



# MACHAKOS UNIVERSITY

University Examinations 2017/2018

## SCHOOL OF ENGINEERING AND TECHNOLOGY

### DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

#### SECOND YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN MECHANICAL ENGINEERING

##### MED-PR 215: PRODUCTION TECHNOLOGY II

DATE: 18/12/2017

TIME: 8.30-10.30 AM

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#### INSTRUCTIONS

This paper consists of *FIVE* questions

Answer question *ONE* (compulsory) and any other *TWO* questions

#### SECTION A (COMPULSORY) - 30 MARKS.

1.
  - a) State any **Five** areas of application for gears. (5 marks)
  - b) State any **Three** materials used in the manufacture of gears. (3 marks)
  - c) Describe any **Five** factors which need to be considered in the selection of gear materials. (10 marks)
  - d) Describe the following methods of manufacturing gears.
    - i Casting
    - ii Metal removal
    - iii Metal forming (12 marks)

#### SECTION B (ATTEMPT ANY TWO QUESTIONS FROM THIS SECTION)

2. Describe any **Five** gear finishing operations. (20 marks)
3. Describe the following surface finishing processes.

- a) Super finishing
  - b) Grinding
  - c) Lapping
  - d) Polishing
  - e) Honing (20 marks)
4. a) Differentiate between cutting and forming operations as used in press work. (4 marks)
- b) Define the following terms as used in press work.
- i. Blanking
  - ii. Punching
  - iii. Drawing
  - iv. Squeezing (8 marks)
- c) In the design of press tools certain requirements have to be met. List any **Five** of them. (5 marks)
- d) State any **Three** advantages of hydraulic presses over mechanical presses. (3 marks)
5. a) Define the following terminologies in press work.
- i. Bed
  - ii. Punch plate
  - iii. Stroke
  - iv. Punch
  - v. Bolster plate (10 marks)
- b) Define the term '**Spring back**' and explain how allowances are made to compensate for its harmful effects (4 marks)
- c) Estimate the blanking force to cut a blank 25mm wide and 30mm long from a 1.5mm thick metal strip, if the ultimate shear stress of the material is  $450\text{N/mm}^2$ . Also determine the work done if the percentage penetration is 25 percent of the material thickness. (6 marks)