MACHAKOS UNIVERSITY

University Examinations for 2019/2020Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

DIPLOMA IN MECHANICAL ENGINEERING

MED-PR 312 ENGINEERING DESIGN II

DATE: 19/10/2020 **TIME: 8.30-10.30 AM**

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (30 MARKS)

a) State the principle of each of the following with regard to Jig and Fixture design.

i. Clamping

ii. Location (10 marks)

b) Outline Five ways in which jigs and fixtures differ. (5 marks)

c) Explain the advantages of using jigs and fixtures in the following:

i. Productivity;

ii. Interchangeability and quality; (10 marks)

d) Illustrate the use of an indexing jig. (5 marks)

QUESTION TWO (20 MARKS)

a) Explain the following features of jigs and fixtures.

i. Foolproofing;

ii. Clearance;

iii. Rigidity and stability;

iv. Safety. (8 marks)

b) Sketch Four types of drill bushes used in Jig design. (12 marks)

QUESTION THREE (20 MARKS)

a) State TWO advantages of each of the following sources of power:

i. Solar

ii. Hydropower. (4 marks)

b) Design Two simple machines capable of extracting juice from mangoes. (10 marks)

c) Describe any Two forms of green energy. (6 marks)

QUESTION FOUR (20 MARKS)

a) Define the following costs of production, giving Two examples in each case

i. Direct cost;

ii. Material cost. (8 marks)

b) Outline Four purpose of cost estimation in production of a product. (8 marks)

c) Describe the procedure for estimating direct labour cost of a product. (4 marks)

QUESTION FIVE (20 MARKS)

a) With the aid of a sketch, explain generation of power from biomass. (8 marks)

b) Define the following terminologies as used in power generation and illustrate their application:

i. Turbine

ii. Solar panel

iii. Transformer (12 marks)