

Class: 11
Subject: Chemistry
Topic: Hydrocarbons
No. of Questions: 20
Duration: 60 Min
Maximum Marks: 60

1. Which one of the following is an electrophile?

- A. BF_3
- B. NH_3
- C. CN^-
- D. OH^-

Sol: A

Electrophile is an electron deficient species which attacks the electron rich centre. BF_3 is an electrophile

2. Nitration of Benzene is

- A. electrophilic substitution
- B. nucleophilic substitution
- C. electrophilic addition
- D. nucleophilic addition

Sol: A

Electrophilic substitution

3. According to Baeyer's strain theory which among the following is highly stable?

- A. Cyclohexane
- B. Cycloheptane
- C. Cyclopentane
- D. None of these

Sol: C

Angle strain in cyclopentane is minimum and hence is highly stable

4. Anhydrous AlCl_3 is used in the Friedel Crafts reaction because it is

- A. electron rich
- B. soluble in ether
- C. Lewis base
- D. electron deficient

Sol: D

Electron deficient AlCl_3 attracts the pair of electrons from alkyl halide generating the electrophile

5. Which of the following is used to coagulate rubber latex?
- A. formalin
 - B. formic acid
 - C. stearic acid
 - D. benzoic acid
- Sol: B
6. According to Markownikoff's rule, when hydrogen chloride adds to an unsymmetrical alkene, the hydrogen of HX attaches to
- A. carbon at the end of the molecule
 - B. carbon in the middle of the molecule
 - C. carbon with least number of hydrogen atoms
 - D. carbon with maximum number of hydrogen atoms
- Sol: D
7. The type of substitution that can occur in benzyl chloride is
- A. electrophilic substitution
 - B. nucleophilic substitution
 - C. free radical substitution
 - D. all the above
- Sol: D
8. The hybridization of carbon atoms in C-C single bond is $\text{HC} \equiv \text{C} - \text{CH} = \text{CH}_2$, is
- A. $\text{Sp}^3 - \text{sp}^3$
 - B. $\text{Sp}^2 - \text{sp}^3$
 - C. $\text{sp} - \text{sp}^2$
 - D. $\text{sp}^3 - \text{sp}$
- Sol: C
Carbons with $\text{C} \equiv \text{C}$ should be 'sp' hybridised and with $\text{C} = \text{C}$ are sp^2 hybridised. Hence option 3 is correct
9. In Etard's reaction we get
- A. benzoic acid
 - B. benzyl alcohol
 - C. ethyl benzoate
 - D. benzaldehyde
- Sol: D

10. $C_6H_6 + C_2H_5Br \xrightarrow[AlCl_3]{anhydrous} C_6H_5-C_2H_5 + HBr$ This reaction is known as

- A. Wurtz reaction
- B. Wurtz - Fittig reaction
- C. Friedel - Crafts reaction
- D. Williamson's reaction

Sol: C

This reaction is a suitable method for the preparation of alkyl benzenes

11. An alkane has C/H ratio (by mass) of 5.1428. Its molecular formula is

- A. C_8H_{18}
- B. C_7H_{16}
- C. C_5H_{12}
- D. C_6H_{14}

Sol: D

Ratio is $\frac{12 \times 6}{14 \times 1} = \frac{72}{14} = 5.1428$. This way the ratio has to be calculated for each case and

the correct choice is to be identified

12. Which process yields methane

- A. reduction of methyl chloride with Zn - Cu / alcohol
- B. action of heat on a mixture a salt of acetic acid and soda lime
- C. aluminum carbide treated with water
- D. all the above

Sol: D

In ethane C - C single bond is present. In the rest, double bond with or without resonance are present. Always single bond is longer than double bond

13. The monomers of Buna - S rubber are

- A. Vinyl chloride and sulphur
- B. Styrene and butadiene
- C. butadiene
- D. isoprene and butadiene

Sol: B

Buna S and Buna - N are two synthetic rubbers. The monomers of these rubbers are (Butadiene + Styrene) and (butadiene + acrylonitrile) respectively. Here Bu stands for butadiene. Na stands for Sodium (sodium which was used as a catalyst) S - stands for styrene and N stands for acrylonitrile

14. During electrophilic substitution reactions of toluene, substitution takes place at

- A. ortho position
- B. meta position
- C. ortho and meta positions
- D. ortho and para positions

Sol:D

15. In benzene, all the six C - C bonds have the same length because of

- A. resonance
- B. hybridization
- C. isomerism
- D. chain isomerism

Sol:A

16. A hydrocarbon with molecular formula C_4H_6 gives a white precipitate with ammoniacal $AgNO_3$. On passing through dil, H_2SO_4 containing $HgSO_4$ gives 2 butanone. The hydrocarbon is

- A. 2 -butyne
- B. 1- butene
- C. cyclobutene
- D. 1 -butyne

Sol: D

Only a terminal alkyne can satisfy the two reactions mentioned.

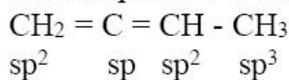
Hence the correct choice should be 1 - butyne. 1 - butyne is $CH_3 - CH_2 - C \equiv CH$. This on hydration gives 2 - butanone

17. The compound 1,2 - butadiene has

- A. only sp hybridized carbon atoms
- B. only sp^2 hybridized carbon atoms
- C. both sp and sp^2 hybridized carbon atoms
- D. sp, sp^2 and sp^3 hybridized carbon atoms

Sol: D

The compound 1,2 - butadiene is having the structure:



18. The hybridisation of carbon atom in benzene is

- A. sp
- B. sp^2
- C. sp^3
- D. d^2sp^3

Sol: B

All carbon atoms in benzene contain 3s bonds. Hence the hybridization is sp^2

19. HDPE is prepared by polymerisation of ethene

- A. using a peroxide catalyst
- B. using a catalyst containing a mixture of triethylaluminium and titanium tetrachloride
- C. at a temperature of 150-250°
- C in the presence of oxygen
- D. using a high pressure

Sol: B

The catalyst mentioned in alternative 2 is called Ziegler - Natta catalyst

20. Nitration of benzene takes place by

- A. nucleophilic substitution mechanism
- B. electrophilic substitution mechanism
- C. elimination - addition mechanism
- D. addition - elimination mechanism

Sol: B