



**NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT  
DEPARTMENT OF ARCHITECTURE, PLANNING AND CONSTRUCTION**

<b>QUALIFICATION: BACHELOR OF REGIONAL AND RURAL DEVELOPMENT</b>					
<b>QUALIFICATION CODE:</b>	<b>07BRAR</b>	<b>LEVEL:</b>	<b>5</b>	<b>CREDITS:</b>	<b>12</b>
<b>COURSE CODE:</b>	<b>NRM511S</b>	<b>COURSE NAME:</b>	<b>NATURAL RESOURCE MANAGEMENT</b>		
<b>DATE:</b>	<b>JUNE 2024</b>	<b>PAPER:</b>	<b>THEORY</b>		
<b>DURATION:</b>	<b>3 HOURS</b>	<b>MARKS:</b>	<b>100</b>		

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
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<b>MODERATOR:</b>	Ben Strohbach

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions.</li><li>2. Read the entire question paper before answering the questions.</li><li>3. Questions may be answered in any sequence, provided that they are numbered clearly and correctly.</li><li>4. Write clearly and legibly.</li></ol>

**PERMISSIBLE MATERIALS**

Pen, ruler, pencil and eraser

**THIS QUESTION PAPER CONSISTS OF 9 QUESTIONS AND 7 PAGES (including this front page)**

**Question 1:**

Select the single *CORRECT* answer to each of the following questions. Just write down the number, e.g. (a) D.

- (a) One of Windhoek's water supply sources is the ....  
A Neckartal Dam  
B Otjivero Pipeline  
C Von Bach Dam  
D Orange River  
E Omdel Aquifer (1)
- (b) Demand-side water management includes ....  
A desalination of seawater  
B installation of water-efficient showers and toilets  
C construction of bulk water-purification plants  
D geophysical surveys to find new aquifers  
E negotiations with neighbouring countries on shared watercourses (1)
- (c) Ecosystem services that are essential for life to exist are known as ...  
A cultural services  
B provisioning services  
C supporting services  
D regulating services  
E biological services (1)
- (d) Depletion of the ozone layer is triggered by ...  
A the presence of polar stratospheric clouds  
B the presence of ultraviolet light  
C the presence of free radicals  
D none of the above  
E all of the above (1)
- (e) Desertification is most likely to occur in ...  
A equatorial rainforests  
B monsoon regions in the tropics  
C temperate regions of the mid-latitudes  
D arid regions bordering deserts  
E natural deserts such as the Namib (1)

- (f) Rangelands are large natural landscapes under natural vegetation. The definition excludes ...
- A wetlands
  - B grasslands
  - C croplands
  - D woodlands
  - E shrublands
- (1)
- (g) Ozone ...
- A is a highly reactive form of oxygen
  - B is the major anthropogenic greenhouse gas
  - C is used in air conditioners and refrigerators
  - D is beneficial for plants
  - E heals cells in the human body
- (1)
- (h) Natural capital refers to ...
- A the renewable resources of Earth
  - B the non-renewable resources of Earth
  - C the processes that regulate the Earth System and its numerous subsystems
  - D the ability of Earth to absorb, neutralise and recycle wastes
  - E the combination of A, B, C and D
- (1)
- (i) The following is not a perpetual resource:
- A sunlight
  - B wind
  - C water
  - D waves
  - E air
- (1)
- (j) The atmospheric layer with the highest concentration of natural ozone, is the ...
- A troposphere
  - B stratosphere
  - C mesosphere
  - D thermosphere
  - E exosphere
- (1)

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[10]

**Question 2:**

- (a) Propose three (3) strategies that the Namibia government and individual Namibians can implement to fight plastic pollution. (3)
- (b) What are the effects of plastic pollution on marine animals? (4)
- (c) Explain the differences between 'point source' and 'diffuse source' pollution, providing appropriate examples of each. (4)

**[11]**

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**Question 3:**

- (a) List and elaborate on three (3) cultural services provided by the atmosphere. (6)
- (b) Discuss the importance of soil by listing and explaining one (1) soil function from each of the four ecosystem service groups: provisioning, supporting, regulating, and cultural. Be specific. (8)

**[14]**

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**Question 4:**

- (a) Why does climate change cause sea levels to rise? (2)
- (b) Describe four (4) distinct ways in which climate change negatively affects human health. (4)
- (c) Suggest four (4) strategies that farmers can use to adapt to climate change. (4)

**[10]**

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**Question 5:**

- (a) List and provide examples of two (2) provisioning services delivered by living organisms. Be specific. (4)
- (b) Discuss the advantages of high *genetic* diversity. (3)

- (c) In addition to pollution, what are the other four (4) main reasons for biodiversity decline? (4)

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[11]

**Question 6:**

- (a) Describe four (4) anthropogenic (man-made) threats to marine ecosystems. (4)
- (b) Imagine that you are the Minister of Environment and Development of a country like Namibia. What would you do to address these environmental threats to marine ecosystems? (4)

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[8]

**Question 7:**

- (a) Describe the water sources of the City of Windhoek. (6)
- (b) Compile a comprehensive definition of 'wetlands'. (6)
- (c) Name three (3) of Namibia's Ramsar sites. (3)

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[15]

**Question 8:**

- (a) As a regional development officer, you are tasked to identify unsustainable agricultural practices that would lead to land degradation in your region. Livestock farming, rain-fed crop production and irrigation agriculture are all included in the term 'agriculture' in this case. Make a list of five (5) unsustainable agricultural practices that you would look for. (5)
- (b) Explain the differences in the objectives and outcomes of deforestation and bush control. (6)

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[11]

**Question 9:**

Match each *term* in Column 1 with the *appropriate description* in Column 2. Write down only the *capital letter* from Column 2 next to the *small letter* from Column 1, for example (a) D.

<u>Column 1</u>	<u>Column 2</u>
(a) Aridity	A Air pollution in the form of fine particles with average diameter of 10 micrometers
(b) Ozone layer	B Decrease in soil pH
(c) Light clutter	C The dome-shaped brightened night sky over a city
(d) Non-renewable resources	D Nuclear waste
(e) PM <sub>10</sub>	E Finite resources that do not renew themselves at a sufficient rate for sustainable economic extraction on a human time-frame
(f) Soil desiccation	F Natural climatic condition of drylands
(g) Effluent	G Excessive, unnecessary groupings of lights
(h) Savanna	H Drying out of soil
(i) POPs	I A grassland without a single tree or shrub
(j) Climate	J Harmful organic substances that remain in the environment for long periods
	K Photochemical air pollution hanging over cities as a brown haze
	L Resources that are inexhaustible on a human timescale, are continuously available, and their quantity is not affected by use
	M Saturation of soil over long periods
	N Liquid waste

- O Atmospheric conditions at a certain moment in time
- P A grassland with scattered trees and shrubs
- Q A statistical description of the mean and variability of the weather over many years
- R A zone in the atmosphere that shields Earth from harmful ultraviolet light
- S Substances that degrade quickly once they are exposed to the elements
- T A zone in the atmosphere that protects Earth from high-energy cosmic rays
- U Gradual increase in salt content of soil (10)

[10]

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**TOTAL: 100**