ΠΑΜΙΒΙΑ UΠIVERSITY
OF SCIEΠCE AΠD TECHΠOLOGY

Faculty of Health, Applied Science and Natural Resources

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES
DEPARTMENT OF NATURAL RESOURCE SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT	
QUALIFICATION CODE: 07BNTC	**LEVEL:** 7
COURSE CODE: WWR711S	**COURSE NAME:** Water and Wetland Resources Management
DATE: June 2023	
DURATION: 3 HOURS	**MARKS:** 150

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Mr R. Kavari
MODERATOR:	Mrs. N. Nashipili

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

PERMISSIBLE MATERIALS

1. Examination question paper
2. Answering book

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Including this front page)

QUESTION 1 Terminology

Define the following terminologies, using realistic examples from Namibia or Southern Africa:

1.1	Eutrophication	(2)
1.2	Ramsar site	(2)
1.3	Alluvial Aquifers	(2)
1.4	Dilapidated Water Infrastructure	(2)
1.5	Perennial vs. Ephemeral wetlands	(2)
1.6	Linear Oasis	(2)
1.7	Allogenic	(2)
1.8	Unconventional water sources	(2)
1.9	Hemi-Cenote lake	(2)
1.10	Palustrine vs. Lacustrine Wetlands	(2)

[20]

QUESTION 2 Namibia`s Water Resources

2.1 According to Fuller (16th century), "We never know the worth of water till the well is dry". Explain this statement and then emphasize how a well or borehole can run dry. (5)

2.2 You are tasked to represent the Department of Natural Resource Sciences at World Water Day Celebration in the year 2023. Provide a brief outline of the World Water Day; On which day is it celebrated? What is the theme for the year 2023? What is the value of celebrating such a day? (3)

2.3 Namibia is one of the driest countries south of the Sahara. One of the climate drivers is rainfall. How will you describe rainfall occurrence in Namibia to tourists visiting from other countries? (5)

2.4 Name any 2 parameters and or variables that you can monitor to ensure sound management of water and wetland resources. (2)

2.5 Use a diagram and notes to explain the hydrological cycle of Namibia. Clearly label the diagram to indicate the percentage water balance of Namibia. (5)

[20]

QUESTION 3 Ramsar Convention

3.1 The Ramsar Representative from Ministry of Environment, Forestry and Tourism has requested you to motivate (in tabular format) why the Karst sinkholes and caves, would qualify as future Ramsar site, under the Ramsar category "Karst and other subterranean Hydrological systems". Prepare the table, showing five relevant criteria and how the Karst sinkholes and caves meet each. (10)

3.2 Clearly explain any four ecological functions provided by wetlands. (8)

3.3   Mention and describe any two natural resources/goods provided by wetlands.   (2)
        [20]

QUESTION 4   **Coastal Wetlands**

4.1   Explain the process of sulphur eruption at Namibia`s west coast and state its
        effects on supply of desalinated sea water at the coastal areas of Namibia.   (10)

4.2   Briefly, discuss the flow dynamic of the Orange River Mouth.   (5)

4.3   Explain why the Orange River Mouth is placed under the Montreux Record.   (5)
        [20]

QUESTION 5   **Riverine Wetlands**
5.1   Explain why the flood pulse concept is important for perennial river systems
        such as the Okavango River and Zambezi River.   (4)

5.2   Joseph Mbambangandu conservancy is the only conservancy on banks of the
        Okavango River. According to the committee members consulted, the
        conservancy has appointed personnel as fish guards. Explain the role of a fish
        guard and how it is important for recovery of fish stocks in the stream. Discuss
        the advantage of such initiatives to the Okavango River biodiversity chain.   (5)

5.3   You are a manager of the 'Sikondo Green Scheme farm' (irrigation scheme)
        along the Okavango River; a group of visiting Natural Resources Management
        students from NUST ask you to answer the following questions:
        a) Which water conservation and management initiatives are implemented
            at the green scheme?   (2)
        b) How can the use of fertilisers and pesticides pollute the water at Sikondo
            irrigation scheme?   (5)

5.4   One of the issues affecting the perennial rivers is the presence of
        Schistosomiasis causing snails. Name the 2 snail species causing these bacteria
        disease. Use a diagram and notes to explain the life cycles of these bilharzia
        causing organisms.   .   (8)

5.5   One of the conservation issues facing ephemeral rivers in Namibia and their
        functions is the construction of impoundment. Clearly explain the effects of
        dams constructed on ephemeral rivers.   (5)

        Water is not always where people and animals are. Use the Cuvelai Basin to
5.6   explain the issue of scale (with reference to water availability and supply).   (5)
        [30]

QUESTION 6 **Lacustrine Wetlands**

6.1 Name any dam/impoundment in Southern Africa, indicate on which river it is (3)
constructed, and for what purpose.

6.2 Name and discuss the different layers in a stratified impoundments in summer. (7)
[10]

QUESTION 7 **Palustrine Wetlands**

7.1 Use a realistic example of crustacea order, to explain how they are adapted to living
in ephemeral rainwater   pools. (5)

7.2 The Karst Groundwater Basin Management Committee (KGBMC) has asked you, as
the Warden in charge of Waterberg EE Center, to write a **short article** for their
newsletter on the importance of **seeps and springs** and the threats these wetlands face.
As an introduction say why springs and seeps are ecologically important, then deal with
three threats faced by **groundwater-fed springs and seeps** in the Waterberg area and
conclude by recommending what farmers can do to conserve these important wetlands. (10)
[15]

QUESTION 8 **Integrated Water Resources Management**

8.1 Unfortunately, the only permanent rivers in Namibia are on the periphery, thus
shared with other countries. Name any 2 commissions and what their functions are in
ensuring sustainable use of resources from internationally shared water sources. (5)

8.2 Explain the concept of Integrated Water Resources Management, using the feasibility
study (video) on the proposed hydropower scheme at Epupa on the Kunene River. (10)
[15]

End

TOTAL [150]