



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 316
COURSE TITLE: INDUSTRIAL CHEMICAL TECHNOLOGY I
COURSE UNIT: 2
TIME: 2 HOURS
INSTRUCTION: Answer question one and any other two questions.

QUESTION ONE

- 1(a) Explain the following terms: (i) Mass transfer by diffusion (ii) Mass transfer by convection (iii) mass transfer by change of phase
- 1(aii) Name and explain the three modes of heat transfer.
- (1b) Define mass concentration and molar concentration.
- (1bii) Discuss the second law of thermodynamics and its implications for heat flow
- 1(c) State Fick's first law of diffusion and include an equation
- 1 (cii) Explain diffusion velocity.
- 1(di) Give four examples of industrial processes that involve mass transfer operations.
- 1 (dii) Define an exothermic reaction and give one example to explain.

QUESTION TWO

- 2(a) Describe the process of crystallization and its applications. (5 marks)
- (2b) Discuss velocity in a multi-component system (6 marks)
- (2c) Define a unit process and provide examples. (5 marks)
- (2d) Explain eddy diffusion with an example (4 marks)

QUESTION THREE

- (3a) Explain the tubular heat exchanger and its process (6 marks)
- (3b) Define chemical technology and explain its role in the chemical industry. (4 marks)
- (3c) Define molar concentration and mass concentration and include equations (5 marks)
- (3d) Provide five examples of industrial processes involving mass transfer. (5 marks)