



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

SCHOOL OF NATURAL AND APPLIED SCIENCES

DEPARTMENT OF BIOLOGY, CHEMISTRY AND PHYSICS

QUALIFICATION : BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	LEVEL: 7
COURSE: ENERGY AND ENVIRONMENT	COURSE CODE: EEN701S
SESSION: JUNE 2023	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Prof Sylvanus A. Onjefu
MODERATOR:	Dr Valentine T. Chabata

INSTRUCTIONS

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| <ol style="list-style-type: none">1. Write all your answers in the booklet provided.2. Begin each question on a new page |
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PERMISSIBLE MATERIALS

1. Non-Programmable Scientific Calculator

THIS QUESTION PAPER CONSISTS OF 3 PAGES
(Including this front page)

QUESTION 1 **[23]**

- 1.1 Explain how crude oil is formed and the function of oxygen and heat in its formation. (5)
- 1.2 How is natural gas different from crude oil? (4)
- 1.3 Describe surface mining. (4)
- 1.4 Explain the environmental impacts of surface mining processes and burning of coal. (6)
- 1.5 Give four reasons why most power plants prefer the use of anthracite. (4)

QUESTION 2 **[22]**

- 2.1 Give two human safety issues and two health risk associated with coal mining. (4)
- 2.2 Discuss acid precipitation and how it occurs. (4)
- 2.3 Briefly explain how Sulphur emission associated with combustion of coal can be reduced. (5)
- 2.4 Describe the clean coal technology and give one example of clean coal technology. (4)
- 2.5 Why do you think the production and use of synfuels should be discouraged? (5)

QUESTION 3 **[28]**

- 3.1 Explain the term radiation. (2)
- 3.2 Discuss the three-water circuit in a typical nuclear power plant. (9)
- 3.3 Describe the safety features of a nuclear power under the following parts:
 - 3.3.1 Reactor vessel. (4)
 - 3.3.2 Containment building. (4)
- 3.4 Explain the breeder nuclear fission and why there is public distrust for it. (5)
- 3.5 What do you understand by nuclear meltdown? (4)

QUESTION 4

[27]

- 4.1 Briefly discuss two ways in which solar energy is different from fossil and nuclear fuels. (4)
- 4.2 Describe the working of photovoltaic solar cells. (4)
- 4.3 The Government of Namibia plans to decommission her nuclear power plant. However, it has been argued that the internationally recommended first and second options of decommissioning a nuclear power plant is not suitable for the country.
- 4.3.1 Explain the third internationally acceptable option for decommissioning a nuclear power Plant. (2)
- 4.3.2 What are the safety measures that should be put in place to protect workers? (3)
- 4.3.3 What could be the likely risk to both workers and the environment? (3)
- 4.4 Described the source of energy called the Ocean thermal energy conversion. (4)
- 4.5 Is Ocean thermal energy conversion possible in Namibia? And why? (2)
- 4.6 What is your argument against the use of crop residue as biomass fuel? (5)

END