UNIVERSITY OF GHANA

BSC. ENGINEERING FIRST SEMESTER EXAMINATIONS: 2017/2018

DEPARTMENT OF FOOD PROCESS ENGINEERING

FPEN 311: INTRODUCTION TO BIOTECHNOLOGY (2 Credits)

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER THREE QUESTIONS.

TIME ALLOWED: TWO (2) HOURS

1.

a. Modern biotechnology techniques can be applied to manipulate and alter the genetic material of different organisms. Using a specific example, describe the complete process involved in the modification of microbial genetic material to produce a food additive.

b. What are the key considerations in designing a fermenter?

2.

a. Discuss the benefits associated with the fermentation of traditional African foods.

b. Nucleic acids are the basic store of genetic information in all cells. Explain in detail how the structure and function of nucleic acids allows the storage, decoding and usage of genetic information.

c. Golden Rice is an example of a genetically modified organism. Briefly explain the modification.

3.

a. Briefly explain the following
   i. Primary metabolism in microorganisms
   ii. Southern Blot Technique
   iii. Polymerase Chain Reaction
   iv. Fed-Batch fermentation
   v. Plasmids

b. Describe the essential features of a typical Aerated Stirred Tank Batch Fermenter.

4.

a. Discuss the options available for downstream processing of products generated through industrial microbiology.

b. Using flow diagrams, describe in detail the process for the production of the following products
   i. Yoghurt
   ii. Dawadawa

5.

a. Discuss the key ethical issues that arise in response to the application of modern biotechnology techniques.

b. Differentiate between the fermentation processes applied in making Gari and Dawadawa.

c. Briefly explain the following
   i. Identification of a bacteria cell that has been transformed with rDNA
   ii. The use of Reverse Transcriptase in Genetic Engineering