UNIVERSITY OF GHANA

BSC. ENGINEERING FIRST SEMESTER EXAMINATIONS: 2016/2017

DEPARTMENT OF FOOD PROCESS ENGINEERING

FPEN 311: INTRODUCTION TO BIOTECHNOLOGY (2 Credits)

INSTRUCTIONS: ***ANSWER QUESTION ONE (1) AND ANY OTHER THREE QUESTIONS***

TIME ALLOWED: ***TWO (2) HOURS***

1. The manipulation and alteration of genetic material of an organism are the key underlying principles of modern biotechnology techniques. Use the basic steps in genetic engineering to explain in detail how conventional corn can be genetically modified to be resistant to the RoundUp herbicide.

2.

a. Explain the need for complementary DNA and describe in detail the process of its synthesis.
b. Identify five (5) features that you would consider as critical in designing a fermenter. Give reasons for your selection.
c. Briefly comment on plasmids and how are they used in Genetic Engineering?

3.

a. Nucleic acids are the basic store of genetic information. Discuss the composition of nucleic acids and explain how the stored information is decoded and used.
b. Discuss the options available for downstream processing of products generated through industrial microbiology.
c. Differentiate between Batch, Continuous and Fed-Batch Fermentation.

4.

a. Discuss how biotechnology can be used to address food security in Ghana. Use specific examples to support your answer.
b. Explain the Central Dogma of Genetics.
c. Differentiate between primary and secondary metabolism in microorganisms? Why are they important?

5. Traditional biotechnology or fermentation is one of the oldest methods of food processing.

a. Select a food or beverage product obtained using traditional biotechnology and describe in detail the process for its production. Highlight product characteristics developed through the fermentation process.
b. State the factors that impact the quality and safety of the food product.
c. How would you improve the current process?