



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF AGRICULTURE AND FOOD SECURITY**

**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN BACHELOR IN  
SCIENCE AGRICULTURAL EDUCATION**

**3<sup>RD</sup> YEAR 2<sup>ND</sup> SEMESTER 2023/2024 ACADEMIC YEAR**

**CENTRE: SIAYA CAMPUS**

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**COURSE CODE: SES 3311**

**COURSE TITLE: FARM POWER AND MACHINERY**

**EXAM VENUE: STREAM: BSc AGED**

**DATE: ../04/2024 EXAM SESSION:**

**DURATION: 3 HOURS**

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**Instructions**

- 1. Answer question all question in SECTION A (Compulsory) and ANY other two questions in SECTION B**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

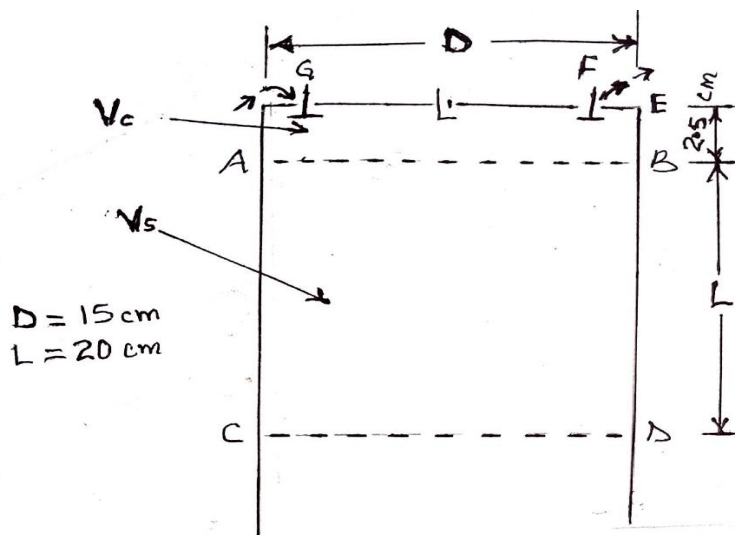
**SECTION A: Attempt all questions**

**QUESTION ONE (10 Marks)**

a) Explain in brief what you understand by the following in relation to this course  
(5 Marks)

- i. Power
- ii. Farm power
- iii. Mechanical power
- iv. Yoke

b) Below is a diagram of engine cylinder. Use it to answer the questions that follow.  
(5 Marks)



**Fig Q 1(b)**

- i. The part marked F is called?
- ii. The part marked G is called?
- iii. Name the part marked  $V_c$
- iv. The letter D represents?
- v. The letter L represents?

**QUESTION TWO (20 Marks) (Compulsory)**

a) Use Fig Q1(b) to answer the questions that follow  
i. Calculate the swept volume ( $V_s$ ) of the engine (3 Marks)

ii. Calculate the total Volume of the engine (3 Marks)

b) The figure below, Fig Q2 (b) shows a type of harnessing used with draft animals. Use it to answer the questions that follow.

