CLASS XII
ORGANIC CHEMISTRY

Time: 3 hours **Full Marks = 70**

1. Answer the following questions: **1X10=10**

(a) Write the IUPAC name of tetra – tert-butylmethane.

(b) Write the general combustion equation for an alkane.

(c) Arrange the following in order of their increasing acidity: HF, HCl, HBr, HI

(d) Arrange the following in increasing order of C–H bond length: C_2H_2, C_2H_4, and C_2H_6.

(e) Partially deactivated palladised charcoal is known as ..... catalyst.

(f) Define enantiomer with an example.

(g) How is the electronegativity of carbon atoms related to their state of hybridisation in an organic compound ?

(h) What is the ratio of σ and π bonds in benzene?

(i) What is the state of hybridisation of C of silver acetylide?

(j) What is the order of acidity in ethane, ethylene and acetylene?

2. Answer the following questions: **2X10=20**

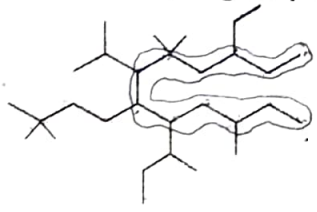
(a) Explain why C–O bond length in phenol is less than ethyl alcohol.

(b) Explain why aniline is less basic than ethylamine.

(c) How will propene react with HBr (i) in the presence of peroxide (ii) in the absence of any peroxide ?

(d) Explain why trichloroacetic acid is more stronger than monochlorocaetic acid.

(e) Write the IUPAC name of the following compound



(f) Select the electrophile and nucleophile from the following:

ROH, NO^+, BF_3, Cl^-, $AlCl_3$, NH_3,

(g) Explain why $(CH_3)_3C^+$ is more stable than $CH_3CH_2^+$ and CH_3^+ is the least stable cation.

(h) Define metamerism with an example.

(i) CO_2 has no dipole moment but SO_2 has a dipole moment of μ= 1.6 D. Explain.

(j) Distinguish the following: (i) Ethane and ethene (ii) Ethene and Ethyne

3. Answer the following questions: **3X5=15**

(a) Explain the following terms: i) Inductive effect ii) Electromeric effect

(b) Explain the conformation of n–Butane, rotation along C2 and C3 and their order of stability.

(c) Out of benzene, m–dinitrobenzene and toluene which will undergo nitration most easily and why?

(d) Ozonolysis of an alkene 'X' followed by decomposition with water and a reducing agent gave a mixture of two isomers of the formula C_3H_6O. Give the structure of the alkene and its IUPAC name.

(e) Addition of HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.

4. What happens when (write equation also) **1x5=5**

(a) Phenol is passed over heated zinc dust and then treated with CH_3Cl in presence of Anyd. $AlCl_3$.

(b) Acetylene is passed over red hot Fe tube at 873K and the product is heated with a mixture of conc. HNO_3 and conc. H_2SO_4 at 323–333K

(c) 1–bromopropane is treated with Na in presence of dry ether and then heating to 773K at 10–20 atm pressure in the presence of V_2O_5.

(d) Calcium carbide is passed through water and the product is hydrogenated in the presence of Ni catalyst

(e) Aqueous solution of potassium salt of acetic acid is electrolyzed.

5. Convert the following: **(any five)** **1x5=5**

(a) Acetylene to lactic acid
(b) Acetylene to Acetaldehyde
(c) Chloroform to lactic acid
(d) Propan–1–ol to Propan–2–ol
(e) Phenol to m–nitrotoluene
(f) ethanoic acid to benzene

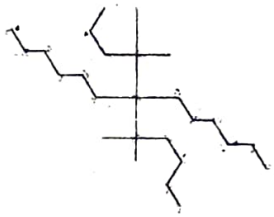
6. An alkyl halide $C_5H_{11}Br$ (A) reacts with ethanolic KOH to give an alkene 'B', which reacts with Br_2 to give a compound 'C', which on dehydrobromination gives an alkyne 'D'. On treatment with sodium metal in liquid ammonia one mole of 'D' gives one mole of the sodium salt of 'D' and half a mole of hydrogen gas. Complete hydrogenation of 'D' yields a straight chain alkane. Identify A, B, C and D. Give the reactions involved. **5**

7. Write short notes of following: **1x5=5**

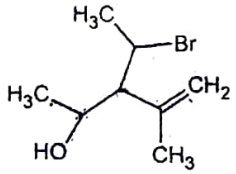
(a) Aldol condensation
(b) Wurtz reaction
(c) Markovnikov rule
(d) Saytzeff rule
(e) Anti–Markovnikov rule

8. Write the IUPAC name of the following: **1x5=5**

(a)



(b)



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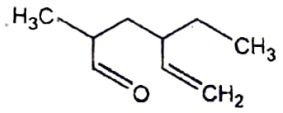

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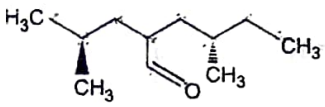

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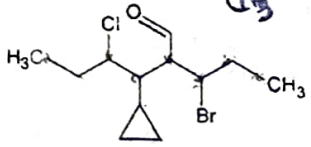

$CaC_2 + H_2O \longrightarrow Ca(OH)_2 + H_2 + C_2$

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$H_3C - CH = C = CH - CH_3$

$H_2C = HC - C \equiv C - CH_3$