

**Time: 2 Hours****Total Marks: 40**

- N.B.: 1. All questions are compulsory  
2. Answer all subquestions together  
3. Figures to right indicate full marks

Q.1 A. Attempt **any four** of the following. (4)

- Define Process control with reference to large scale processes
- Define Process development
- Name the typical equipments used in a production plant.
- Is polymorphism a problem for API? Justify your answer.
- What is MSDS? Signify its importance.

B. Answer the following questions in brief (**any three**) (6)

- What is nitronium ion? What is its use? Explain with suitable equation.
- What is the use of sodium hypochlorite. Explain using suitable example.
- Explain Zinnin reduction.
- In brief explain catalytic halogenations.

Q. 2 a) Explain method for preparation of chloral. (2)

b) Classify different types of probable impurities present in API. Give the sources of these impurities. (2)

c) Classify different stages of scale up processes. Explain any one of them. (2)

Q.3 a) Outline different types of oxidation reactions. Explain any 3 of them briefly. (3)

**OR**

a) Write a note on liquid phase oxidation. (3)

b) Write a note on different types of fire and explain which fire extinguisher is used for which fire type. (3)

Q. 4 a) Explain how does reactor shape and back mixing affects Chemical process kinetics? (3)

b) Write a note on mixed acid nitration. (3)

**OR**

b) Write in detail about preparation of nitrobenzene. (3)

Q. 5 a) Explain about dedicated plant for the synthesis of aspirin (2)

b) Which types of materials are susceptible for hydrolysis. (2)

c) Give brief overview for guideline for API Manufacturing (2)

Q.6 a) Write a note on Bechamp reduction. (3)

**OR**

a) Enlist different reduction methods available for synthesis of amines. (3)

b) Explain about The Biazzi process for preparation of glyceryl trinitrite (3)