
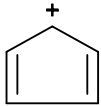

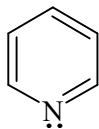


CHEMISTRY-1

Hydrocarbons

[Set-1]

SECTION-A

1. Which of the following alkene on reductive ozonolysis gives only one product?
- (i) But-2-ene (ii) 2,3-Dimethyl but-2-ene
(iii) Cyclohexene (iv) All of these
2. Among the following the most reactive alkene towards HBr is
- (i) $(\text{CH}_3)_2\text{C}=\text{C}(\text{CH}_3)_2$ (ii) $\text{CH}_2=\text{CH}_2$ (iii) $\text{CH}_3-\text{CH}=\text{CH}_2$ (iv) $\text{CH}_3\text{CH}=\text{CHCH}_3$
3. Which of the following is not aromatic?
- (i)  (ii)  (iii)  (iv) 
4. Which of the following reagent is not used for the halogenation of benzene?
- (i) Cl_2/Fe (ii) $\text{Cl}_2/\text{FeCl}_3$ (iii) Br_2/Fe (iv) HBr/dark
5. Match the following:

Column-I

- A. Benzene + $\text{Cl}_2 \xrightarrow{\text{anhyd AlCl}_3}$
- B. Benzene + $\text{CH}_3\text{Cl} \xrightarrow{\text{anhyd AlCl}_3}$
- C. Benzene + $\text{CH}_3\text{COCl} \xrightarrow{\text{anhyd AlCl}_3}$
- D. Toluene + $\text{Cl}_2 \xrightarrow{\text{anhyd AlCl}_3}$

Column-II

1. Methyl phenyl ketone
2. Toluene
3. 4-chloromethyl benzene
4. Chlorobenzene

- | | A | B | C | D |
|-------|---|---|---|---|
| (i) | 4 | 4 | 1 | 3 |
| (ii) | 4 | 2 | 1 | 3 |
| (iii) | 3 | 1 | 2 | 4 |
| (iv) | 3 | 4 | 1 | 2 |

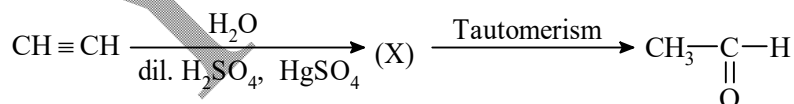
Assertion-Reason type Questions:

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true
6. A: But-2-ene gives the same product with HBr in dark or in the presence of organic peroxide.
 R: Addition of HBr in dark or in the presence of organic peroxide follows ionic mechanism.
7. A: In the nitration of benzene using $\text{HNO}_3/\text{H}_2\text{SO}_4$ involves the cleavage of O - N bond in HNO_3 , $\text{HO} - \text{NO}_2$.
 R: H_2SO_4 helps in the protonation of nitric acid and speed up the cleavage of O - N bond in $\text{HO} - \text{NO}_2$.

Passage based questions:

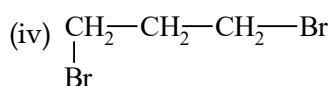
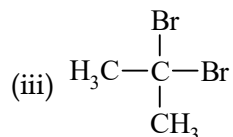
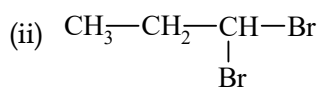
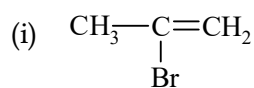
Ethyne on reaction with strong bases like sodium metal and sodamide (NaNH_2) liberates hydrogen gas. This indicates that ethyne is acidic in nature in comparison to ethene and ethane. Acidic strength can be explained in terms of the stability of conjugate base. More the stability of conjugate base, stronger the acid is. But like ethene, ethyne also give addition reactions with X_2 , HX and H_2O . The addition reactions of ethyne proceed via vinylic cation.

8. The correct order of acidic strength is
 (i) $\text{HC} \equiv \text{CH} > \text{CH}_2 = \text{CH}_2 > \text{CH}_3 - \text{CH}_3$
 (ii) $\text{HC} \equiv \text{CH} > \text{CH}_3\text{C} \equiv \text{CH} >> \text{CH}_3\text{C} \equiv \text{C} - \text{CH}_3$
 (iii) $\text{HC} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{CH}_3\text{CH}_2\text{C} \equiv \text{CH}$
 (iv) All are correct
9. The structure of the compound 'X' is



- (i) $\text{CH}_2 = \underset{\text{OH}}{\underset{|}{\text{C}}} - \text{H}$ (ii) $\text{CH}_2 = \text{C} = \text{O} - \text{H}$ (iii) $\overset{+}{\text{C}}\text{H}_2 - \underset{\text{H}}{\underset{|}{\text{C}}} - \text{H}$ (iv) $\text{H} - \underset{\text{H}}{\underset{|}{\text{C}}} = \text{C}^+ -$

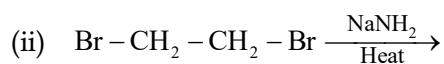
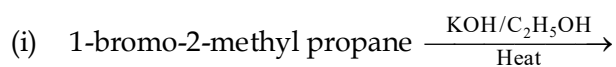
10. Propyne on reaction with excess of HBr gives



SECTION-B

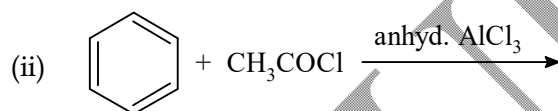
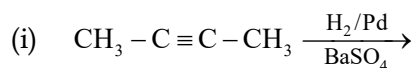
11. Draw the eclipsed and staggered conformers of ethane, C_2H_6 . Which conformer is more stable and why?

12. Write the structure of the major product in each of the following reactions:



OR

Complete the following reactions:



13. Explain the following name reactions:

- (i) Kolbe electrolysis
- (ii) Friedel-Craft alkylation

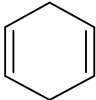
14. How will you make the following conversions?

- (i) Benzene into p-bromonitrobenzene
- (ii) Propene into 2-bromo propane
- (iii) Ethyne into but-1-yne

OR

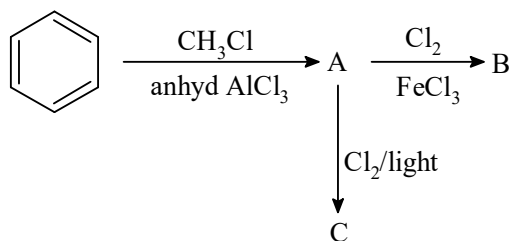
Account for the following:

(i) Ethyne hydrogen is more acidic than ethene

(ii)  is non-aromatic

(iii) n-pentane has a lower melting point than neo-pentane.

15. (i) Write the structures of A, B and C



(ii) An alkene A (C_5H_{10}) on ozonolysis gives propanone and ethanal

(a) Write the structure and IUPAC name of A

(b) What happens when HBr is added to compound A in dark?