

# UNIVERSITY OF FORT HARE

## DEGREE EXAMINATIONS

JUNE 2017

### ALP313 - Land Use Planning

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Time: 3 hours

Marks: 100

Internal examiners

External examiner

Prof. J Mupangwa  
Mr. IRF Trollip  
Dr. A Manyevere  
Dr. F Yusuf  
Dr. K Mopipi  
Ms. M Maphaha  
Mr. R Moyo

Pof. MC Laker

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#### INSTRUCTIONS

1. This paper consists of **FOUR** pages, including the 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 2** in section B and **ANY 1** in section C.

**SECTION A (Answer BOTH questions)****QUESTION ONE (20 marks)**

Land use Planning aims to make the best use of limited resources. This can be achieved, partly, by identifying and resolving conflicts between competing uses, conflicts between the needs of individuals and those of the community and conflicts between the needs of the present generation and the needs of future generations.

With reference to the definition of Land Use Planning and the meaning of the "best use" of scarce resources, give a detailed explanation of the above statement.

**QUESTION TWO (20 marks)**

Discuss the general levels of soil surveys.

**SECTION B (Answer ANY TWO questions ONLY)****QUESTION THREE (20 marks)**

- i. Using an annotated diagram, describe the stages of behavioural change in human being. [10]
- ii. The present South Africa socio-economic environment is a blessing rather than a curse. Discuss. [10]

**QUESTION FOUR (20 marks)**

- i. Define the term 'fodder flow'. [ 5 ]
- ii. State the objective of fodder flow planning. [ 3 ]
- iii. Explain how a farmer can modify feed supply to ensure an adequate feed supply. [12]

**QUESTION FIVE (20 marks)**

- i. Discuss the advantages of crop rotations. [12]
- ii. Discuss applications of crop rotations. [ 8 ]

**QUESTION SIX (20 marks)**

- i. Define veld management. [ 3 ]
- ii. A veld condition assessment was conducted on a 5 000 ha farm of which 60 % lies in the Dohne Sourveld (DSV) and 40 % in the False Thonveld of the Eastern Cape (FTEC). A summary of the results is as follows: The mean contribution of the different categories of grasses to the botanical composition was 15 % Decreasers, 75 % Increaser Is and 10 % Increaser IIs in both veld types.
- The average veld condition score for the surveyed transects was 55 % in the DSV and 50 % in the FTEC portion of the farm. The grazing capacity of the benchmark site for the DSV is 2ha/AU and 3 ha/AU for the FTEC. The average number of browsing units and that of tree equivalents is 2000 and there was no bush in the DSV.
- a. What do the results indicate of the farm's previous management regime? Give reasons for your answer. [ 3 ]
- b. Calculate the grazing capacity and browsing capacity of the farm. [10]  
NB: Consider each veld type as a separate fodder source.
- c. Make recommendations on the appropriate management practices such as rotational grazing and veld burning. [ 4 ]

**SECTION C****(Answer question 7 OR question 8 – DO NOT ANSWER BOTH!)****QUESTION SEVEN (20 marks)**

A farmer wishes to use a small engine driven pump to irrigate a 1.1 ha field next to a stream. He plans to pump for 7 hours per day and 5 days per week. The farmer plans to plant the whole field to maize in October and cabbage in June. Use the information given to calculate whether or not the planned crops can be grown to their full yield potential.

**Table 7.1: 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			

**Table 7.2: Meteorological and stream extraction flow data**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	93	99	105	83	42	35	31	61	70	100	125	104
Evaporation (mm)	220	173	149	120	107	93	99	120	132	155	180	207
Extraction flow, EF(L/s)	4.31	3.49	3.15	2.46	.93	.72	.54	.69	.84	1.08	1.75	3.84

Constant for demand (Cd) =  $\frac{3.7037}{Phr}$  Phr is pumping hours per month  
 ED (Extraction demand) = [(f x Eo)-rain]x area(ha) x Cd (l/s)

**QUESTION EIGHT (20 marks)**

A tractor contractor has a 34 kW tractor and a 2 row CA planting machine which also applies fertiliser. The planter units are set to plant 900 mm rows. The farmer normally uses the tractor for about 265 hours per year. The farmer drives the tractor himself and employs an assistant who he pays R6.25 per hour. Calculate what the contractor should charge his customers per hectare including a 33% mark up for his profit. The customers are small scale farmers. Justify your choice for any figures you choose from the tables.

**Table 8.1: Typical soil drafts when soil is easily workable (speeds for tractors)**

Implement	Power rating	Draft ( kN/m effective width)			Typical Speed (km/h)
		Sandy soil	Loam soil	Clay soil	
Plough	High	8.7	12.4	15	3-4
Chisel plough	High	1.1kN/tine	1.2kN/tine	1.3kN/tine	4-6
Planter, tilled	Low	0.7kN/row	0.8kN/row	0.9kN/row	5-7
Planter, CA	Low	1.2kN/row	1.3kN/row	1.4kN/row	5-7

**Table 8.2. Field Efficiencies for different machinery activities (tractor operated)**

Activity	Field Efficiency (%)
Primary and secondary tillage	80
Planting of row crops (seed only)	60
Planting and fertilising row crops	50
Spraying with boom sprayer	55

(Field efficiency is normally 5 percentage points lower for contractors working on small fields.)

**Table 8.3. Tractor costs per hour of operation for different size tractors**

Tractor (kW)	Power rating Of implement	Cost of operating tractor (R/h)		
		1000h/yr use	500h/yr use	250h/yr use
34	High	120.4	170.50	267.56
	Medium	111.2	161.32	258.38
	Low	104.0	154.18	251.24
44	High	141.3	221.18	345.15
	Medium	145.0	209.03	333.00
	Low	135.5	199.58	323.55

**Table 8.4. Implement costs per hour of operation (tractor drawn)**

Implement Type	Cost per hour (R/h)
Plough, 2 furrow mould board	10.8
Plough, 3 furrow mould board	15.5
Planter, 2 row	74.46
Planter, 4 row	169.95

$$C = \frac{S \times W \times Ef}{1000} \quad (\text{ha/h})$$

$$\text{Charge rate including profit} = \text{Cost per ha.} \times \frac{100 + \% \text{mark-up}}{100}$$