



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: BSC LWM. II**

**COURSE CODE: LUM 207 (NEW PROGRAMME)**

**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 are the most common causes of accidents in an agricultural workshop? Suggest any five safety precautions that should be followed during workshop operations.  
[10 marks]
- b) **Figure 1** (attached) contains a list of common hand tools found on farms and in agricultural businesses.  
i. Identify and name the tools used for marking during workshop processes.  
ii. What precautions would you take to care for the hand tools in the workshop?  
[10 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) Name the squares shown in Figure 2 (attached).  
[4 marks]

What care for the squares would ensure that good accuracy is maintained?

[6 marks]

**SECTION II      ANSWER ANY TWO QUESTIONS**

## QUESTION 2

- a) What features are used to fully describe a file? [3 marks]
- b) You have a farm workshop in rural Swaziland and there is not wire brush to clean the file. How can protect the file from being quickly blocked burrs using common materials available? [5 marks]
- c) Write short notes on draw filing and cross filing indicating their differences in filing process, quality of surface finish achieved and applications under which each method is used. [10 marks]
- d) Metals are commonly shaped by cutting. What factors affect the penetration of cutting tools used and how do these factors influence the life span of the tools and the quality of work produced? [12 marks]

### QUESTION 3

- a) Figure 3 (attached) shows forms in which steel is commonly sold at the hardware stores in Swaziland.
- (i) Name the various forms marked A,B,C,D,E,F. [3 marks]
  - (ii) Give common dimensions that are used to describe the forms [3 marks]
- b) Discuss the advantages and limitations of using cold rolled steel as compared to hot rolled steel in agricultural workshops. [10 marks]
- c) Figure 4 (attached) shows a bracket for workbench. Two such brackets are required per workbench whose top dimensions are 1,5m x 0.9m x 5mm. Prepare a bill of quantities for ten workbenches for ordering from a local hardware store. [14 marks]

**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) Define welding.

[3 marks]

Conventional understanding of welding tends to be associated with arc welding that requires electricity supply to the workshop. Is it possible to still weld in off-grid rural Swaziland? In case it is possible, state the type of welding that would be used.

[5 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]

