

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE, BACHELOR OF SCIENCE IN HORTICULTURE, BACHELOR OF SCIENCE IN ANIMAL SCIENCE AND BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION

AGEN 331: INTRODUCTION TO AGRICULTURAL FIELD MACHINES

STREAMS: BSC(AGRI, HORT, ANSC, AGED) Y3S1

TIME: 2 HOURS

DAY/DATE: THURSDAY 13/12/2018

11.30 A.M – 1.30 P.M

INSTRUCTIONS:

- **This paper contains seven questions**
- **Answer all questions in section A and any other two in section B**

SECTION A (30 MARKS) ANSWER ALL QUESTIONS

- (a) Discuss four main objectives of mechanizing agriculture. [8 marks]
 - (b) Define “soil tillage” for agricultural purpose. [2 marks]
- (a) Differentiate between primary soil tillage and secondary soil tillage. Name two implements used in each type of soil tillage. [5 marks]
 - (b) Define the following terms used in soil tillage:
 - (i) Draught [2 marks]
 - (ii) Scouring [2 marks]
- A soil has a particle density of 2.65 gm/ cm^3 and a bulk density of 1.34 gm/ cm^3 . Calculate the percent total pore space (TPS) in this soil. [6 marks]
- (a) With the aid of a diagram, name the basic parts of a mould board plough bottom. [3 marks]
 - (b) Explain the functions of the disc angle in a disc plough. [2 marks]

SECTION B (40 MARKS) ANSWER TWO QUESTIONS

5. (a) With the aid of diagrams, explain the functions of three main types of disc harrows.

[6

marks]

(b) (i) Define the term 'calibration' as carried out on a grain drill planter. [2 marks]

(ii) In a full width calibration test of a 20 by 200 mm grain drill, 30 turns of the drive wheel yielded 3.5 kg of wheat seed. If the rolling circumference of the drive wheel is 3.7m, determine the seeding rate for this grain drill planter. [6 marks]

(c) Explain four functions of a seed planter. [6 marks]

6. (a) With the aid of a diagram, name the basic parts of a chemical boom sprayer.

[6

marks]

(b) Explain five classifications of chemical spray (give droplet sizes). [5 marks]

(c) Discuss five basic operations performed by a combine harvester in recovering seeds.

[5

marks]

(d) With the aid of a diagram, show the basic parts of a combine harvester cleaning unit.

[4

marks]

7. (a) A 5 metre combine harvester moves at a speed of 1.5 metres per second and in one minute 400 kg of materials enter the header. Of this amount, 180 kg enters the grain tank and the remaining 220 kg of material is discharged through the combine on to the field. Determine the following for this combine harvester.

(i) Field capacity [2 marks]

(ii) Material capacity [2 marks]

(iii) Throughout capacity [2 marks]

(b) With the aid of a diagram, name the basic parts of a forage chopper (harvester)

[6

marks]

(c)(i) Name two types of hay conditioning machines. [2 marks]

(ii) Name three types of mowers used to cut hay. [3 marks]

(d) Explain three possible causes of excessive amount of unthreshed seed. [3 marks]
