MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 374: FARM MACHINERY

DATE: 16/11/2020 **TIME: 8.30-10.30 AM**

INSTRUCTIONS:

Answer *ALL* questions from Section A and any other *TWO* from Section B:

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE (30 MARKS)

a) Distinguish between machinery and farm mechanisation as used in agricultural machinery (4 marks)

b) Describe five ways of classifying machinery used in agricultural field (5 marks)

c) Explain the following as used in farm machinery.

i. Effective Field Capacity (2 marks)

ii. Unit Draft (2 marks)

d) Distinguish four differences between the use of a disc plough and disc harrow. (4 marks)

e) Explain three adjustments needed on a disc harrow for adequate penetration in a wheat farm (3 marks)

f) Describe two types of ferti-drills in a disc type furrow openers (2 marks)

g) Explain four care and maintenance of a sprayer (4 marks)

h) Operation of cutting crops is achieved by four different actions. Explain the four actions as required in harvesting of crops (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

a) Farm machinery are of different types and use. Explain four points to be considered in selecting a farm machinery. (8 marks)

b) Discuss the components of a duster used in spraying locust in Garissa. (8 marks)

c) Seed metering mechanism may be of several types depending on size of land and cost. Describe two main mechanism that may be used in large scale production. (4 marks)

QUESTION THREE (20 MARKS)

a) There are different losses experienced in grain field. Discuss five grain combine losses and straw combines in wheat field. (10 marks)

b) A combine was tested for harvesting wheat and following observations were recorded:
Total area harvested = 78 m^2, Total time required = 65 seconds, Total material left over the rack =18 kg, Free seed over the rack =150 gms, Unthreshed seed over the rack = 120 gms, Free seed over the shoe = 530 gms, Unthreshed seed over shoe = 150 gms, Total material left over shoes = 8 kg, Net grain collected in the tank = 34 kg.
Calculate:

i. Seed yield and total loss in kg/hectare (2 marks)

ii. Cylinder loss (2 marks)

iii. Rack loss (2 marks)

iv. Shoe loss (2 marks)

v. Total grain loss as percent of total yield (2 marks)

QUESTION FOUR (20 MARKS)

a) Machinery recommendations must be based on the characteristics of each individual farm. Discuss the factors that influence machinery selection, in order of importance. (10 marks)

b) Total draft of four bottom, 30 cm MB plough when ploughing 15 cm deep at 5 kmph speed is 1500 kg. Determine:

i. Unit draft in kg/cm^2 (4 marks)

ii. Actual power requirement? (3 marks)

iii. If the field efficiency is 75% the rate of doing work in ha/hr. (3 marks)

QUESTION FIVE (20 MARKS)

a) There are defined steps in calibration of seed drill or seed-cum- fertilizer drill. Discuss the ten steps needed in the calibration of this sowing equipment. (10 marks)

b) Cultivators are used as a secondary implement, but some farmers use in making lines in manual planting. In reference to its use, describe the two types of cultivators clearly bringing out their differences. (5 marks)

c) Mower is a machine to cut herbage crops and leave them in swath. Discuss the conventional parts of the mower. (5 marks)