NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY, JABI - ABUJA.

FACULTY OF SCIENCES
DEPARTMENT OF PURE AND APPLIED SCIENCE
FIRST SEMESTER EXAMINATION 2021[1234]

COURSE CODE: **CHM391**
COURSE TITLE: **PRACTICAL CHEMISTRY V – INORGANIC AND ANALYTICAL**
TIME: **2 HOURS**
INSTRUCTION: **Answer question one and any other three questions.**

QUESTION ONE

1a. For a complex to exhibit charge transfer behavior it must fulfill certain condition. State these conditions.

(2 marks)

1b. With the aid of a block diagram explain the components of a spectrophotometer

(9 marks)

1c. Explain dry ashing and why is it important to exercise caution? (4 marks)

1d. The use of a calibration graph is advantageous in analysis of sample by IR spectroscopy, briefly itemize these advantages (3 marks)

1ei. Acidity in water has several consequences on things in the environment, enumerate these consequences

(4 marks)

1eii. List the various radicals or compounds that contribute to alkalinity of a given sample of water

(3 marks)

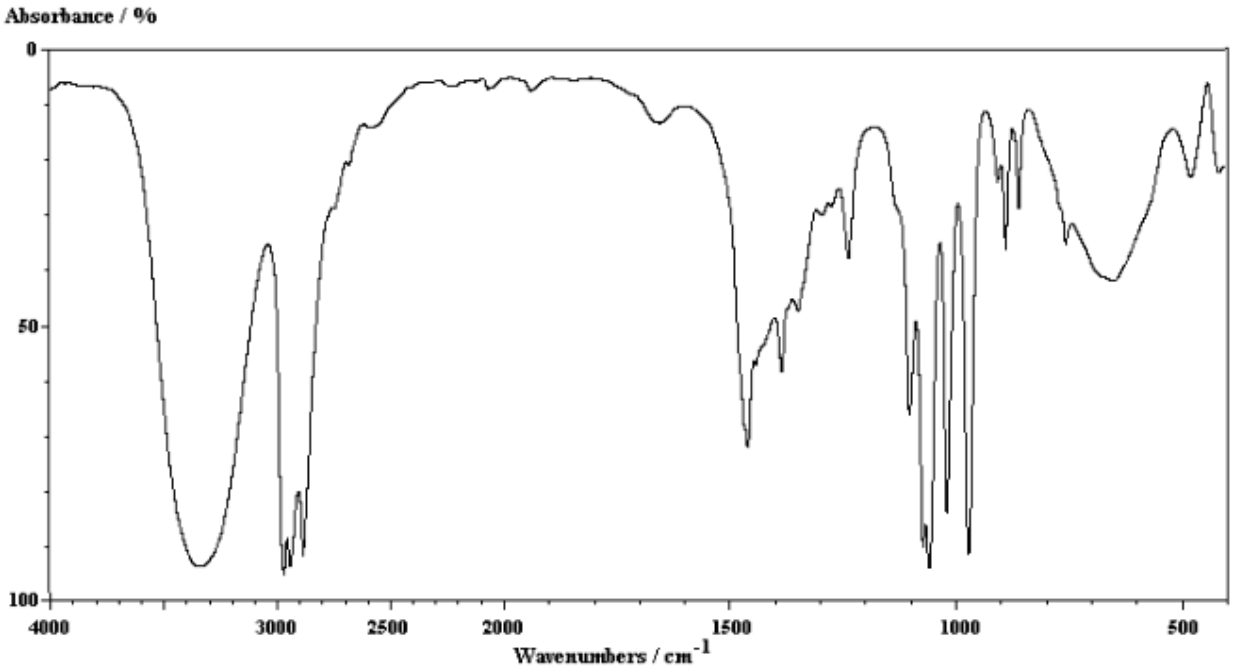
QUESTION TWO

2a. Briefly explain how liquid and solid samples can be prepared for analysis in infrared spectroscopy (6 marks)

2b. List the fundamental types of gravimetric analysis (2 marks)

2c. State the principle underlying all precipitation in gravimetric analysis (3 marks)

2d Using the graph below, list functional groups and respective wavenumber in the IR Spectra (4 marks)



QUESTION THREE

3a. State how CO_2 can be determined experimentally in a sample of water

(6 marks)

3b.Potentiometric titration is more useful or advantageous over visual methods. Explain

(4½ marks)

3c. Determine the concentration of an organic compound whose molar absorptivity was found to be 16800, at absorbance of 2.63 and the cell length is 1cm

(4½ marks)

QUESTION FOUR

4a. Using a graph, determine the concentration of a 1cm (path length) sample that has an absorbance of 0.60 (7 marks)

Absorbance	Concentration (M)
0.27	0.20
0.41	0.30
0.55	0.40
0.69	0.50

4bi. Analytical techniques are based on principles, comment on the principle of UV – Visible spectroscopy

(6 marks)

4bii. How useful is Ultraviolet and Visible Spectroscopy (2 marks

QUESTION FIVE

5a. With an appropriate diagram, explain the procedure for transferring supernatant liquid to a filter paper (8 marks)

5b. What is the total hardness of 20 ml of water sample titrated with 15.0 ml of 0.01 M EDTA solution?

(5 marks)

5c. How would you calibrate a spectrophotometer (2 marks)