UNIVERSITY OF FORT HARE

MAIN EXAMINATION

JUNE 2023

ALP 313 – LAND USE PLANNING

Time: 3 hours

Marks: 100

Internal examiners:

Mr STC Mdletshe

Mr S Gajana

Dr P. Prince

Dr F Yusuf

Dr B Gusha

Dr. L Mzini

Mr S Gasa

External examiner:

Dr G Nortje

INSTRUCTIONS:

1. This paper consists of **FIVE** pages, including cover page
2. The paper is made up of 3 sections (A, B and C). Take careful note of the instructions at the start of each section. You must answer **both** questions in **section A**, **any two** questions in **section B** and **any one** question in **section C.**

SECTION A (Answer BOTH questions)

QUESTION ONE (20 Marks)

Goal defines what is meant by the 'best' use of the land. Briefly explain this statement as it applies to an individual land user.

QUESTION TWO (20 Marks)

1. List a few applications of soil surveys (8 marks)
2. Discuss the pre-survey stages of any soil survey (12 marks)

SECTION B (Answer any two questions only)

Question three (20 Marks)

1a. The present South Africa socioeconomic environment is a blessing rather than a curse. Discuss

1a. What are the components of agricultural knowledge systems? Explain the components with examples.

2a. Critically examine the role of Agricultural Extension Personnel in land use planning.

2b. (i) List four components of Agricultural knowledge system

(ii) Mention Five stages of behavior change. {20 marks}

Question four (20 Marks)

1. Define veld condition assessment and explain why is it important to retain a good veld [5]
2. Name two methods of evaluating veld condition [2]
3. Name 3 importance of maintaining a good stocking rate [3]
4. Name 5 effects of high stocking rate [5]
5. Name 5 effects of low stocking rate [5]

Question Five (20 Marks)

1. Write brief note on the following fertilizer placement strategies in vegetable production, indicating limitations if any: (a) Broadcast, (b) Banding (c) Side-dressing, (d) Fertigation and (e) Foliar application. [10]

2. State pros and cons of using organic fertilizer in your vegetable garden. [10]

Question six (20 Marks)

1. Discuss the limiting factors on broiler growth and quality. [10marks]
2. Write short notes on the following:

a. Management of piglets from birth to weaning. [5marks]

b. Management of sows during lactation periods. [5marks]

SECTION C (Answer ONE of the two questions)

QUESTION SEVEN (20 Marks)

a. What is irrigation? (2)

b. A community is planning a garden in a fenced area of 1.7 ha next to a small perennial river. Water will be pumped directly from the river for up to 9 hours per day for 5 days per week. Irrigation will be applied to the garden by overhead sprinklers at an average efficiency of 75%. In order to maximize utilization of the land, the cropping program (area and timing) in table 1 has been decided by the community. Crop information is shown in table 2. The 25 year average rainfall and evaporation from a class A pan is given in table 3. ED = [(f x Eo)-rain]x area x 3.7037 / Phr (l/s)

- Show the calculation of extraction demand for one crop for one month. (5)
- Calculate the total extraction demand for each month, showing your answers in a table. (7)

- Given the extraction flow data in table 1 explain if there is sufficient water in the river in drought years to provide for the irrigation water requirements for the planned crops. (6)

Table 1: Cropping program. The area of each crop (ha) is shown for the month that the crop is planted.

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Maize									1.2			
Cabbage			0.85									
Cabbage					0.85							
EF (L/s)	3.91	3.34	3.37	1.72	1.15	0.56	0.43	0.28	0.32	0.59	1.93	3.66

Table 2: Crop approximate lifespan and crop factors

	Crop Factor in month of life (f)					
Crop	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Maize	0.35	0.71	1.07	1.2	0.92	
Cabbage	0.41	0.64	0.75			
Butternut	0.45	0.70	0.83			

Table 3: 25 year mean meteorological data

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall(mm)	93	99	105	83	42	35	31	51	70	100	125	104
Evaporation(mm)	220	173	149	120	107	93	99	121	132	155	180	207

Question eight (20 Marks)

A farmer is preparing 5 hectares of maize for his neighbour using oxen and conservation agriculture single row planting machine. The soil is loam and row spacing will be approximately 90cm. The farmer will hire two assistants to help him. The assistants will each be pain R5.00 per hour while they are actually planting. Calculate the amount that the farmer will need to charge if he is going to add a 30 % profit margin for the work.

Table 1 Draft force per metre of working width (for draft animal power)

Machine/implement	Field efficiency (%)	Draft force (kN/m width)		
		Sandy soil	Loam soil	Clay soil
Mouldboard plough (200mm depth)	70	5	7.8	8.6
Spike-tooth harrow	70	0.7	0.8	0.9
Cultivator	60	0.6	0.7	0.8
Mower	75	1 to 2	1 to 2	1 to 2
Planter (per row)	45	0.45(kN/row)	0.5(kN/row)	0.55(kN/row)

C A Planter (per row)	45	1.0(kN/row)	1.1(kN/row)	1.15(kN/row)
Boom sprayer	45			

Table 2 Work potential of man and various draft animals

Item	Man	Heavy horse	Riding horse	Ox	Donkey
Mass (kg)	80	900	500	600	200
Pull (N)	100	900	500	600	250
Speed (m/s)	1	1.4	1.25	0.83	1.0
Speed (km/h)	3.6	5.04	4.5	3.0	3.6
Power (W)	100	1260	630	500	200
Power, (W/kg mass)	1.25	1.4	1.26	0.83	1.0
Work time (h/day)	6	5	5	6	4

Table 3 Typical operating costs for oxen and animal drawn implements

Item	Cost (R/item/hour)
Oxen	1.15 (R/ox/h)
Trek gear	0.32 (R/ox/h)
Plough	1.95 (R/h)
Spike tooth harrow	3.48 (R/h)
Conventional single row planter	12.66 (R/h)
Conservation agriculture single row planter	15.10 (R/h)
Single row ripper	2.25 (R/h)
Boom sprayer, 5m boom	42.80 (R/h)
Boom sprayer, hand operated, 3m boom	17.12 (R/h)
Supplementary feed for oxen should be 0.65 kg maize meal/kW.h	1.50 (R/kg)

Pd(kW) = **0.28** x **D**raft force per m width(kN/m) x **S**peed(km/h) x **W**orking width(m or rows)

Supplementary feed cost per hour = 0.65 x Pd x cost of maize meal per kg