NATIONAL OPEN UNIVERSITY OF NIGERIA PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI – ABUJA
FACULTY OF SCIENCES
DEPARTMENT OF CHEMISTRY
2025_2 EXAMINATIONS

COURSE CODE: CHM 312
COURSE TITLE: INDUSTRIAL CHEMICAL PROCESSES
COURSE UNIT: 2 TIME: 2 HRS
INSTRUCTION: Answer question one (1) and any other two questions

QUESTION. 1

1a. (i) Define fermentation. **(2 marks)**
(ii) Give reason why penicillin is considered a secondary metabolite, and when is it produced during fermentation? **(2 marks)**

1b. (i) Describe the two major classes of industrial fermentation? **(6 marks)**
(ii) Explain the unit operations involved in a fermentation product recovery and purification? **(6 marks)**

1c. (i) Define the following: (a)analgesics **(1 mark)** (b) antibiotics **(1 mark)**
(ii) Differentiate between analgesics and antibiotics in terms of mechanism of action. **(4 marks)**

1d. Define (i) polymers **(2 marks)**
(ii) polymerization **(2 marks)**
(iii) Give examples of natural, synthetic, addition and condensation polymers. **(4 marks)**

QUESTION 2

2a. Differentiate between (i) Homopolymers and copolymers
(ii) thermoplastics and thermosets? **(4 marks)**

2b. List two applications each of polymers in the medical field and agricultural industry. **(4 marks)**

2c. **(i)** What is the primary difference between the production of red wine and white wine? **(4 marks)**
(ii) Give reason why fermentation tank is constantly agitated during the fermentation process? **(3 marks)**

2d. Mention four methods used in aging wine and explain why aging is important? **(5 marks).**

QUESTIONS 3

3a. What are Antibiotics? **(2 marks)**

3b. Explain the production process of tetracycline, including the role of fermentation and the significance of the culture medium used. **(10 marks)**

3c. (i) What are the two major types of Styrene Butadiene Rubber (SBR)?**(2 marks)**
(ii) How is the polymerization process terminated in Solution SBR production? **(2 marks)**
(iii) What is the significance of of styrene content in SBR?**(2 marks)**
(iv) What are the advantages of emulsion polymerization for producing E-SBR? **(2 marks)**

QUESTION 4

4a. (i). Give two examples each of chemical pesticides and biopesticides. **(4 marks)**

4a (ii). Fill -in the missing pesticides and pest in the Table below. **(0.5 EACH = 2 marks)**

ii. Pesticides and their target Pests

Ss/n	**PESTICIDE**	**PEST CONTROLLED**
1	**Malathion**	
2		Weeds
3	**Bacillus thuringiensis (Bt)**	
4		Fungi

4b. Describe the production process of pesticides. **(6 marks)**

4c. Classify dyes based on the following: (i) Dyeing process (ii) Chromophore (iii) Source of materials **(8 marks)**

QUESTION 5

5a. (i) What is a flavouring agent? **(2 marks)**

(ii) Briefly discuss natural and synthetic flavoring agents. **(8 marks)**

5b. (i) What are explosives? **(2 marks)**

(ii). Write briefly on the classification of explosives. **(4 marks)**

5c. What are adhesives? Mention four qualities of an adhesive. **(4 marks)**