



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, APPLIED SCIENCE AND NATURAL RESOURCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION: Bachelor of Science in Agriculture	
QUALIFICATION CODE: 07 BAGA	LEVEL: NQF Level 7
COURSE: Rangeland Ecology	COURSE CODE: RGE521S
DATE: November 2022	
DURATION: 3 Hours	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S):	Mrs. Angela Lilungwe
MODERATOR:	Dr. Hilma Amwele

**THIS QUESTION PAPER CONSISTS OF 3 PAGES
(INCLUDING THIS FRONT PAGE)**

INSTRUCTIONS

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

PERMISSIBLE MATERIALS

1. Examination paper.
2. Examination script.
3. Calculator

Question 1

Copy down the table below except for the contents of the second column, and then rearrange the contents of the second column so that each name fits in the same row alongside its most appropriate description in the third column.

[15]

	Name	Definition
1.1	Forage	Space between leaf and stem, in dicotyledon
1.2	Ligule	Branch of a grass plant
1.3	Rachilla	Dead organic matter on the soil surface
1.4	Fodder	Fringe of tissue between leaf sheath and leaf blade of a grass
1.5	Axil	Stem of spikelet
1.6	Tiller	Plants eaten by herbivores
1.7	Mulch	Plants that get cut and fed to herbivores
1.8	Pedicele	Portion of a compound leaf, comprising several leaflets
1.9	Keyline	Portion of leaf wrapped around stem
1.10	Sheath	Position in landscape where tributaries meet and water flow spreads out
1.11	Pedestal	Position in landscape where water gets held back
1.12	Tannin	Small stem on which florets are attached
1.13	Pinna	Secondary compound found in some dicotyledons
1.14	Petiole	Small stem at the base of a leaf that attaches to the proper stem, in dicotyledons
1.15	Base level	Small column of soil which remains after erosion

Question 2

Describe how Decreaser and Increaser 2 grass species function in a rangeland experiencing different grazing pressures? [6]

Question 3

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	
3.1	10-20m	40-75%	Short forest
3.2	1-2m	40-100%	High dense woodland
3.3	0.5-1.5m	1-10%	Short open woodland
3.4	2-5m	>75%	Tall dense shrubland
3.5	2-3m	1-10%	High open shrubland
3.6	2-5m	1-10%	Tall open grassland

Question 4

Discuss the life cycle of a perennial grass with the aid of a diagram.

[10]

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

Give brief answers to each of the following questions.

[8]

- 6.1 Why is the soil in the sacrifice zone usually more fertile than soil in other piospheres? (2)
- 6.2 Which type of plants tend to grow in the sacrifice zone in a paddock under continuous grazing? (2)
- 6.3 Which type of plants tend to grow in the sacrifice zone in a paddock under alternating year-long resting? (2)
- 6.4 In which condition are perennial grasses likely to be in the piosphere farthest from the water point in a very large paddock? (2)

Question 7

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.

[7]

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.

Question 8

Discuss causes of bush encroachment.

[15]

Question 9

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 10

Draw a chart that shows the relationship between stocking rate on the x-axis and both production per hectare and production per animal on the y-axis. Label three positions on the chart to show three stocking rates that apply to three different objectives of rangeland management.

[7]

Total marks 100

End