



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: BSC ABE. II

COURSE CODE: ABE204

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) What measurements can determine using a try square? [4 marks]
- b) Define the following properties of engineering materials:
- (i) Toughness; [3 marks]
 - (ii) conductivity; [3 marks]
 - (iii) Hardness. [3 marks]
- c) Steel is the most commonly used metal for workshop processes.
- (i) What steels constitute plain carbon steel? [4 marks]
 - (ii) Name one example of application steel in (i) above. [4 marks]
- d) Figure 1 shows two methods filing metals.
- (i) Name the methods [2 marks]
 - (ii) State the expected of quality of surface obtained. [2 marks]
 - (iii) State the most appropriate application of each method. [2 marks]

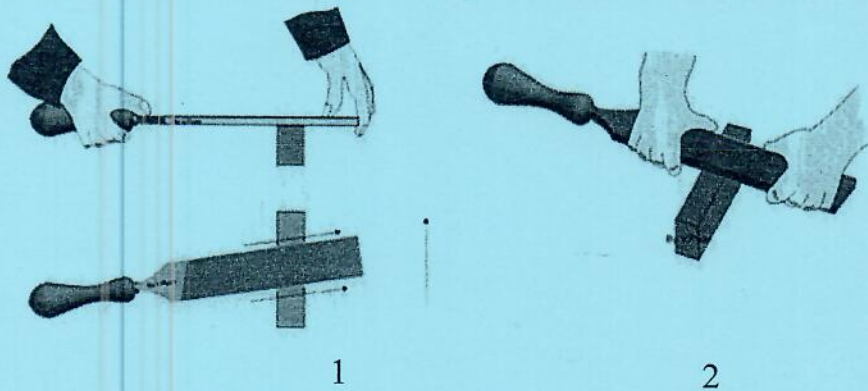


Figure 1 Filing metals using a hand file.

- e) Figure 2 shows a stationary drill press using a belt-pulley drive system. An electric motor runs at 1800 rpm and drives a pulley whose diameter is 150 mm. If the diameter of spindle pulley 150 mm, determine
- (i) The speed of the spindle. [5 marks]
 - (ii) The cutting speed with which the material is being removed to drill a 10 mm hole. [4 marks]
 - (iii) The material that must be extracted, if a hole is drilled through a 40x5 mm flat bar. [4 marks]

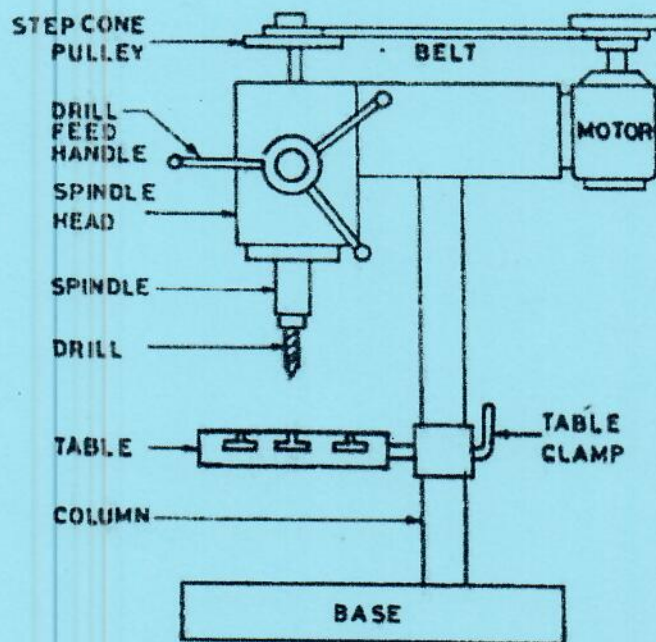


Figure 2 A common workshop bench drill

SECTION II ANSWER ANY TWO QUESTIONS**QUESTION 2**

- a) Figure 3 shows the teeth of a heavy duty power saw blade.
- Name the labelled angles. [3 marks]
 - Discuss the effects of the angles on the life of the tool and the quality of the work produced. [9 marks]

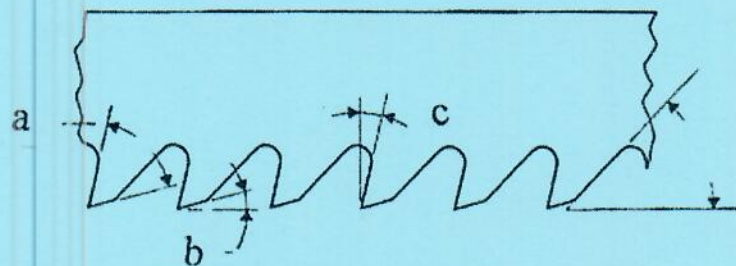


Figure 3. Angles of cutting teeth of a power saw blade.

