



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR 1ST SEMESTER
MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE RENEWBLE
ENERGY

COURSE CODE: IPT 331

COURSE TITLE: BIOPROCESS ENGINEERING

DATE: 18th January 2018

TIME: 9:00 – 11:00 a.m.

INSTRUCTIONS TO CANDIDATES

Answer Question one (1) and any other two (2) Questions. Question one is compulsory and carries 30 marks, the other Questions carry 20 marks each.

TIME: 2 Hours

This paper consists of 2 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

Question 1.

- a) In the context of industrial biotechnology, define
 - i. fermentation (2 Marks)
 - ii. bioprocess engineering (2 Marks)
 - iii. Enzymology (2 Marks)
 - iv. Broth (2 Marks)
- b) With examples, distinguish between biotechnology services and biotechnology products (5 Marks)
- c) State and briefly describe major considerations in media design (5 Marks)
- d) State the three basic components/biological basis of a bioreactor (5 Marks)
- e) What is the purpose of a bioreactor? (3 Marks)
- f) State how a bioprocess engineer can improve process economics (4 Marks)

Question 2

Briefly describe microbial cell design for products or services (20 Marks)

Question 3

Discuss the physicochemical parameters of a bioreactor (20 Marks)

Question 4

Describe the phases of microbial growth in a batch bioreactor (20 Marks)

Question 5

Distinguish between upstream and downstream processing in industrial fermentation (20 Marks)