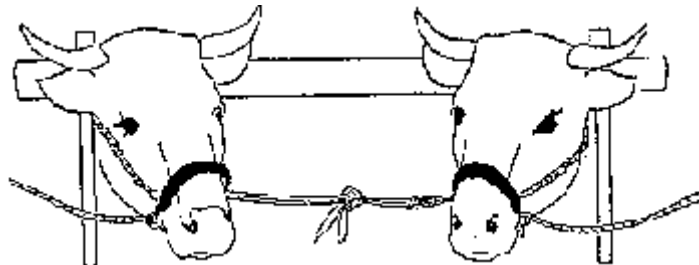
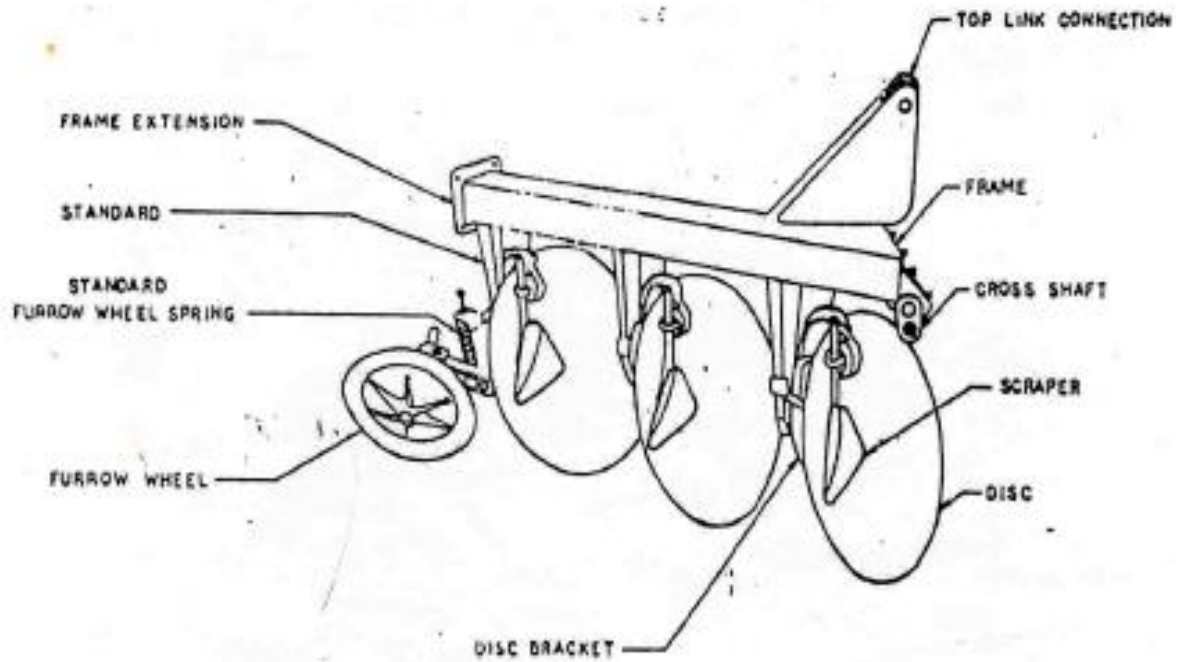


Fig m

- i. This type of harness is called? (1 Mark)
  - ii. Generally what is the purpose of harness in the use of animal draft power? (2 Marks)
  - iii. Under what circumstances is this type of harness suitable (4 Marks)
  - iv. This type of harness is not good for equines but good for cattle family. Briefly discuss this statement. (4 Marks)
- c) The implement shown below is said to be suitable where soil erosion control is required. Very briefly justify this statement (3 Marks)



**SECTION B: Attempt any two question; the questions carry same marks**

**QUESTION THREE (20 Marks)**

In conventional primary tillage two commonly used implements are mouldboard plow and disc plough. Discuss each giving the description, mode of operation, conditions best suited for use, adjustments, advantages and disadvantages (20 Marks)

**QUESTION FOUR (20 Marks)**

In most parts of the country large tracks of land lie fallow. The farmers stick to subsistence type of farming which is not even able to suffice their own household needs. Farmers use old traditional implements whose capacity can only open very limited area per season. Most often the land preparation season comes at a time when hunger hangs all over the nation and farmers are too weak to work their fields. This scenario has led to perennial food insecurity and poverty in the rural areas of Kenya. Discuss how you can revolutionize this scenario to create food security and wealth by applying the knowledge you have gained in this course

**QUESTION FIVE (20 Marks)**

- a) Briefly discuss the working principle of a four stroke petrol engine; simply outline the key events in each of the four strokes. (10 Marks)
- b) Discuss the factors that influence selection of a tractor for use in a particular farm (6 Marks)

**QUESTION SIX (20 Marks)**

- a) Answer the following

- i. What do you understand by the term depreciation as concerns machinery economics (2 Marks)
  - ii. What are the factor which affect depreciation of a machine? (Briefly discuss) (3 Marks)
  - iii. Taking into account time value of money, compute the value of farm tractor at the end of the third year of its purchase given the following information (5 Marks)
    - Total purchase cost Ksh 4,500,000
    - Cost of a set of new pneumatic tyres = Ksh 280,000
    - Economic life = 15 Yrs
    - Salvage value = Ksh 450,000
    - Company rate of interest = 7%
    - $F=P(1+i)^n$
- b) A farm machinery can be acquired through any of the following means: ***direct purchase, hire or lease***. Briefly discuss each giving any advantages and disadvantages of one over the others (10 Marks)