- b) Teeth-set is a common term used on cutting blades
- Name the common types of teeth-set. [4 marks]
 - What is the function of a blade tooth-set in cutting metal? [4 marks]
- c) What characteristics are used to classify a file? [6 marks]
- d) Figure 4 shows a bench-vice holding a long work-piece. Discuss the considerations taken when mounting the bench-vice on the workbench for such operations. [4 marks]

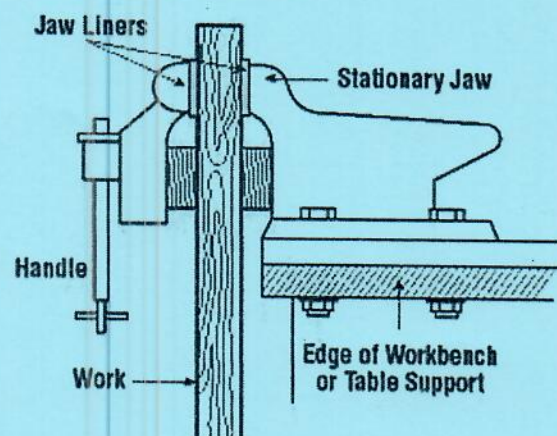


Figure 4 Mounted bench-vice workbench combination

QUESTION 3

- a) Grid electricity has made the operation of agricultural workshops very productive. What are the advantages of using power tools [5 marks]
- b) Most fabrications in agricultural workshops utilize hot rolled steel materials. Discuss the advantages of using hot rolled steel for farmstead fabrication processes. [10 marks]
- c) Figure 5 shows a variety of chisels used in workshop processes..
- (i) Name the chisels [5 marks]
- (ii) Name the uses of each of the chisels in the figure. [10 marks]

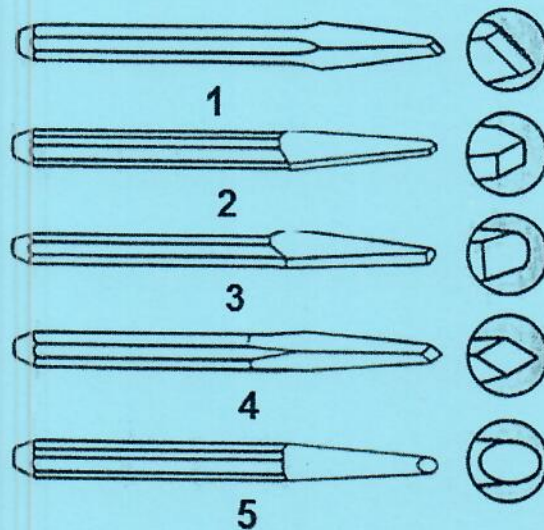


Figure 5. Types of chisels

QUESTION 4

- a) Most fabricated components are assemblies and subassemblies of individual work-pieces that have been joined together.
- i. Distinguish between joining and assembly [4 marks]
- ii. Name the five methods of joining parts together. [5 marks]
- iii. For each method, state whether the method produces a permanent or temporary joint. [5 marks]

- b) What advantages do adhesives have over mechanical or heat joints
[5 marks]
- c) Figure 6 shows common joints used to connect two metals together.
Name the joints in Figure 6.
[5 marks]

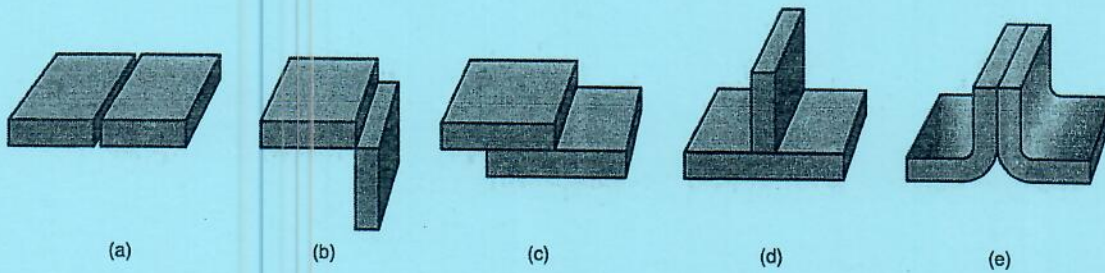


Figure 6 Common joints of solids

- d) Figure 7 shows hacksaw blades displaying information about features on the blade. Interpret the features that are displayed on the blades.
[6 marks]



Figure 7 Information of features of hacksaw blades.