



**UNIVERSITY OF ESWATINI
MAIN EXAMINATION PAPER**

PROGRAMME: BSc AGRICULTURAL AND BIOSYSTEMS ENGINEERING 1

COURSE CODE: ABE101

TITLE OF PAPER: AGRICULTURAL ENGINEERING PRINCIPLES

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

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CHIEF INVIGILATOR

SECTION 1: COMPULSORY QUESTION**QUESTION 1**

- a. Discuss two of the reasons why recycling is an important component of waste management processes. **[10 Marks]**
- b. Discuss why potatoes are cheaper per unit weight than fried chips. **[8 Marks]**
- c. Describe how you could store the following food items and why you choose that method. **[12 Marks]**
- i. Peanut butter.
 - ii. Soy sauce
 - iii. Mayonnaise
- d. Describe any two of the factors that contribute to waste generation in cities. **[10 Marks]**

SECTION II: ANSWER ANY TWO (2) QUESTIONS**QUESTION 2**

- a. Describe the difference between weather and climate change. **[7 marks]**
- b. List four human activities that are likely to induce climate change. **[8 marks]**
- c. Discuss with the aid of a diagram how the basic trigonometry principle led to the use of an isosceles triangle to measure height of objects in land surveying. **[4 marks]**
- d. Explain how the basic trigonometry principle led to the design of an Abney level or clinometer. **[2 marks]**
- e. Discuss in detail how the levelling principle of a device that focuses on a horizontal plane and a height measuring instrument was used to develop the modern surveyor's level

and the levelling staff. [4 marks]

f. A surveyor measured the distance of a section of an irrigation mainline, which was found to be 3.140 m upper stadia and 2.500 m lower stadia at the other end. Calculate the length of the mainline section. [2 Marks]

g. State the two categories of mechanics used in agricultural engineering. [1 Marks]

h. What are the two most common loading patterns in agricultural buildings and structures? [2 marks]

QUESTION 3

a. Why is safety necessary in a farm workshop? [6 Marks]

b. There are different types of hazards in farm workshops

- i) Name the types of hazards in a farm workshop. [4 Marks]
- ii) State one example for each type of hazard in farm workshop. [4 Marks]

c. With the aid of a diagram explain the 'fire triangle' that is necessary for propagating fire. [6 Marks]

d. Calculate the magnitude of the forces L and M in Figure 1. [5 Marks]

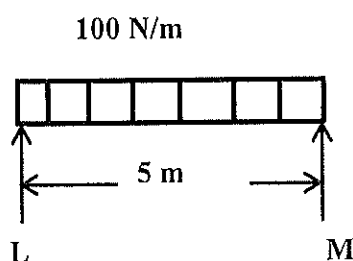


Figure 1. Concrete ring beam loading.

e. Describe the two types of farm tasks with examples. [5 Marks]

QUESTION 4

a. Discuss the environmental and socio-economic impacts that should be considered when establishing an irrigation project. **[20 marks]**

b. Discuss two (2) advantages of animal power over human and tractor power. **[10 marks]**