D) 1-ene- bromobutane

Sol. (B)
The IUPAC name of the compound $CH_3CH=CH-CH_2Br$ is 1-bromo-but-2-ene.

Q24. Reagent that takes away an electron pair is called as:

(A) Electrophile

(B) Carbanion

(C) Nucleophile

(D) Carbocation

Sol. (A)
Reagent that takes away an electron pair is called as Electrophile.

Q25. Which of the two: $O_2NCH_2CH_2O^-$ or $CH_3CH_2O^-$ is expected to be more stable and why?

Sol. NO_2 group is an electron-withdrawing group. Hence, it shows- I effect. By withdrawing the electrons toward it, the NO_2 group decreases the negative charge on the compound, thereby stabilising it. On the other hand, ethyl group is an electron – releasing group. Hence, the ethyl group shows + I effect. This increases the negative charge on the compound, thereby destabilising it. Hence, $O_2NCH_2CH_2O^-$ is expected to be more stable than $CH_3CH_2O^-$.