NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF NATURAL RESOURCES AND SPATIAL SCIENCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION: BACHELOR OF AGRICULTURE	
QUALIFICATION CODE: 07BAGR	**LEVEL:** 5
COURSE CODE: RSC520s	**COURSE NAME:** RANGELAND SCIENCE
SESSION: NOVEMBER 2019	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	MR. RICHARD T. KAMUKUENJANDJE
MODERATOR:	DR HILMA RANTILLA AMWELE

INSTRUCTIONS
1. Answer ALL the questions. 2. Write clearly and neatly. 3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. All written work MUST be done in blue or black ink
2. No books, notes and other additional aids are allowed

THIS QUESTION PAPER CONSISTS OF 3 PAGES (excluding this front page)

Question 1

Copy down the table below except for the contents of the fourth column, and then rearrange the contents of the fourth column so that each name fits in the same row alongside the characteristics in the second and third columns that represent it. [6]

No.	Woody plants		Name that describes the rangeland structure
	Height	Cover	
2.1	10-20m	40-75%	Short forest
2.2	1-2m	40-100%	High dense woodland
2.3	0.5-1.5m	1-10%	Short open woodland
2.4	2-5m	>75%	Tall dense shrubland
2.5	2-3m	1-10%	High open shrubland
2.6	2-5m	1-10%	Tall open grassland

Question 2

Copy down the table below to indicate the influence of different types of fire on the balance between bushes and grasses on a farm near Grootfontein. Assume that there are some herbivores present, but not so many that they consume most of the organic matter that turns into mulch.
Fill in each blank square with either a tick or a cross or a number, as appropriate:

Frequency of fire	Time of the year of fire	Grasses get weak	Fuel is plentiful	Fire is fierce	Bush has broken dormancy	Bushes get weak	Amount of soil cover	Balance of bush versus grass
Every year	Early dry season							
	Late dry season							
Once every six years	Early dry season							
	Late dry season							

In the first five columns, put ✔ or X, whichever is applicable
In the column for the amount of soil cover, put a number 1, 2, 3 or 4 with 1 representing the least cover and 4 representing the most cover
In the last column, for balance of bush versus grass, put the number for one of the following answers:

1. Grasses decrease a lot, so bushes increase a lot.
2. Grasses decrease slightly as bushes increase slightly.
3. A fairly steady balance between bushes and grasses.
4. Grasses increase as bushes decrease.

[7]

Question 3

Copy down the tables and titles below. Then fill in the cells with brief explanations that show the changing balance between the two types of plants. [15]

Response by individual legume and non-legume to changing nitrogen in the soil

Growing alone	LOW NITROGEN	HIGH NITROGEN
NON-LEGUME		
LEGUME		

Competition between legumes and non-legumes under changing nitrogen in the soil

Growing together	LOW NITROGEN	HIGH NITROGEN
NON-LEGUMES		
LEGUMES		

Question 4

Name the conditions which the harmfulness of toxic plants depends on in a rangeland [5]

Question 5

There are different models that explain the dynamics of plant communities in rangelands. The simplest model is that of succession. Explain how this model functions with the aid of a diagram? [10]

Question 6

To a rangeland scientist, there are many signs that can indicate the health of the land when visually assessing the condition of sample rangelands. Name and explain the various types of signs (indicators) that may be used in the field when carrying out this assessment? [16]

Question 7

The influence that the tool of trampling, followed by rest, has on the condition of the rangeland depends largely on the season and the texture of the soil. Explain the differences in response to trampling in the growing season and dry season between sandy and loamy soils, and recommend which soil should rather be trampled more in which season. [10]

Question 8

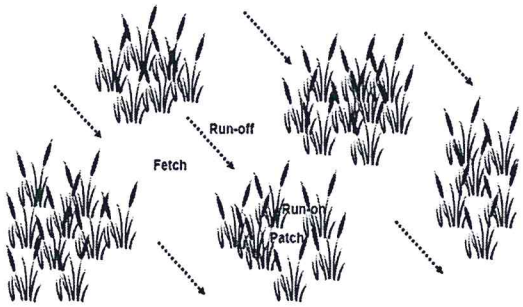
Use five examples to illustrate how a plant species may be selected by livestock under some circumstances and avoided under other circumstances. [15]

Question 9

Study the diagram below and

a) Discuss the Patch Dynamics in terms of the rate of water infiltration. (10)

b) How can the fetches be decreased and the patches be increased to produce more fodder? (6)



TOTAL: 100