



A Charutar Vidya Mandal's Institution  
**V.P. & R.P.T.P. SCIENCE COLLEGE**

(AUTONOMOUS) (Grant – in – Aid)  
Affiliated to Sardar Patel University  
VALLABH VIDYANAGAR – 388120



**Bachelor of Science (Semester – III) External Examination – 2025**

**US03MAICV01: Unit Processes in Organic Synthesis – I**

**Date: 06<sup>th</sup> October, 2025**

**Time: 02:00 P.M. TO 04:30 P.M.**

**Day: Monday**

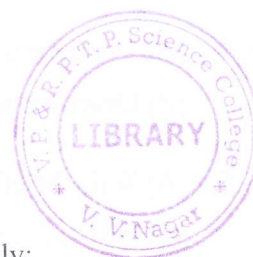
**Total Marks: 50 Marks**

Note: The figure to the right indicates the full marks for each question.

**Q – 1 Answer the following Multiple-Choice Questions. (All are compulsory)**

**[10]**

- Nitration reactors are generally made of:  
(A) Stainless Steel (B) Cast Iron with Acid Proof Material  
(C) Copper (D) Zinc
- During di-nitration of benzene to m-dinitrobenzene, the second nitro group enters the:  
(A) Ortho Position (B) Para Position  
(C) Meta Position (D) Both Ortho and Para Position
- In Bechamp reduction, the reducing agent is:  
(A)  $\text{Fe}^{2+}$  ions formed in situ (B)  $\text{Fe}^{3+}$  ions  
(C) HCl gas (D) Steam
- In Zn/HCl reduction, Zn acts as:  
(A) Oxidizing Agent (B) Catalyst  
(C) Reducing Agent (D) Solvent
- The reduction of m-dinitrobenzene with Fe/HCl gives predominantly:  
(A) m – Nitroaniline (B) Aniline  
(C) o – Nitroaniline (D) p – Nitroaniline
- Which halogenation is the most exothermic?  
(A) Fluorination (B) Chlorination  
(C) Bromination (D) Iodination
- In chlorination of benzene with  $\text{Cl}_2/\text{FeCl}_3$ , the actual electrophile is:  
(A)  $\text{Cl}_2$  (B)  $\text{Cl}^+$   
(C)  $\text{Cl}^-$  (D)  $\text{Cl}_2^+$
- Which of the following is not an oxidation process?  
(A) Alcohol  $\rightarrow$  Aldehyde (B) Alkane  $\rightarrow$  Alkene  
(C) Aldehyde  $\rightarrow$  Carboxylic acid (D) Alkene  $\rightarrow$  Epoxide
- Oxidation reactions are often accompanied by which type of reaction?  
(A) Precipitation (B) Neutralization  
(C) Reduction (D) Evaporation
- In a redox reaction, the oxidizing agent is the substance that:  
(A) Increases its oxidation number (B) Loses Electrons  
(C) Becomes Neutral (D) Gains Electrons



❖ Answer The Following Long Questions

- Q – 2 [A] Define term nitration and Give Mechanism of Aromatic Nitration [05]  
[B] Enlist Nitrating Agent, give function of  $H_2SO_4$  in Nitration reaction and Write nitro compound and their uses. [05]

OR

- Q – 2 [A] Detail manufacturing of chlorobenzene to ortho and para nitro chlorobenzene [05]  
[B] Notes on process equipment for technical nitration [05]

- Q – 3 [A] Write Metal and Alkali Reductions [05]  
[B] Discuss Other Metal and Acid Reductions [05]

OR

- Q – 3 [A] Detail note on catalytic hydrogenation. [05]  
[B] Explain Sulphite Reduction [05]

- Q – 4 [A] Describe the design and construction of halogenation equipment. [05]  
[B] Describe the commercial production of chlorobenzene. [05]

OR

- Q – 4 [A] Describe the thermodynamics and kinetics of Halogenation reaction. [05]  
[B] Describe the commercial production of chloroacetic acid. [05]

- Q – 5 [A] Write brief note on oxidizing agent. [05]  
[B] Discuss commercial manufacturing of benzoic acid. [05]

OR

- Q – 5 [A] Write a note on types of oxidation reaction. [05]  
[B] Write a note on permanganate as oxidizing agent [05]



... Best of Luck ...