FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA
SCHOOL OF LIFE SCIENCES
DEPARTMENT OF MICROBIOLOGY

FIRST SEMESTER EXAMINATION 2015/2016 SESSION

COURSE CODE: MCB 512
COURSE TITLE: FERMENTATION TECHNOLOGY (3 UNITS)
CLASS: 500 LEVEL
TIME: 2 HOURS
Instruction: Attempt two (2) questions in each section

Section A

1. (a) Assume you carry out a serial dilution on palm wine and discover that the original number of cells in one litre of your sample was 8, 000 yeast cells. How many yeast cells will be present in 10 hours if the generation time is 30 minutes (assume unlimited food and clean environment)? What is the entire yeast population in the sample if you have 12 litres?

   (b) i. What is industrial fermentation?
   ii. Describe homolactic fermentation, heterolactic fermentation and glycolysis.

2. (a) A food handler in the student cafeteria suffering from typhoid fever inoculated fruit salad with 100 cells of *Salmonella typhi*. After 10 hours of preparing the salad, it was discovered that the food now contains 3 million cells of the pathogen. How many generations have occurred? What is the duration of each generation?

   (b) i. Discuss the process of hydrogen gas production during fermentation
   ii. What is the productivity of a culture system?

3. (a) As a bakery manager, assume that baker's yeast divides every 30 minutes. You inoculate 5 kilograms of dough with 500, 000 yeast cells. After 3 hours, how many yeast cells will be present in the dough? Let's say that for every 1 million yeast cells, one kilogram of dough is made to rise, how long will it take to bake the bread?

   (b) i. Describe a chemostat.
   ii. Enumerate the benefits and negative effects of food fermentation to man

Section B

1. (a) Define a bioreactor. Enumerate the basic functions of a fermenter.

(b) Outline the uses of *Saccharomyces* species in the production of foods and beverages.

2. (a) “Foaming is a major problem in fermentation process”. Discuss

   (b) Discuss three types of foods produced through lactic acid fermentation?

3. (a) Write short notes on the following:

   (i) Sparger

   (ii) Stirrer Glands and Bearings

   (iii) Baffles

   (b) Outline the major steps in the production of beer and wine