



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSC ABE. II

COURSE CODE: ABE 207

TITLE OF PAPER: WORKSHOP TECHNOLOGY

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO
OTHER QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

SECTION I COMPULSORY

QUESTION 1

- a) Define the following properties of engineering materials:
 - (i) Toughness; [3 marks]
 - (ii) Strength; [3 marks]
 - (iii) Malleability; [3 marks]
 - (iv) Hardness. [3 marks]

- b) List the measurements you can obtain using a try square. [8 marks]

- c) Steel is the most commonly used metal for workshop processes. Classify the major groups of steel and give examples where the groups are mainly used. [10 marks]

- d) Sharpening of tools in rural Africa has been done on stones accompanied by water. Discuss the use of water in sharpening tools with a critic on the common practice of using a power grinding stones without water. [10 marks]

SECTION II ANSWER ANY TWO QUESTIONS

QUESTION 2

- a) Figure 1 shows the teeth of a heavy duty power saw blade.
 - i. Name the labelled angles. [3 marks]
 - ii. What are the uses of the angles? [6 marks]

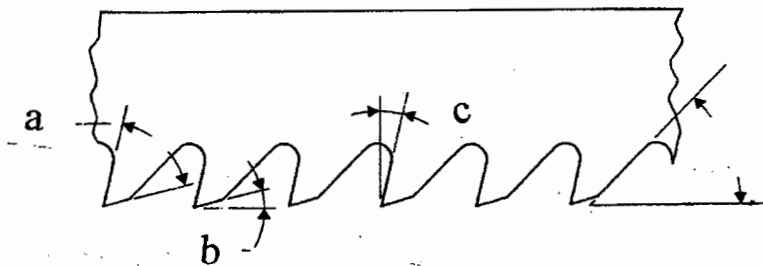


Figure 1. Arrangement of cutting teeth of a power saw blade.

- b) Name five common types of files used in agricultural workshops [10 marks]
- c) Distinguish between a hand file and a flat file? [3 marks]
- d) Black board chalk is widely used during filing operations.
- What is the function of chalk in the filing process? [3 marks]
 - How does chalk achieve the functions in (i) above? [5 marks]

QUESTION 3

- a) Grid electricity has made the operation of agricultural workshops very productive. What are the advantages and disadvantages of using power tools [8 marks]
- b) What are the advantages and limitations of using cold rolled steel in agricultural workshops? [10 marks]
- c) Figure 2 shows a variety of punches used in workshop processes.
- Name the punches [4 marks]
 - Name the uses of each of the punches in the figure. [8 marks]

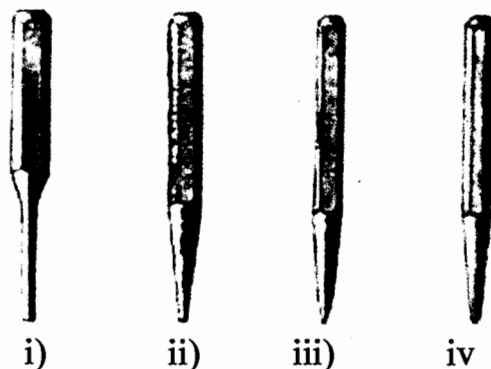


Figure 2. Types of punches

QUESTION 4

- a) Describe two major types of joints used to assemble components together and give examples of where they are used.

[4 marks]

Give advantages and disadvantages of each type of the joints above.

[8 marks]

- b) (i) Define welding.

[3 marks]

Conventional understanding of welding tends to be associated with arc welding that requires electricity supply to the workshop.

- (ii) State the different types of welding.

[5 marks]

- (iii) Which type of welding can be used in off-grid regions of Swaziland?

[2 marks]

- c) An electrode for arc welding has the mark E6013 showing its group according to ISO (International Standards Organisation). Explain the information expressed in the group mark.

[8 marks]