

MACHAKOS UNIVERSITY

University Examinations 2019/2020

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:

TIME:

INSTRUCTIONS

Answer Question 1 (COMPULSORY) and any other TWO questions.

You need the following for this examination:

- Drawing instruments,
- Scientific calculator.

1. (a) State the principle of each of the following with regard to Jigs and Fixtures design.
 - (i) Location;

(ii) Clamping. (10 marks)
- (b) Sketch FOUR types of drill bushes in Jigs design. (12 marks)
- (c) With the aid of a sketch, explain the point location principle. (8 marks)
2. (a) State TWO requirements of the clamping system in jigs and fixtures. (4 marks)
- (b) List FOUR uses of clearances in Jig design. (8 marks)
- (c) With aid of a sketch explain the following types of locators:
 - (i) Support pad,
 - (ii) Adjustable pin. (8 marks)

3.(a) Explain redundant location. (4 marks)

(b) Illustrate the following clamps in their application :

- (i) Latch-type clamp ;
- (ii) Equalizing clamp.
- (iii) Cam-operated clamp.

(16 marks)

4(a) Define the following costs of production, giving TWO examples in each case:

- (i) Material cost,
- (ii) Direct cost.

(8 marks)

(b) Design a simple machine capable of extracting juice from sunflower seeds.

Explain how your machine works.

(12 marks)

5.(a) State TWO advantages of hydropower. (2 marks)

(b) Explain the following terms:

- (i) Turbine,
- (ii) Solar power,
- (iii)Transformer.

(6 marks)

(c) Explain four forms of green energy. (12 marks)