

**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 SCIENCES**

**JULY 2018 EXAMINATIONS**

**COURSE CODE: CHM 316**

**COURSE TITLE: INDUSTRIAL CHEMICAL TECHNOLOGY I**

**COURSE UNIT: 2**

**TIME: 2 Hours**

**INSTRUCTION: Question one is compulsory. Answer question one and any other**

**Three questions.**

**QUESTION ONE**

1a) Describe the mechanism of heat transfer. 8 marks

1bi) State the second law of thermodynamics and enumerate on it. 2 marks

1bii) Mention two unit operations that employ heat transfer. 1 mark

1ci) Explain briefly mode of mass transfer by convection. 3 marks

1cii) Mention any two mass transfer operations. 1 mark

1di) Write short note on unit processes. 4 marks

1dii) Draw a flow chart of physical processes of sugar manufacture. 2 marks

1f) What is a reactor, expatiate. 4 marks

**QUESTION TWO**

2a) Enumerate on the unit operation “mixing”. 3 marks

2b) Give the three stages of mixing, and briefly discuss them. 91/2 marks

2c) Differentiate between mixing and agitation. 21/2 marks

**QUESTION THREE**

3) Write a short note on the separation process distillation and adsorption. 15 marks

**QUESTION FOUR**

4a) Discuss briefly gravitational separation and extraction. 9 marks

4b) What is Mass Transfer by Diffusion (Molecular or EddyDiffusion): 6 marks

**QUESTION FIVE**

Explain briefly chemical technology, chemical technology equipment and heat exchangers.

15 marks