



MACHAKOS UNIVERSITY

2018/2019 ACADEMIC YEAR

SCHOOL OF ENGINEERING AND TECHNOLOGY

MECHANICAL ENGINEERING DEPARTMENT

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN
MECHANICAL ENGINEERING.**

MED-PR 215

PRODUCTION TECHNOLOGY II

Instructions

- This Examination Contains **Two** sections A and B.
- Section A is compulsory
- Attempt any other **Two** questions from section B.

Section A (compulsory) - 30 marks.

1(a) (i) Differentiate between cutting and forming operations as used in press work.

(4 mks)

(ii) Define the term spring back and explain how allowances are made to compensate for its harmful effects.

(4 mks)

(b) Calculate the diameter of a hole that can be punched in a 1.5mm thick aluminium plate if the punching force is limited to 40KN and the ultimate shear strength of the plate is 90N/mm².

(4 mks)

(c) Explain the working principle of a radiation pyrometer as a means of measuring furnace temperature with the aid of a sketch. (12 mks)

(d) Describe any THREE factors to consider in the selection of gear materials. (6mks)

SECTION B (ATTEMPT ANY TWO QUESTIONS FROM THIS SECTION)

2(a) State any FIVE areas of application for gears (5mks)

(b) Describe the following methods of manufacturing gears.

(i) Casting

(ii) Metal forming. (8mks)

(c) Describe the following methods of gear finishing

(i) Gear Shaving. (3mks)

(ii) Gear burnishing. (4mks)

3 (a) Define the following terms as used in press work.

(i) Blanking

(ii) Punching

(iii) Squeezing (6mks)

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b) List any THREE requirements which have to be met in the design of press tools.

(3mks)

(c) In a punching operation, 10mm diameter holes are punched in a plate which is 5mm thick. If the shear strength of the material of the plate is 320N/mm^2 . Determine;

(i) The force that must be applied to the punch. (6mks)

(ii) The work done in punching the hole, assuming the force on the punch to remain constant during the punching process. (5mks)

4(a) State and explain any FIVE requirements which need to be met by heat treatment furnaces. (10mks)

(b) With the aid of a sketch describe the working principle of an electrically heated furnace stating TWO advantages and TWO limitations. (10mks)

5. (a) Describe the following metal finishing processes.

i) Honing (2mks)

ii) Buffing (2mks)

iii) Lapping (2mks)

iv) Polishing. (2mks)

(b) Describe the following methods of surface preparation processes.

(i) Descaling

(ii) Deburring

(iii) Degreasing (6mks)

(c) Explain the following metal coating processes.

(i) Galvanising

(ii) Electroplating (6 mks)

