

**DEPARTMENT OF CHEMISTRY**  
**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**  
**SECOND SEMESTER EXAMINATION, 2011/2012 SESSION.**

**COURSE CODE: CHM 326**

**UNITS: 2**

**COURSE TITLE: INDUSTRIAL CHEMICAL TECHNOLOGY I.**

**TIME ALLOWED: 1 HOUR 30 MINUTES.**

**INSTRUCTION: ANSWER QUESTION ONE AND ANY OTHER TWO.**

- 1(a) Using Fourier's law, derive an equation that shows the resistance  $R$  between the hot and cool regions where  $A$  and  $Q$  are the same for all layers.
- (b) Adsorption using activated carbon is an operational process in an industry. Mention and explain this operational process.
- (c) List and explain a dryer that contains a series of circular trays mounted one after the other.
- (d) (i) Who design a chemical reactor?  
\* (ii) Explain the design of a chemical reactor.
- 2(a) With the aid of a diagram, explain the application of agitated vessel in the process industry.
- (b) Explain the following: (i) Gate valve (ii) Globe valve (iii) Check valve.
- (c) Enumerate four benefits of conveying system.
- 3(a) Explain convection and radiation as a means of heat transfer.
- (b) Explain continuous stirred tank reactor as a reaction process in the process industry.
- (c) Outline three (3) criteria's for comminution.
- 4(a) Explain filtration as a separation mechanism.
- (b) Explain spray dryer as a slurry drying machine.
- (c) List and explain four (4) equipment for size reduction.