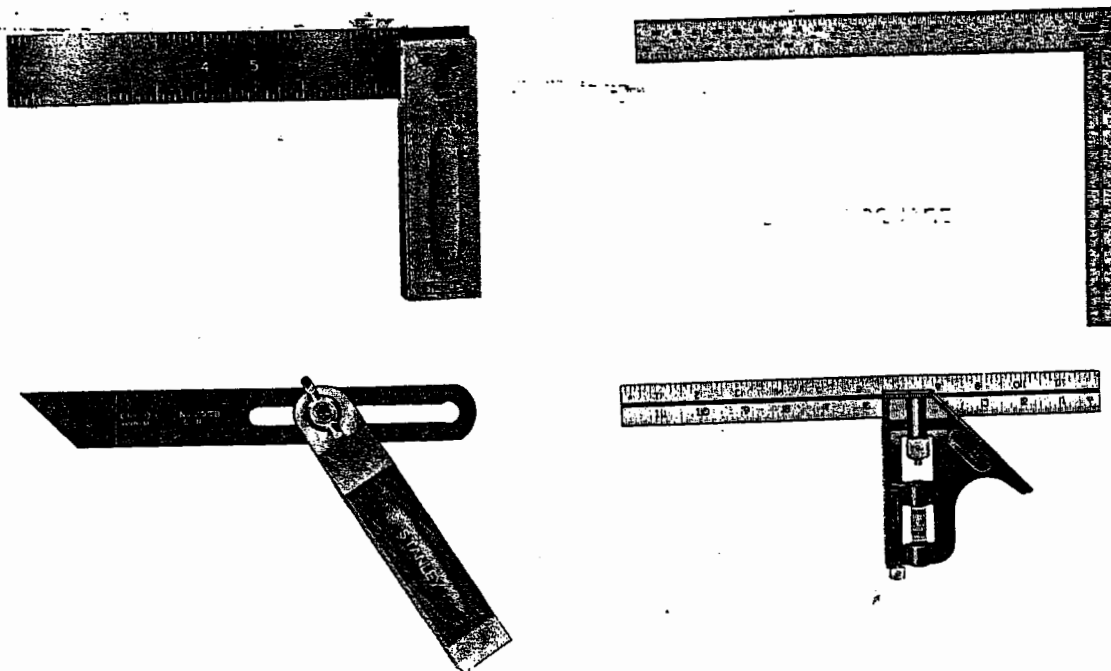


Figure 2. Squares for surface measurements

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