

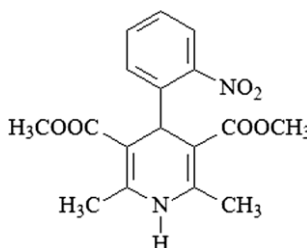
M.Sc.(Chem.) Semester - 1 (CBCS) Examination
OCT/NOV-2025 (AS PER SYLLABUS YEAR JUNE-2023)
Analytical Chemistry (Core (New-23))

Time: 2:30 Hours**Marks:70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1 (A) Answer the following question (04)

- (1) How would you prepare 1 in 1,00,000 as per pharmacopoeia?
1 represents drug, Tolfenamic acid
1,00,000 represents, diluent, methanol
- (2) Write empirical formula and calculate molecular weight.

**Q.1 (B) Answer any two questions out of three. (10)**

- (1) How will you prepare following buffer solutions? Calculate all for 100 mL.
 - (a) 10% v/w o-phosphoric acid in water.
 - (b) 1% v/v o-phosphoric acid in water.
 - (c) 10 ppm acetic acid in water.
 - (d) 10 mM sodium hydroxide in water.
 - (e) 0.1 molal potassium hydroxide in water.
- (2) Explain mole concept and find the number of moles present in 5 gm of HCl.
- (3) Define normality, explain the concept of equivalent weight with suitable examples and discuss preparation of 500 mL 0.5N H₂SO₄.

Q.2 (A) Answer the following question (04)

- (1) Differentiate between plane-polarized light and ordinary light.
Name two substances that show optical activity.
Define optical activity.
Dose concentration of analyte effects on optical rotation?

Q.2 (B) Answer any two questions out of three. (10)

- (1) Explain the process for calibration of polarimeter.
- (2) Discuss immersion refractometer in detail.
- (3) Discuss the concept of refractive index in various medium.

Q.3 (A) Answer the following question (04)

- (1) Explain Fajan's method for estimation of chloride.

Q.3 (B) Answer any two questions out of three. (10)

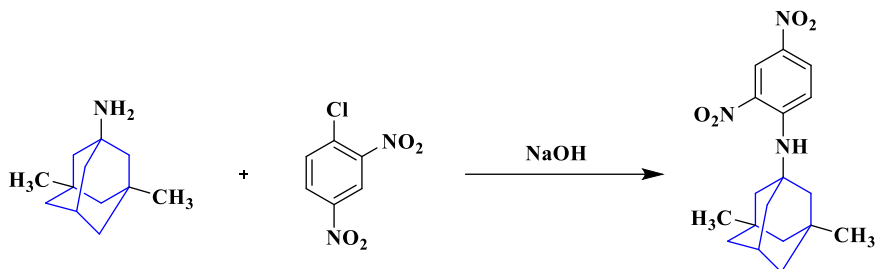
- (1) Discuss Mohr's method and its limitation.
- (2) Explain types of curves in acid -base titration with example
- (3) Classify of volumetric titration and state basic requirements of volumetric methods.

Q4 (A) Answer the following questions (04)

- (1) Define green chemistry
- (2) Why Microwave assisted reactions are considered green synthesis?

Q4 (B) Answer any two questions out of three (10)

- (1) Write twelve green principles and explain any one in detail.
- (2) What are ionic liquids? write its properties, application and examples.
- (3) What is atom economy? calculate atom economy for following reaction.



Q.5 (A) Answer the following question (04)

- (1) What is glass transition temperature?
- (2) Name the thermocouples used in DSC.

Q.5 (B) Answer any two questions out of three. (10)

- (1) Give principle of TGA and discuss TGA taking suitable example.
- (2) Discuss instrumentation of DSC with labeled diagram.
- (3) Discuss the factors affecting TGA and DTA analysis.
