



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF AGRICULTURE AND NATURAL RESOURCE SCIENCES

DEPARTMENT OF NATURAL RESOURCE SCIENCES

QUALIFICATION: BACHELOR OF NATURAL RESOURCES MANAGEMENT HONOURS	
QUALIFICATION CODE: 08BNRMH	LEVEL: 8
COURSE CODE: IWW821S	COURSE NAME: INTEGRATED WATER AND WETLAND MANAGEMENT
DATE: JUNE 2023	
DURATION: 3 HOURS	MARKS: 120

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Ms. S. Bethune.
MODERATOR:	Ms. 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
3. Calculator
4. The Criteria for identifying wetlands of International Importance. 1 page
5. Findings from "The Okavango River Basin Transboundary Diagnostic Analysis Reimagining the river" 1 page

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page and materials 4 and 5)

QUESTION 1. WETLANDS AWARENESS

- 1.1 Groot Aub Primary school has asked you to prepare a **6-slide** presentation for **Grade 6** learners for their World Wetland Day celebration this year. They have asked you to link it to this year's theme for World Wetland Day and to the visit you plan to do with the learners to Avis Dam after your presentation. The presentation should make them aware of the plants and animals supported by the dam and the Klein Windhoek River, the social value of Avis Dam to the citizens of Windhoek, as well as any threats to these wetlands. Conclude with practical activities the learners themselves can do to help to reduce the impacts of these threats. Ensure that your title slide is eye-catching, your presentation is well-illustrated and has a clear message for action. (12)
- 1.2 Based on your kayaking and bird counting experience at the coast this year, prepare a short newspaper article (max 250 words) for a tourist supplement in "*The Namibian*" on wetland-based tourism. Showcase the value of the Walvis Bay Ramsar Site as both an adventure sport and bird watching destination. Also provide positive guidelines on how tourists can help prevent unnecessary disturbance when visiting these wetlands to conserve their rich biodiversity. Have a catchy title, Describe the photograph that you will use to illustrate your article **and** give its caption. (9)
- 1.3 Clearly distinguish between lotic and lentic wetlands. (2)
- 1.4 Clearly distinguish between lacustrine and palustrine wetlands. (2)
- [25]

QUESTION 2 WETLANDS CONSERVATION - RAMSAR

- 2.1 Choose **either A or B** (10)
- A.** The **Etosha Pan Ramsar site** at the bottom end of the Cuvelai System
- B.** The **Ishana section of the Cuvelai System** as a potential Ramsar Site
- Use the attached Ramsar Criteria, to draw up a table to clearly show **how** the site you choose meets **five** of the Ramsar Criteria. {Provide a brief description of each criterion}.
- 2.2 Briefly explain what the Montreux Record is, name the Namibian Ramsar Site currently on this list, and give **two** reasons why it is on the list. (4)
- [14]

QUESTION 3. WATER RESOURCES MANAGEMENT IN NAMIBIA

- 3.1 Write a paragraph to explain what is meant by Water Demand Management, give six (6) examples of how this is done in Namibia **and** conclude with why implementing WDM is important in Namibia. (8)
- 3.2 Based on your practical in the Fish River below the Hardap Dam, say what SASS stands for, **and** explain why we use aquatic invertebrates to determine river health. (2)
- 3.3 Give examples of Mini-SASS groups you found in the Fish River: (5)
- A.** One with a high score, **B.** Two with medium scores and **C.** Two with low scores.
- 3.4 Name the aquatic mammal that we identified from the scats we found at the site where we did our mini-SASS survey in the Fish River. (1)
- [16]

QUESTION 4. INTEGRATED WATER SUPPLY AND MANAGEMENT IN THE CENTRAL NAMIB AREA

Based on what you learnt on your excursion to the coast, write an **essay** on water supply to the Central Region from the alluvial aquifers in the Kuiseb and Omaruru rivers **and** the challenges the bulk water suppliers face when trying to ensure an adequate, good quality water supply to the users in such an arid, yet rapidly developing, area. Be sure to give accurate facts and figures. **Also** explain how the water suppliers make use of unconventional water sources to meet the growing demand, discuss the challenges related to making use of these unconventional water sources **and** give the reasons for the increase in water demand in the central coastal area. **Conclude** by suggesting an additional effective WDM strategy, that the municipalities of the coastal towns should consider implementing.

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QUESTION 5. INTERNATIONAL- LEVEL RIVER BASIN MANAGEMENT

At international-level river basin management is the task of River Basin Management Commissions, like the Permanent Okavango River Basin Commission OKACOM.

- 5.1 Read the attached handout of the main findings of the OKACOM EFA, and interpret the **main overall results** shown in the mean annual runoff graphs, schematic maps, and the total livelihoods graph across the three, water use and development scenarios tested, (Low, Medium, and High), and say where the greatest impacts will be. (8)
- 5.2 Write a paragraph to discuss a new threat identified to the Okavango River System, by the *National Geographic* team that have monitored the basin since the OKACOM EFA study and say what impact, this threat will have in each of the riparian countries and internationally. (8)

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QUESTION 6 INTEGRATED WATER RESOURCES MANAGEMENT

Write an **essay** on IWRM in the Namibian River Basin unit that you prepared a poster on. (25)
As an introduction briefly describe your river basin, where it is, the mean annual rainfall, variability in rainfall, the types of wetlands and aquifers found there, and the main activities or land uses in the basin.

Choose **three** of the points below and write a paragraph on each to show Integrated Water Resources Management links within your basin:

- The joint use of both surface and groundwater sources
- Use of both conventional and unconventional water sources
- Co-operation and sharing between different water suppliers and users.
- Water conservation to ensure enough water for both the Environment and people.
- Cooperation between countries that share the same River Basin

Finally conclude with **two** main advantages of IWRM to Namibia.

[25]

TOTAL - 120