GWANDA STATE UNIVERSITY

FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF HORTICULTURE AND CROP PRODUCTION

PROGRAMME: BSc (HONOURS) CROP SCIENCE

LCS4213: IRRIGATION AGRONOMY

FINAL EXAMINATION APRIL 2025

This examination paper consists of 4 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements: Scientific calculator, ruler (supplied by student)

Examiner's Name:

Instructions

1. Answer **ALL** questions in Section A
2. Answer any **THREE (3)** questions in Section B

Mark allocation

Question	**Marks**
Section A	40
Section B	60
Total attainable marks	100

SECTION A: Answer <u>ALL</u> questions in SECTION A.

Question 1

a) Discuss different Irrigation methods highlighting their advantages and disadvantages [15]

b) Outline the principles and functions of irrigation. [8]

c) Describe the latest technologies in irrigation [7]

d) Briefly explain the meaning of the following terms

i. Field capacity [2]

ii. Management allowable depletion (MAD) [2]

iii. Available Moisture content (AMC) [2]

iv. Permanent wilting point (PWP) [2]

v. Saturation point [2]

[40 marks]

SECTION B: Answer <u>THREE</u> questions in SECTION B.

Question 2

Discuss constraints to irrigation development in Zimbabwe [20]

Question 3

a) Suppose you are at Epoch mine mountainous area, which irrigation methods can you use to irrigate crops, give reason for your chosen irrigation method. [10]

b) Explain in detail factors that influence the selection of your choice of a suitable irrigation method for a named vegetable production. [10]

Question 4

a) Define the term irrigation scheduling [2]

b) Given the following information: Type of pan: Class A evaporation pan. Water depth in pan on day 1 = 150 mm. Water depth in pan on day 2 = 144 mm (after 24 hours). Rainfall (during 24 hours) = 0 mm. Assume K pan = 0.75 and a bean crop 45 days after planting. Determine Et_o and ET_{crop} [8]

c) What are the benefits of irrigation scheduling [10]

Question 5

a) A farmer intends to produce a crop of wheat and the following information is provided. Total irrigable area to be irrigated is 18 ha, the soil is medium texture loam, and root depth is 0.7m. Recorded peak daily water use is 5.8mm/day. The available moisture is 140mm/m. Allowable depletion is 50%. Soil infiltration rate is 5-6mm/hr. You are also told that the climate is moderate.

Calculate:

i. Net depth of application [2]

ii. Irrigation frequency [2]

iii. Gross depth of application [2]

iv. Volume of application [2]

v. System capacity (Q) taking operating time of 11hrs per shift at 2 shifts per day and an irrigation cycle of 7 days to complete the irrigation cycle [2]

b) Explain factors that influence the formation of tillers in a wheat crop [10]

Question 6

a) Discuss irrigation water management from planting up to harvesting in any one of the following crops: Maize, Potato, or Sugar beans [10]

b) Outline yield influencing factors that have to be managed in order to obtain high yields in a commercial irrigation farm [10]

END OF QUESTION PAPER!!!