**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**
**MICROBIOLOGY DEPARTMENT**
**FIRST SEMESTER EXAMINATION**
**2017/2018 SESSION**
**COURSE TITLE: FERMENTATION TECHNOLOGY**
**COURSE CODE: MCB 512 (3 units)**

**INTRUCTIONS:** Answer THREE questions in Section A and TWO questions in Section B. All Question carry equal marks
**TIME: $2^{1}/_{2}$ Hours**

**SECTION A**

1(a). (i) Define fermentation from microbiological point of view.
(ii) Mention typical examples of fermentation products
(iii) Name at least one microorganism that is responsible for the production of the following products
(i) yogurt (ii) wine (iii) nail polish (iv) vinegar

1(b) Write short notes on the following:
(i) Batch fermentation
(ii) Baffles
(iii) Spargers
(iv) Growth media
(v) Crude media

2(a). Outline the procedures for the production of the following products in the laboratory
(i) yogurt (ii) pickled cucumber (iii) beer
(b) What is a fermenter?

3(a). Draw a generalized schematic representation of a typical fermentation process.
3(b). Differentiate between single stage continuous fermentation and single stage recycle continuous fermentation.

4(a). Materials used for designing a fermentor have some important functions. Discuss.
4(b). Explain why each and every industry that carryout fermentation process may face contamination problem.

**SECTION B**

5(a) What is downstream processing? With the aid of a diagram summarised the major steps
involve in the downstream processing.

5(b). Discuss vividly the last two steps in the downstream processing.

6(a) Define balance growth and unbalance growth. Why do shift – up and shift – down Experiment cause cells to enter unbalance growth.

6(b). Why would cell that are vigorously growing when inoculated into fresh culture medium have a shorter lag phase than those that have been stored in a refrigerator?

7(a). What are the principles behind the following purification techniques

(i) Cell disruption
(ii) Centrifugation
(iii) Concentration
(iv) Chromatography
(v) Liquid – liquid extraction

7(b). List the two phases in chromatography.