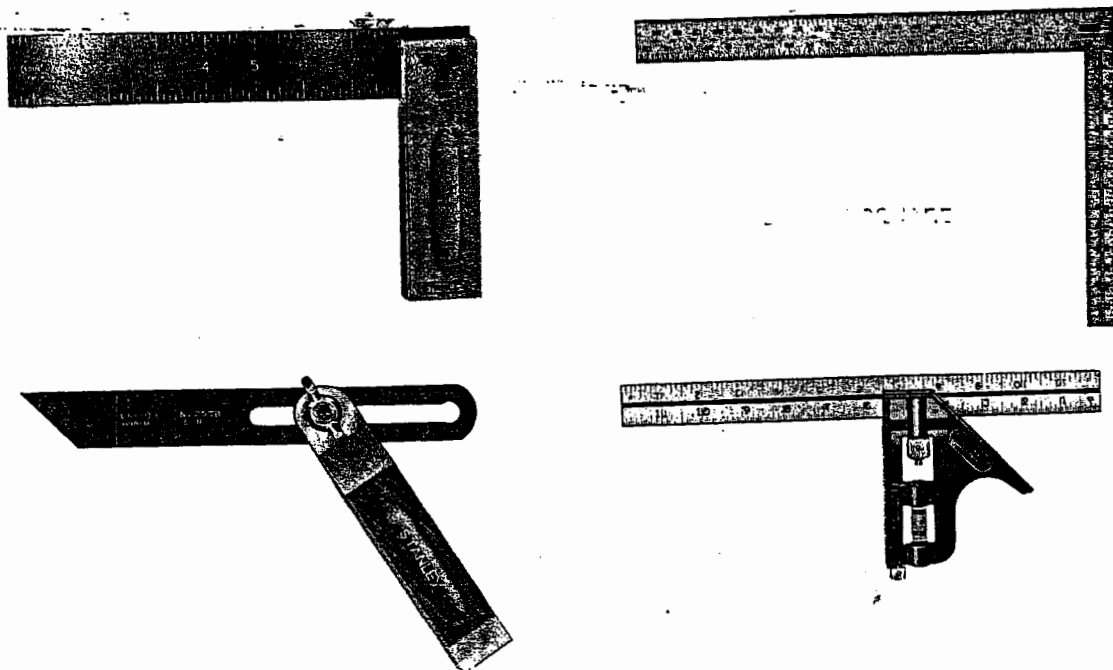


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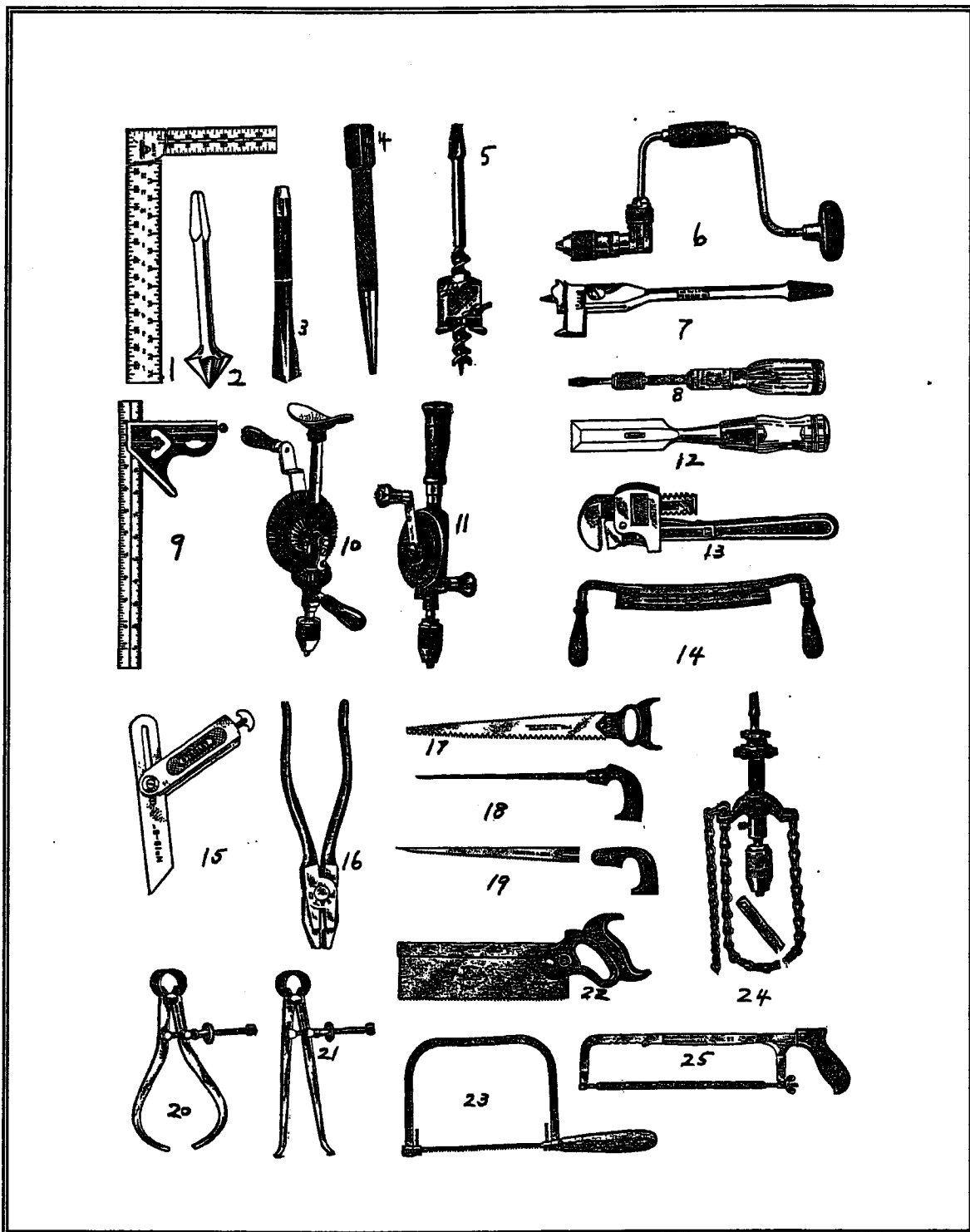


