



# MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

KRM 201: AGRICULTURAL FIELD ENGINEERING

DATE: 26/7/2019

TIME: 8.30-10.30 AM

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## INSTRUCTIONS:

Answer question one and any other two questions

- a) Differentiate between the following terms:
  - i. Drilling and precision planting systems (2 marks)
  - ii. Back sight (BS) and fore sight (FS) (2 marks)
  - iii. Compression and power engine strokes (2 marks)
  - iv. Furrow and border irrigation systems (2 marks)
- b) Land suitability Classes reflect degrees of suitability. Name and explain three land suitability classes (6 marks)
- c) Describe three (3) methods used during hitching of farm machinery (6 marks)
- d) Explain the procedure of calibrating a seed drill (7 marks)
- e) Explain the factors that affect amount and distribution of precipitation (5 marks)
- f) Explain five (5) main parts of the reciprocating engine (5 marks)
- g) With the aid of a sketch briefly describe the herringbone milking parlour (3 marks)

**SECTION B: ANSWER ANY THREE (3) QUESTIONS (60 MARKS)**

**QUESTION TWO**

- a) Suggest one firing order of a tractor engine and explain why that firing order is in that sequence (10 marks)
- b) Explain the functions of the following systems of a tractor machine:
- i. Power-take-off (PTO) system (2 marks)
  - ii. Lubrication system (4 marks)
  - iii. Hydraulic system (4 marks)

**QUESTION THREE**

- a) Explain five (5) factors that influence the response of crops to fertilizer application (10 marks)
- b) A distance between point A and B was measured by a 30 m tape. After measuring 1820 m, the tape was re-checked and found to have stretched to 30.128 m. The surveyor continued with further measurements and at the end, re-checked again the tape and discovered that it had stretched further to 30.175 m. If the total distance between A and B was found to be 3km under these conditions, find the distance between these points if the correct length of the tape had been used (10 marks)

**QUESTION FOUR**

- a) Explain five (5) advantages of drip irrigation compared to the other irrigation systems (10 marks)
- b) A slope distance of 640m was measured using a 20m tape. If the percentage slope of the land was 16%, calculate the correct horizontal distance of the measured line. Assume that the tape was checked before and after fieldwork and found to be of standard length (10 marks)

**QUESTION FIVE**

- a) Explain the actions taken for the purpose of tractor maintenance after it has been operating for the following hours:
- i. 10 hours (5 marks)
  - ii. 200 hours (5 marks)
- b) Table Q1 was extracted from profile leveling field note book where a farm road needs to be constructed. The readings marked 'A' to 'F' were illegible.

Table Q1: Proposed farm road measurements

<b>BS</b>	<b>IS</b>	<b>FS</b>	<b>HI</b>	<b>Reduced Level</b>
0.618			A	20.480
	1.654			B
	C			19.898
2.135		D	E	18.988
	1.231			F
		0.991		20.132

Based on the table, determine the missing readings and carry out the arithmetic check  
(10 marks)