

Seat No.	207
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M.Sc. (Part - I) (Semester - I) (NEP)

Examination, December - 2023

CHEMISTRY

E-ACH-103 : Analytical Chemistry - I (Elective Paper)

Sub. Code : 92123

Day and Date : Tuesday, 5 - 12 - 2023

Total Marks : 80

Time : 10.30 a.m. to 1.30 p.m.

- Instructions :
- 1) Attempt in all five questions.
  - 2) Question No.1 is compulsory.
  - 3) Attempt any two questions from Section-I and any two questions from Section-II.
  - 4) All questions carry equal marks.
  - 5) Figures to the right indicate marks.

Q1) Solve the following.

[16]

- a) What is red and blue shift in UV-Visible spectroscopy?
- b) Fingerprint region in IR spectroscopy lies in \_\_\_\_\_.
- c) What is meant by thermogram?
- d) What is the source of radiation used in AAS?
- e) IR spectrum is a plot of \_\_\_\_\_.
- f) Mention the common detectors used in spectrophotometer.
- g) Name the factors which affect thermogravimetric curve.
- h) Name the fuel-oxidant pair having maximum temperature in AAS.
- i) How will you confirm an aromatic system in organic compounds by UV-Visible spectroscopy?
- j) What is the effect of ring size on carbonyl stretching frequency?
- k) In AAS, with what material is the cathode in hollow cathode lamp constructed?
- l) What measures DTA?
- m) The C-H stretching frequency at  $2700\text{ cm}^{-1}$  indicates presence of \_\_\_\_\_.
- n) Mention the types of electronic transitions.
- o) Dilatometry is also known as \_\_\_\_\_.
- p) Define plasma in ICP?

P.T.O.

SECTION - I

Q2) a) Explain in detail principle and instrumentation of TGA. [8]

b) Discuss interferences in AAS. [4]

*no part*  
c) Give a short note on graphite furnace atomic absorption spectroscopy. [4]

Q3) a) Discuss the principle, working and instrumentation of AAS. [8]

b) Give the applications of DTA. [4]

c) Explain the factors affecting the TGA curves. [4]

Q4) Write short notes on the following. [16]

a) Instrumentation of DTA.

b) Explain the steps involved in the formation of inductively coupled plasma.

c) Give the advantages and disadvantages of AAS.

d) Thermometric titrations methods and applications.

SECTION - II

Q5) a) Explain the principle and instrumentation of UV-Visible Spectroscopy. [8]

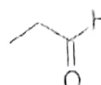
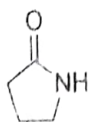
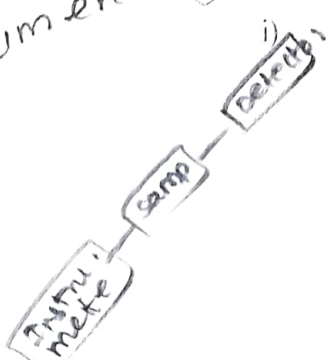
b) Explain fingerprint region in IR spectroscopy. [4]

c) How will you distinguish following pairs on the basis of IR spectroscopy? [4]

*biochemical  
reactions*

*biological  
labs.  
petroleum  
industry.*

*Instrumental analysis*



and

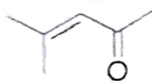


ii)

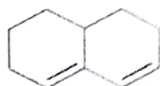
*α decarbonyl*

*heating rate  
performance atmosphere  
crucible geometry  
sample characteristics*

- Q6) a) Discuss the principle and instrumentation of FT-IR. //
- b) Give the applications of UV-Visible Spectroscopy. //
- c) Calculate the  $\lambda_{\max}$  for the following compounds. //



i)



ii)

Q7) Write notes on any four of the following.

- a) State and explain Beer-Lamberts law.
- b) Types of Electronic transitions.
- c) Chromophores and auxochromes.
- d) UTR-FTIR.
- e) Types of Vibrations in IR.
- f) Applications of IR Spectroscopy.

ideal impurities  
in sample



- ① extension of conjugent
- ② detection of chromophore
- ③ detection of geometrical isom
- ④ structure of
- ⑤ Quantitative
- ⑥ Qualitative
- ⑦ strength of H-bond