Figure 1. Common hand tools for an agricultural workshop.

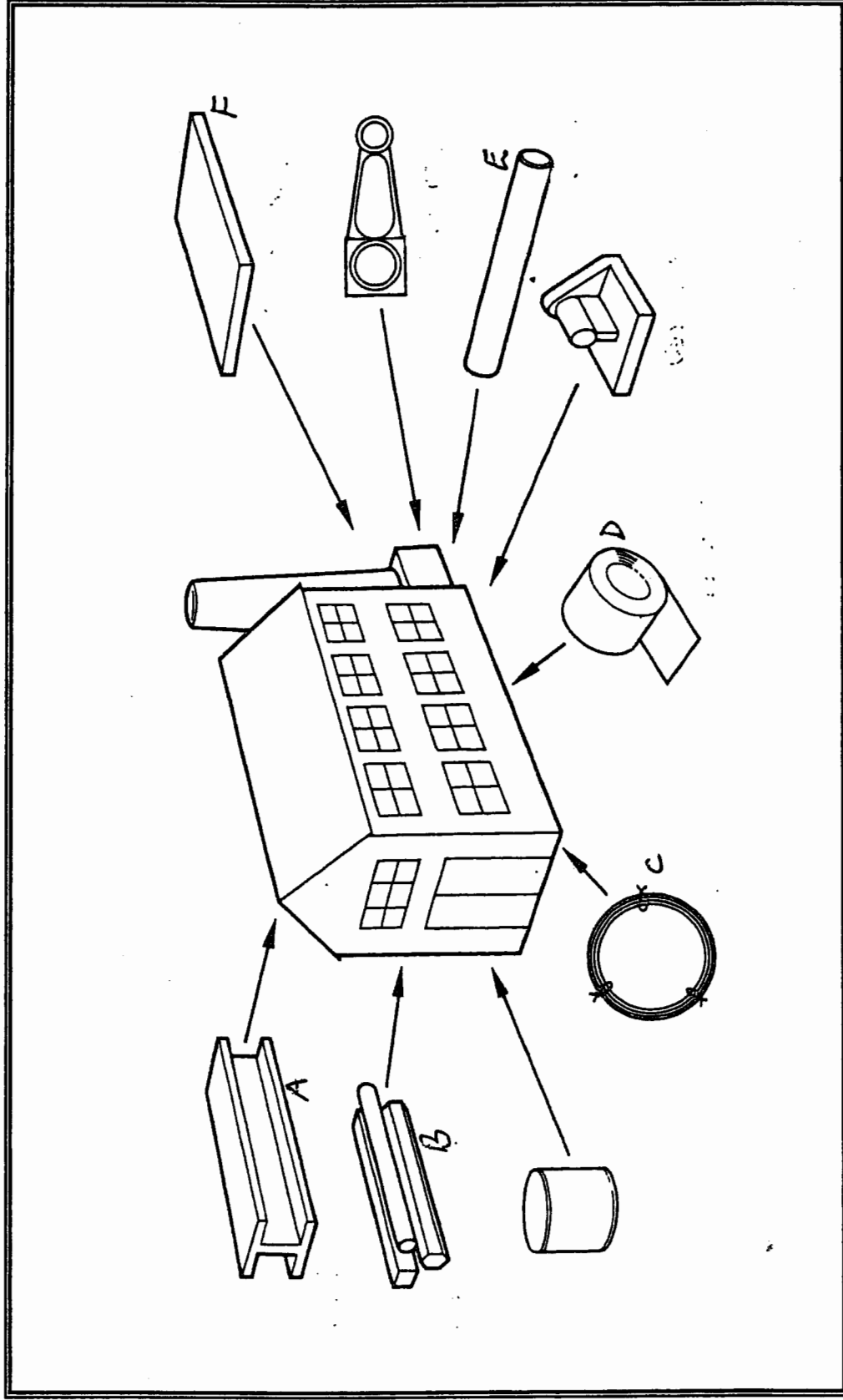


Figure 3. Forms of steel supplied on the market.

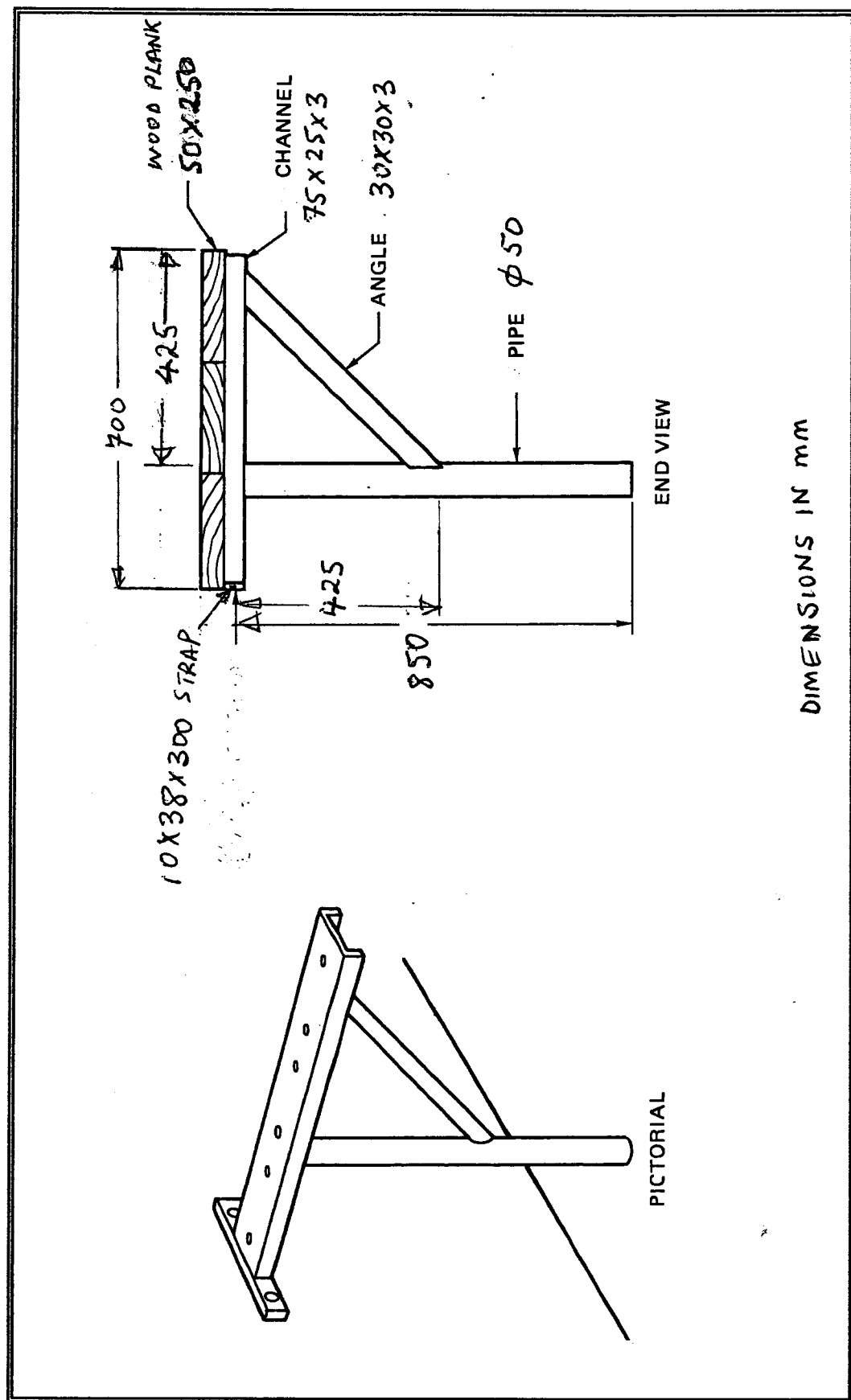


Figure 4. Workbench bracket.