NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMMERCE, HUMAN SCIENCE AND EDUCATION

DEPARTMENT OF TECHNICAL, VOCATIONAL EDUCATION AND TRAINING

QUALIFICATION: NUST BRIDGING PROGRAMME (TVET AGRICULTURE STREAM)	
QUALIFICATION CODE: 04NBTA	**LEVEL: 4**
COURSE CODE: FOF412S	**COURSE NAME: FUNDAMENTALS OF FARM MECHANIZATION**
SESSION: NOVEMBER 2024	**PAPER: 1**
DURATION: 3 HOURS	**MARKS: 100**

FIRST OPPORTUNITY EXAMINATION PAPER	
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MODERATOR:	Mr Mungalisa Ocacious Mungalisa

INSTRUCTIONS
1. ANSWER ALL THE QUESTIONS. 2. READ ALL THE QUESTIONS CAREFULLY BEFORE ANSWERING. 3. NUMBER THE ANSWERS CLEARLY

THIS QUESTION PAPER CONSISTS OF _5_ PAGES (INCLUDING THIS FRONT PAGE)

Section A: Multiple Choice Questions [20 marks]

1. What is the primary objective of farm mechanization? (2 marks)

a) To expand farm acreage

b) To minimize labour requirements

c) To enhance soil fertility

d) To conserve water resources

2. Which of the following is not an advantage of using tractors in farming operations? (2 marks)

a) Time efficiency

b) Lower fuel consumption

c) Enhanced land preparation

d) Increased crop yield

3. What role does Draught Animal Power (DAP) play in Namibian agriculture? (2 marks)

a) It is more costly than tractors.

b) It is primarily used in urban farming.

c) It enables farmers to cultivate larger areas than manual labour alone.

d) It requires specialized technical expertise.

4. Why is adequate lighting crucial in a workshop setting? (2 marks)

a) To improve the aesthetics of the workshop

b) To reduce electricity consumption

c) To ensure safety and precision during operations

d) To facilitate nighttime work

5. Which of the following materials is most suitable for constructing durable workshop walls? (2 marks)

a) Wood

b) Plastic

c) Concrete blocks

d) Glass

6. Which type of tractor is characterized by having only two wheels and being operated by a person walking behind it? (2 marks)

a) Four-wheel tractor

b) Walking tractor (Power tiller)

c) Crawler tractor

d) Track-type tractor

7. Which type of engine operates by burning fuel outside the engine cylinder to generate mechanical work? (2 marks)

a) Internal Combustion Engine

b) External Combustion Engine

c) Diesel Engine

d) Two-Stroke Engine

8. Which component of a four-stroke engine is responsible for igniting the air-fuel mixture? (2 marks)

a) Intake Valve

b) Exhaust Valve

c) Spark Plug

d) Piston

9. In a two-stroke engine, how frequently does the piston fire? (2 marks)

a) Once every two revolutions

b) Once every four revolutions

c) Once every revolution

d) Twice every revolution

10. What is the alternative name for a crawler tractor? (2 marks)

a) Wheel tractor

b) Power tiller

c) Track-type tractor

d) Walking tractor

Section B: Short Answer Questions [40 marks]

1. Define Farm Mechanization and analyse the comparative benefits and drawbacks of Draught Animal Power (DAP) versus tractors, focusing on cost-effectiveness and efficiency in Namibian agriculture. **(10 marks)**

2. Discuss the role of farm mechanization in improving agricultural productivity and the potential barriers to its widespread adoption. **(10 marks)**

3. Describe the four stages of a four-stroke engine cycle and the role of each stage in the engine's operation. **(10 marks)**

4. Define Calibration. **(2 marks)**

5. What is the importance of Calibration? **(3 marks)**

6. What is the difference between Static and Field Calibration? **(5 marks)**

Section C: Calculations (25 marks)

a) Calculate the mass of an implement that a cow weighing 700 kg can pull, assuming it can exert a force equal to 13% of its body weight. **(5 marks)**

b) Given that a cow weighs 700 kg, calculate the force it can exert in newtons (N), using the acceleration due to gravity as 9.81 m/s^2. **(5 marks)**

c) A cow exerts a force of 6867 N. Calculate the total force exerted when four cows work together. **(5 marks)**

d) Calculate the load a donkey weighing 250 kg can carry on its back, given that it can carry 40% of its body weight. Additionally, determine the total weight a donkey can pull using a cart, given that it can pull three times its body weight. **(5 marks)**

e) After calibrating a boom sprayer, calculate its nozzle average output if it has four (4) nozzles: **(5 marks)**

- Nozzle 1 = 250 ml
- Nozzle 2 = 260 ml
- Nozzle 3 = 255 ml
- Nozzle 4 = 200 ml

Section D: Essay questions (15 marks)

1. Farm mechanization significantly enhances productivity but also introduces certain challenges. Discuss the advantages and disadvantages of implementing farm mechanization in Namibia, particularly in terms of economic and environmental impact. **(10 marks)**

2. Discuss the Environmental concerns during agricultural chemical applications. **(5 marks)**

END OF PAPER

[100 MARKS]