

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2014/2015**

**YEAR 3 SEMESTER II EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN LAND RESOURCES PLANNING AND MANAGEMENT**

**ABE 2304: TILLAGE AND PLANTING MACHINERY**

**DATE: April 2015 TIME: 2 HOURS**

**INSTRUCTIONS: Answer questions ONE (Compulsory) and any other TWO questions**.

**QUESTION ONE (COMPULSORY)**

1. i. List four main objectives of tillage. (4marks)

ii. With the aid of a labelled sketch explain the functions of the main components of a mouldboard plow body. (10marks)

1. Each body of a 3-body mouldboard plow cuts 32 cm wide and 16 cm deep in a soil of unit resistance of 1230 kg per meter of width at a forward speed of 5.4 KPH. If the average idle travel is 12 min in each hour of operation, determine:
2. The effective field capacity of the plow (3marks)
3. The 8-hour days required to plow a 360 ha field if the idle travel is 10 min/hour (4marks)
4. The tractor draw bar power required to pull the plow. (3marks)
5. i. A rotary tiller produces negative resistance during operation. Discuss. (3marks)

ii. Compare the construction and the operation principles of plain roller and pulveriser (3marks)

**QUESTION TWO**

1. i. What are the objectives of secondary tillage? (4marks)

ii. Why is it necessary to everlap part of the area covered during the proceeding trip in operation of tandem disc harrow? (4marks)

1. Give four factors that affect the soil penetration of a disc harrow. (8marks)
2. What are the advantages of spring tine harrow over spike tooth harrow? (4marks)

**QUESTION THREE**

1. Using a simple labeled diagram describe the operation of an air planter using vacuum metering unit. (6marks)
2. i. What is the need or objective of calibrating a planting machine? (4marks)

ii. The row spacing of a two-unit maize planter is 100 cm. For every revolution of an 80 cm diameter drive wheel, the 14-cell seed plate rotates 2 times, dropping two seeds per cell. Calculate:

1. The spacing of seed within the row. (5marks)
2. Plant population per hectare if all the seeds germinate. (5marks)

**QUESTION FOUR**

1. i. Explain briefly the operation of pto driven seed distributor. (6marks)

ii. Give two methods used to change the seed rate (2marks)

1. Discuss the importance of routine maintenance of agricultural machines (6marks)
2. Planning, scheduling and decision making are important management tools in mechanization. Discuss. (6marks)

**QUESTION FIVE**

1. Write short notes on the following:
2. The role plant breeding and genetic engineering may play in country’s food security. (8marks)
3. Use of farmyard manure and slurry to increase soil fertility. (6marks)
4. Costing is an important operation in commercial farming enterprise. Discuss. (6marks)