

W1-2-60-1-6

 **JOMO KENYATTA UNIVERSITY**

 **OF AGRICULTURE AND TECHNOLOGY**

 **University Examinations 2012/2013**

**YEAR IV EXAMINATION FOR THE DEGREE OF BACHELOR OF PROCESSING ENGINEERING**

**ABE 2406: MACHINERY FOR CROP PROTECTION AND HARVESTING**

## DATE: AUGUST 2012 TIME: 2 HOURS

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

1. a) Discuss the role of crop protection as a management procedure during crop

 growth in relation to crop yields and income for the commercial farmer. (6 marks)

 b) i) Explain briefly the meaning and importance of calibration of

 spraying equipment. (4 marks)

 ii) Describe the procedure for calibration of a boom sprayer in the

 laboratory. (4 marks)

 c) i) Explain four modes of action through which pesticides kill insect pests.(4 marks)

 ii) Differentiate between modes of action between contact and

 systemic herbicides. (2 marks)

2. a) Describe the method of controlling pests through use of fumigation for:

 i) Soil-borne insects in the field. (2 marks)

 ii) Weevils in bags of maize in a store. (2 marks)

 b) i) Why are viral crop diseases more difficult to control than those

 caused by other pathogens. (4 marks)

 ii) Give two cultural and two biological methods of controlling

 crop diseases. (4 marks)

 c) Write short notes on the following:

 i) Safety precautions in the use of agricultural chemicals. (4 marks)

 ii) Drift during spraying and its control. (3 marks)

3. a) Describe the sequential processes and the equipment used at each stage of

 making baled hay from green grass. (8 marks)

 b) Manure spreader 2.5m wide is operating at 6.4KPH. If the machine takes 15 min.

 to turn at the headlands for every hour of operation, determine:

 i) The time, in hours, required to cover45 ha. field. (1½ marks)

 ii) The area (in ha) covered if the speed and the turning time are

 changed to 6.8Kph and 12 min respectively. (1½ marks)

 c) i) With the aid of schematic diagram, describe the operation of a row

 crop forage chopper using flail type of chopping rotor. (6 marks)

 ii) Give three methods by which length of the cut of forage material

 could be varied. (3 marks)

4. a) i) With the aid of block flow diagram explain and show the direction flow of

 material through combine from standing wheat to the cleen grain. (6 marks)

 ii) Explain FOUR combine adjustments necessary to ensure efficient

 operation and minimization of crop losses during harvesting process.(2 marks)

 b) i) Describe FOUR parameters / factors an engineer has to consider when

 designing root harvesting machines. (4 marks)

 ii) Using a simple sketch explain the operation of a potato spinners. (4 marks)

 c) Describe two methods of harvesting tree fruits mechanically. (4 marks)