

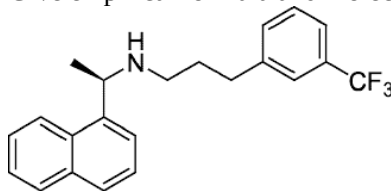
M.Sc.(Chem.) Semester - 1 (CBCS) Examination
Nov/Dec-2023 (SYLLABUS YEAR JUNE-2023)
Analytical Chemistry (Core)

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

1. Figures to the right indicate marks.
 2. All questions are compulsory.
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Que.1(A) Answer the following. (04)

- 1) Define analytical chemistry and state basic functions of analytical chemist.
- 2) Give empirical formula and molecular weight for given structure.



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

- 1) Explain the detailed classification of modern analytical techniques.
- 2) Define Molarity and explain how will you prepare following solutions.
 - (i) 20 mM acetic acid in water.
 - (ii) 0.2 M benzoic acid in methanol
- 3) Calculate and write preparation of following solutions.
 - (i) 500 mL, 500 ppm paracetamol in water
 - (ii) 20% v/v valproic acid in methanol.
 - (iii) 10% w/v divalproex sodium in ethanol.
 - (iv) 1.0 L, 1.0 M Sodium hydroxide in water.
 - (v) 2.0 L, 1.0 N Sulfuric acid in water.

Que.2(A) Answer the following. (04)

- 1) Explain the classification of volumetric titration in brief.

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

- 1) Discuss Mohr's method for identification of halogen with its limitations.
- 2) Write detailed note on redox titrations.
- 3) Discuss the acid-base theories with suitable example.

Que.3(A) Answer the following. (04)

- 1) Define Green Chemistry and discuss merits and demerits of microwave synthesis.

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

- 1) Discuss atom economy with suitable example.
- 2) Write twelve green principles and discuss any one in detail.
- 3) Explain the role of following green approaches.
 - (i) Design to degrade
 - (ii) Use of catalyst

Que.4(A) Answer the following. (04)

- 1) What are optical methods?
- 2) Explain plain polarized light in brief.

Que.4(B) Answer any two questions out of three. (10)

- 1) Discuss basic instrumentation of Abbe refractometer.
- 2) Discuss refraction and critical ray with diagram.
- 3) Write a note on calibration of simple polarimeter.

Que.5(A) Answer the following. (04)

- 1) Give brief introduction of Thermogravimetry Analysis.

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

- 1) Explain Glass transition temperature, Crystallization, Melting and Curing in DSC.
- 2) Discuss factors affecting DSC curves.
- 3) Draw probable TGA curves and calculate theoretical stoichiometric % weight loss after each decomposition steps in (i) CaCO₃ (ii) CaC₂O₄ · H₂O
