NATIONAL OPEN UNIVERSITY OF NIGERIA
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESS WAY,
JABI - ABUJA.
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2024 1 EXAMINATION

COURSE CODE: CHM 306
COURSE TITLE: INSTRUMENTAL METHODS OF ANALYSIS
COURSE UNIT: 2
TIME: 2HOURS
INSTRUCTION: Answer question one and any other two questions.

QUESTION ONE

1(ai) What is polarimetry? (2 marks)

1(aii) The specific rotation of a solute in a solution can be determined through polarimetry. State the formula and define each term.(6 marks)

1(b) Describe mnochromator as a component of a spectrometer in relation to its composition and functions (10 marks).

1(c) Mention at least 6 applications of fluorimeters and state at least seven precautions that must be taken to use it successfully (12 marks)

QUESTION TWO

(2a) How does impurity affect the refractive index of a substance? (4 marks).

2 (b) Describe the underlying principle of polarimeter (11 mark).

2 (c) Describe the relationship between precipitation titration and conductance (5 mark).

QUESTION THREE

(3ai) Differentiate between ordinary light and plane polarized light (2 marks).

3(aii) With the aid of relevant diagrams, illustrate how plane polarized light can be obtained (9 marks)

3(b) Describe how the knowledge of conductance can be used to determine the dissociation constant of a weak acid solution (9 marks)

(b) Jimoh Ltd is into transport; he had ordered and used N560, 000 worth of fuel from Texaco Ltd. However, Jimoh Ltd was able to pay N500, 000 before the end of the accounting year.

Required:

Record the above transaction in the books of Jimoh Ltd and Texaco Ltd **10marks**

(Total 20marks)

QUESTION THREE

(a) List nine (9) examples of non-profit making organization in Nigeria **9marks**

(b) Elucidate the following:

(i) Work-In-Progress **(3marks)**

(ii) Scrap materials **(3marks)**

(iii) Factory overhead cost/expenses **(2marks)**

(iv) Closing stock or raw materials **(3marks)**

(Total 20marks)

QUESTION FOUR

(a) State the advantages of joint venture business **(3marks)**

(b) BELLO sells goods to two organizations on January 1 1995:

TO Mato Ltd	N246,000
TO Jude Ltd	N150,000

He drew bills of Exchange on each of them and they are both accepted. He discounted both of the bills with the bank and suffered discounting charges of N8,000 on Mato's bill and N6,500 on Jude's bill. On maturity, Mato Ltd met its liability. Jude 's bill was discounted and is duly noted with noting charges of N600.

You are required to show the necessary accounts:

(i). In the books of Bello **(10marks)**

(ii). In the books of Mato Ltd and Jude Ltd. **(7marks)**

(Total 20mrks

(Total 15 marks)

QUESTION THREE

a. Johnbull Engineering Company is trying to decide which type of machine tool to buy, of the two types available. Type A costs ₦60,000,000 and the net annual income from three years of its life will be ₦18,000,000, ₦24,000,000 and ₦30,000,000 respectively. At the end of this period, it will be worthless except for scrap value of ₦6,000,000. To buy a type A tool, the company would need to borrow from a finance group at 8%. Type B will last for three years too, but will give a constant net annual cash flow of ₦18,000,000. It costs ₦36,000,000 but credit can be obtained from its manufacturer at 7% interest. It has no ultimate scrap value.

Which investment would be the more profitable? Give reason for your answer. (11 marks)

b. There are basic assumptions underlying the basic discounted cash flow appraisal. Highlight FOUR (4) of these assumptions. (4 marks)

(Total 15 marks)

QUESTION FOUR

Blue Nig. Plc is considering a project having the following cash flow profit.

Year	Outlay ₦	Savings ₦	Running Cost ₦
0	(750,000)	--	--
1		315,000	105,000
2		336,000	147,000
3		630,000	262,500
4		787,500	378,000

The company's cost of capital is 15%

You are required to calculate the net present value of the project.

(Total 15 marks)

QUESTION FIVE

a. Explain the following terms:

(i) Real cash flow (2 ½ marks)

(ii) Money cash flow. (2 ½ marks)

b. A labour saving machine costs ₦72,000 p.a. at current wage rates. The initial outlay of the machine is ₦180,000. The machine is expected to have a four-year life and nil scrap value. The firm's cost of capital is 10%.

Calculate the project's NPV:

i. with no inflation (5 marks)

ii. with general inflation of 15% which wage rates are expected to follow (i.e. synchronized inflation) (5marks)

(Total 15 marks)