

[Time: 2½ Hours]

[ Marks:60]

Please check whether you have got the right question paper.

- N.B:**
1. All questions are **compulsory**.
  2. **Figures** to the right indicate **full marks**.
  3. **The use of a log table or a non-programmable calculator is permitted.**

**Q1 A** Attempt **Any Two** of the following:

08

- i What are chemical standards and reference materials? What is their importance in chemical analysis?
- ii Enlist the safety precautions to be taken while working in a chemical laboratory.
- iii How are hazardous and corrosive materials stored in chemical laboratories?
- iv Explain the significance of the patented work and its benefits.

**B** Discuss the first aid methods used in case of accidents in chemical plants.

04

OR

**B** Write a note in detail on "ASTM".

04

**Q2 A** Attempt **Any Two** of the following:

08

- i Explain the mechanism of dialysis.
- ii Discuss application of multi-layer films in determination of potassium ion in serum sample.
- iii What is the basic operating principle behind ultrafiltration?
- iv State the advantages of membrane process.

**B** What is reverse osmosis? What are its advantages?

04

OR

**B** Describe the operation of flow injection analysis system for the determination of chloride ion in water sample.

04

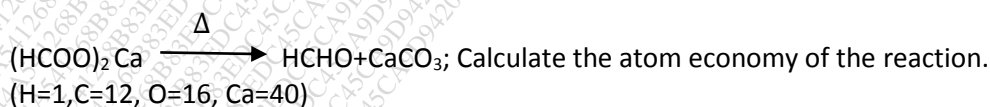
**Q3 A** Attempt **Any Two** of the following:

08

- i How ionic solids are "green" and "sustainable"?
- ii State the advantages of photochemical reactions in emerging green technologies.
- iii Explain with a suitable example, the terms Inherently Safer Design (ISD) and Process intensification (PI).
- iv State the advantages of CO<sub>2</sub> as a supercritical fluid.

**B** Why is atom economy calculated? The following reaction is used as a preparation of methanal from the calcium salt of formic acid:

04



OR

**B** With the help of suitable examples, explain the use of microwave methods as a green way of chemical syntheses.

04

Turn over

- Q4 A** Attempt **Any Two** of the following: **08**
- i Discuss in detail the morphology of nano particles.
  - ii Explain the principle of SDS PAGE, and discuss its instrumentation and applications.
  - iii What is the principle of gel electrophoresis? State its applications.
  - iv Write a note on capillary isotachopheresis.

**B** Discuss the following methods of detection in capillary electrophoresis: Absorption and fluorescence. **04**

**OR**

**B** Give a detail account of Micellar Electrokinetic Capillary chromatography. **04**

- Q5** Attempt **Any Four** of the following: **12**

- i What first aid treatment is given the victim for burning due to caustic alkalies?
- ii Explain with suitable examples the term "Transportation Symbols".
- iii What are the advantages of flow injection analysis due to absence of air bubble?
- iv Discuss cross flow microfiltration.
- v State the application of microwave synthesis in green chemistry.
- vi With suitable examples, discuss the role of ionic liquids as catalysts.
- vii How do we define gels on the basis of their composition?
- viii Give a brief account of three dimensional nano particles.