



*"Investing in Africa's Future"*

**COLLEGE OF HEALTH, AGRICULTURE & NATURAL  
SCIENCES**

**NAAE 211: FARM POWER AND MACHINERY**

**END OF SECOND SEMESTER SUPPLEMENTARY EXAMINATIONS**

**JULY 2022**

**LECTURER: MR. W. ZENDERA**

**DURATION: 3 HOURS**

***INSTRUCTIONS***

1. Answer ALL question in Section A                      20 Marks

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2. Answer four questions in Section B                      80 Marks

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Use the answer booklet provided

Begin the Answer for each question on a new page

3. Begin Your Answer for Each Question on a New Page

## Section A

(Answer All Questions, 20 Marks)

Name the part of the seed drill that performs the following functions:

Write the terms which matches the following statements:

1. Part of the mouldboard plough the helps to counteract the side pressure exerted by the furrow slice. [2 marks]
2. A flat, rolling disc with sharpened edge which provides clean smooth furrow wall by cutting the furrow vertically. [2 marks]
3. A heavy duty tool designed to operate below the normal depth to break the plough pan. [2 marks]
4. A PTO driven implement used for quick seedbed preparation and soil tillage. [2 marks]
5. An accessory shaped like a miniature plough which cuts a small ribbon of soil and helps deflect standing trash. [2 marks]
6. Match the following tractor system with the components. [10 marks]

Systems	Components
Electrical systems	Oil bath filter
Cooling system	Drain plug
Fuel system	Thermostat
Air intake system	Distributor
Lubrication system	Carburetor

## Section B

### (Answer Any Four Questions, 80 Marks)

#### Question 1B

- a) Describe the adjustments made on a combine harvester. [10 marks]
- b) Name the parts of a combine that performs the following functions:
- i. Cutting the standing crop, [2 marks]
  - ii. Conveying and feeding the cut material to the threshing material, [2 marks]
  - iii. Threshing or removal of seed from the head or pod, [2 marks]
  - iv. Separating the seed and chaff from straw, [2 marks]
  - v. Cleaning the chaff and other debris from seed. [2 marks]

#### Question 2B

- a) Describe the effect of the following adjustments on a disc plough.
- Spacing between discs [3 marks]
  - Horizontal angle [3 marks]
  - Tilt angle [3 marks]
- b) Describe the mode of function of the two most common types of agitators in sprayers. [4 marks]
- c) You have a 6 m boom with 8 nozzles spaced at 75 cm apart. The average output nozzle is 3.5 l/min the sprayer is equipped with 380 litre tank and will be used at a speed of 6.4 km/hr.
- i. Calculate the application rate in l/ha for this sprayer. [3 marks]
  - ii. If atrazine is to be sprayed in this field at a rate of 2.5 litres per ha. How many litres of atrazine will be required will be needed for the 380 litre tank? [4 marks]

#### Question 3B

- a) With the aid of a diagram describe the general equipment failure pattern. [5 marks]
- b) Explain the possible causes of the following types of smoke in diesel engines:
- i. White smoke. [5 marks]
  - ii. Black smoke. [5 marks]
  - iii. Blue smoke. [5 marks]

### Question 4B

- a) Differentiate between renewable and non-renewable energy sources. [4 marks]
- b) Define an energy audit. [2 marks]
- c) Explain energy hybrid systems and give their advantages. [8 marks]
- d) What factors would you consider before deciding on an energy source to adopt at a farm. [6 marks]

### Question 5B

- a) Briefly describe the purpose of each of the following tractor accessories:
  - i. Tractor cabin, [2 marks]
  - ii. Three point linkage system, [2 marks]
  - iii. Differential lock, [2 marks]
  - iv. External hydraulics, and [2 marks]
  - v. Independent brakes. [2 marks]
- b) Discuss the functions performed by the tractor lubrication systems. [7 marks]
- c) What precautions should be taken when switching from a non-detergent to a detergent oil? [3 marks]

### Question 6B

- a) Explain how you would make the following adjustments on an ox-drawn mouldboard plough:
  - i. Adjustment of depth, [3 marks]
  - ii. Adjustment of width. [2 marks]
- a) With the aid of diagrams briefly describe the following gang assemblies on disc harrows:
  - i. Single acting, [5 marks]
  - ii. Tandem, and [5 marks]
  - iii. Offset. [5 marks]

**End of Examination Paper**