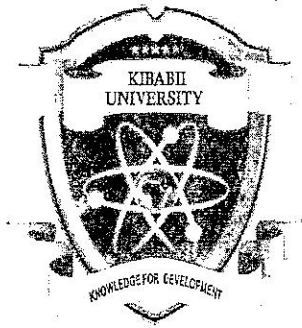


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(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE RENEWBLE
ENERGY

COURSE CODE: IPT 331

COURSE TITLE: BIOPROCESS ENGINEERING

DATE: 11/12/2019 TIME: 3:00PM

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



KIBABII UNIVERSITY EXAMINATIONS

Question 1

- a) Define Bioprocess Engineering (2marks)
- b) What is a bioreactor?(2marks)
- c) Define the term microbial growth (2marks)
- d) Write short notes of expression of a gene in a heterologous host(5 marks)
- e)
 - i)What is Mass transfer? (2marks)
 - ii) Name the processes in which mass transfer occurs (5marks)
- f)
 - i) Explain fed batch culture (3marks)
 - ii) Explain batch culture (3marks)
- g) What is the origin of plasmid replication? (4marks)
- h) What is heat transfer? (2marks)

Question 2

Discuss upstream downstream bioprocessing (20 marks)

Question 3

With examples explain the industrial applications of enzymes (20 marks)

Question 4

Discuss various requirements for microbial growth (20 marks)

Question 5

Describe the use of algae as a source of bioenergy (20 marks)