NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

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

QUALIFICATION: BACHELOR OF REGIONAL AND RURAL DEVELOPMENT					
QUALIFICATION CODE:	**07BRAR**	**LEVEL:**	5	**CREDITS:**	12
COURSE CODE:	NRM511S	**COURSE NAME:**	NATURAL RESOURCE MANAGEMENT		
DATE:	JUNE 2023	**PAPER:**	THEORY		
DURATION:	3 HOURS	**MARKS:**	100		

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	Ben Strohbach

INSTRUCTIONS

1. Answer ALL the questions.
2. Read the entire question paper before answering the questions.
3. Questions may be answered in any sequence, provided that they are numbered clearly and correctly.
4. Write clearly and legibly.

PERMISSIBLE MATERIALS

Pen, ruler, pencil and eraser

THIS QUESTION PAPER CONSISTS OF 11 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 Swakoppoort Dam
- B Otjivero Pipeline
- C Naute Dam
- D Okavango River
- E Omdel Aquifer (1)

(b) *Demand*-side water management includes ....
- A desalinization of seawater
- B installation of water-wise gardens
- C construction of water-purification plants
- D inter-basin water transfers
- E transboundary water-use agreements (1)

(c) The capacity of the environment to absorb, neutralise or recycle wastes is called ...
- A perpetual resources
- B sinks
- C provisioning services
- D ecosystems
- E renewable resources (1)

(d) The form of light pollution in which oncoming traffic temporarily blinds a driver is ...
- A skyglow
- B light clutter
- C glare
- D colour blindness
- E light trespass (1)

(e) Desertification is ....
- A an extreme form of land degradation in arid regions
- B caused by droughts
- C an extended period of below-normal rainfall
- D the natural condition of drylands
- E a natural phenomenon that creates deserts (1)

(f) The following are Namibian *Ramsar* sites:

A Hardap Dam, Lake Otjikoto, Lake Liambezi
B Kunene River Mouth, Etosha Pan, Sandwich Harbour
C Etosha Pan, Hardap Dam, Lake Otjikoto
D Orange River Mouth, Sandwich Harbour, Walvis Bay Lagoon
E Lower Okavango-Bwabwata, Sossusvlei, Etosha Pan (1)

(g) Which one of the following is a *solar* power station?

A Von Eck
B Omburu
C Kudu
D Ruacana
E Ombepo (1)

(h) Which one of the following is a greenhouse gas?

A methyl bromide
B methane
C nitrogen
D carbon tetrachloride
E oxygen (1)

(i) Ecosystem services that keep nature in balance are known as ...

A cultural services
B provisioning services
C regulating services
D equilibrium services
E supporting services (1)

(j) Salt-tolerant vegetation growing in tropical and subtropical intertidal zones or river estuaries are known as ....

A corals
B steppe
C temperate forests
D coniferous woodlands
E mangroves (1)

[10]

Question 2:

(a) *"Soil is the living skin of Earth."* (3)
Express your opinion on this statement. (What idea does the statement convey? Do you agree or disagree? Why?)

(b) *"Soils are intimately linked with livelihoods, cultural identity and sense of place."*
Debate this statement and offer appropriate examples in support of your arguments. (6)

[9]

Question 3:

What do you understand under the term '*rangeland degradation*'? In your explanation, include your own definitions of *rangeland* and *degradation*, and four (4) visible *signs* that a rangeland is degraded.
(5 marks for definitions; 4 marks for signs) (9)

[9]

Question 4:

(a) What is an ecosystem? Elaborate on the various components, with examples. (4)

(b) Discuss the advantages of high *ecosystem* diversity. (3)

(c) Provide two (2) examples of ways in which humans cause habitat fragmentation, and suggest one remedial action for each of your examples. (4)

[11]

Question 5:

(a) Differentiate between a hydrological drought and an agronomic (crop) drought. (4)

(b) Propose a scenario that could cause an area to suffer a hydrological drought, but not an agronomic drought. (2)

(c) Describe the typical characteristics of drylands. (4)

[10]

Question 6:

(a) Differentiate between climate change *adaptation* and climate change *mitigation*, and provide two (2) examples of each.
(2 marks for explanation; 4 marks for examples) (6)

(b) List and explain three (3) ways in which climate change and the anthropogenic drivers of climate change threaten marine and coastal ecosystems. (6)

[12]

Question 7:

(a) Differentiate between primary and secondary pollutants and provide examples of such substances to strengthen your explanation. (4)

(b) Suggest four (4) strategies for turning the problem of waste into an asset or economic opportunity. (4)

[8]

Question 8:

(a) *"Renewable energy is not necessarily green energy".*
Debate this statement, with reference to some of the negative impacts that the use of renewable energy sources may have on humans and the environment. (5)

(b) Explain the basics of how a concentrated solar power plant (CSP) works. (3)

[8]

Question 9:

(a) What is ozone? (2)

(b) Why is ozone both a benefit and a problem for life on Earth? (4)

(c) Which two international agreements deal with the protection of the ozone layer and regulating the use of ozone-depleting substances?
(The short versions of the names are acceptable.) (2)

[8]

Question 10:

Discuss the potentially *negative* impacts that the mining industry may have on human health and the environment. (5)

[5]

Question 11:

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.

Column 1		Column 2	
(a)	Nutrient mining	A	Natural assets and the ecosystem services resulting from them
(b)	Abiotic resource	B	International treaty dealing with wetlands as waterfowl habitats
(c)	Natural capital	C	Soils becoming salty
(d)	Effluent	D	Harmful organic substances that remain in the environment for long periods
(e)	Desiccation	E	Liquid waste
(f)	Eutrophication	F	Atmospheric conditions at a certain moment in time
(g)	Salinisation	G	Water becoming anoxic due to algal blooms
(h)	POPs	H	Soil degradation through constant cultivation without addition of fertilisers
(i)	Ramsar Convention		
(j)	Climate		

I	A statistical description of the mean and variability of the weather over many years
J	Resources obtained from living organisms and organic material
K	Saturation of soils for long periods
L	Soils becoming acidic
M	Substances that damage the ozone layer
N	Resources that are inexhaustible on a human time-scale
O	International treaty dealing with drought, land degradation and desertification
P	Gaseous waste
Q	Soil degradation through overuse of fertilisers
R	Resources obtained from the physical environment
S	Drying-out of soils
T	Water becoming toxic due to the presence of heavy metals

[10]

TOTAL: 100