



**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) Name the common classifications of accidents that occur at work?  
[8 marks]
- b) Briefly discuss the three elements that must be present for fires to propagate.  
[6 marks]
- c) Distinguish the three types of fires that are common in workshop practices.  
[6 marks]
- d)
- i. Name any five alloying elements.  
[5 marks]
  - ii. State the effects of alloying elements in (i) on the properties of the base metals  
[5 marks]
- e) 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]

**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 you lack a wire brush to clean the file. How can you protect the file from being quickly blocked by burrs using common materials available? [5 marks]
- c) Comment on the traditional practice of our grandparents sharpening their hand tools on stones and pouring water on the tools. Relate your comment to the common sharpening methods in agricultural workshops. [10 marks]
- d) Metals are commonly shaped by cutting.
- i. What factors affect the penetration of cutting tools used? [6 marks]
- ii. How do these factors influence the life span of the tools and the quality of work produced? [6 marks]

**QUESTION 3**

- a) (i) Define welding. [4 marks]
- (ii) 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? [3 marks]
- (ii) In case it is possible, state the type of welding that would be used. [3 marks]

- b) Define the following properties of engineering materials:
- (i) Toughness;
  - (ii) Strength;
  - (iii) Malleability;
  - (iv) Hardness.
- [12 marks]
- c) What are the technical processes that a product undergoes before its commissioning to use?
- [8 marks]

**QUESTION 4**

- a) Discuss the two major methods of joining metals.
- [10 marks]
- b) 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.
- [12 marks]
- c) (i) Distinguish between natural and synthetic engineering materials.
- [4 marks]
- (ii) Name two examples of materials in each group
- [4 marks]