UNIVERSITY OF FORT HARE
AUTO-SUPPLEMENTARY EXAMINATIONS
JANUARY 2019
ALP 313 – LAND USE PLANNING

Time: 3 hours
Marks: 100

Internal examiners:
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INSTRUCTIONS:

1. This paper consist 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)

i. Define the following terms:
   a. Pedon
   b. Polypedon
   c. Mapping Unit
   d. Map
ii. Describe the soil survey stage in any soil survey.
iii. What type of information should be available in reconnaissance soil survey reports?

QUESTION TWO (20 MARKS)

Give the definition of Land use planning and the planning problem. Use these to explain the important role of planning objectives (goal) in ensuring the “best use” of the land with respect to sustainability.

SECTION B (Answer any two questions only)

QUESTION THREE (20 MARKS)

i. State the two important functional characteristics of veld condition assessment and their indicators.
ii. A veld condition assessment was conducted on a 3000ha farm in the False Thornveld of the Eastern Cape (FTEC). The mean contribution of the different categories of grass species to the botanical composition was 25% of Decreaser species, 5% increaser I species and 70% increaser II grass species. The average Veld condition score of the surveyed transect was 45%. The grazing capacity of the benchmark site is 3ha/AU. The average number of browsing units per ha and that of Tree equivalents was 1 500. The recommended livestock enterprise comprises a beef and goat production system.
   a. Calculate the grazing and browsing capacity of the farm.
   b. Calculate the grazing capacity of the farm i.e. the number of animal unit and small stock unit that can be kept on the farm.
iii. State the types of grazing management and veld resting that you would recommend for this farm.

QUESTION FOUR (20 MARKS)

a. With the aid of an annotated diagram, explain the stages of behavioral changes.
b. What are the goals of agricultural development?
QUESTION FIVE (20 MARKS)

Describe and explain fertilizer placement strategies, indicate limitations:

i. Broadcasting; [5]
ii. Banding; [5]
iii. Fertigation; [5]
iv. Foliar application. [5]

QUESTION SIX (20 MARKS)

Section A:

1. What is the age at point of lay for layers? [1]
2. What is the age (weeks) at which layers are culled? [1]
3. What is the age and market weight for commercial broilers? [2]
4. What is the external fixture of a chicken that indicates the colour of the egg a chicken will lay? [1]
5. What happens in the infundibulum of a hen? [1]
6. What is the major stimulus that control the biological clock of a chicken? [1]
7. What is the recommended stocking density for broiler chickens? [1]
8. Describe All in All out system [2]

Section B:

1. What is the gestation period of pigs? [1]
2. What is the most important sign of oestrus or heat in pigs? [1]
3. How many piglets are born in 15 minutes interval at birth? [1]
4. At what age should the piglets be weaned? [1]
5. At what age should the boars start breeding or mating? [1]
6. Give three major causes are piglet death. [3]
7. Describe the importance of iron injection in piglets [2]
SECTION C (ANSWER ONE OF THE TWO QUESTIONS)

QUESTION SEVEN (20 MARKS)

A community that wants to grow crops on a total of 89 ha is given a 44 kW tractor with a 3 furrow plough. The width of cut of each plough furrow is 41 cm. The window of opportunity for ploughing is 48 calendar days. The operator of the tractor will work an 8 hour day, Monday to Friday. Use the information given to decide if the ploughing will be completed on time.

Table 1: Typical soil drafts when soil is easily workable (speeds for tractors)

<table>
<thead>
<tr>
<th>Implement</th>
<th>Field efficiency(%)</th>
<th>Draft (kN/m effective width)</th>
<th>Typical Speed (km/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sandy soil</td>
<td>Loam soil</td>
<td>Clay soil</td>
</tr>
<tr>
<td>Plough</td>
<td>80</td>
<td>8.7</td>
<td>12.4</td>
</tr>
<tr>
<td>Chisel plough</td>
<td>80</td>
<td>1.1 kN/tine</td>
<td>1.2 kN/tine</td>
</tr>
<tr>
<td>Planter, tilled</td>
<td>50</td>
<td>0.7 kN/row</td>
<td>0.8 kN/row</td>
</tr>
<tr>
<td>Boom sprayer</td>
<td>55</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Implement power requirement \( (P_d) = 0.45 \times D \times S \times W \) (kW)

Field capacity \( (C) = \frac{Speed(km \text{ per hr}) \times Width(m) \times Ef}{1000} \) (ha/h)

\( D_c = D_w + (W_k \times \text{ days off per weekend}) \)

QUESTION EIGHT (20 MARKS)

a. Write a short definition of irrigation. \( (1) \)

b. Name three sources of water for rural and farm use, excluding natural precipitation. \( (3) \)

c. What is the purpose of water estimation in land use planning? \( (1) \)

d. A community has been provided with a dam which has been built on a seasonal stream. The dam has a capacity of 7500 m³ and the runoff from the catchment is expected to fill the dam each year. The community plans to grow green maize planted in August every year. Calculate the area of maize that the community will be able to grow using sprinkler irrigation to provide the full crop water requirements in average conditions. The dam will only be used for irrigation. \( (15) \)

Long term mean meteorological data

<table>
<thead>
<tr>
<th>Month</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean rainfall (mm)</td>
<td>31</td>
<td>45</td>
<td>69</td>
<td>66</td>
<td>72</td>
<td></td>
</tr>
<tr>
<td>Mean “A” pan evaporation (mm)</td>
<td>104</td>
<td>96</td>
<td>119</td>
<td>135</td>
<td>122</td>
<td></td>
</tr>
</tbody>
</table>
### Crop Factor in month of life ($f$)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Month 1</th>
<th>Month 2</th>
<th>Month 3</th>
<th>Month 4</th>
<th>Month 5</th>
<th>Month 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>0.35</td>
<td>0.71</td>
<td>1.07</td>
<td>1.2</td>
<td>0.92</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>0.41</td>
<td>0.64</td>
<td>0.75</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Irrigable area = \( \frac{\text{available water}}{\text{GIRa} \times 10} \)

GIRa is the total of monthly gross irrigation requirement for crops grown measured in millimetres.

GIR for overhead sprinkler irrigation = \( [(f \times Eo) - \text{rain}] / 0.75 \)