



FACULTY OF SCIENCE

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT & ENERGY STUDIES

MODULE	ENS8X04 ENERGY TECHNOLOGY
CAMPUS	APK
EXAM	SUPPLEMENTARY – JANUARY 2020

DATE JANUARY 2020

SESSION TBC

ASSESSOR(S)

DR KRISTY LANGERMAN

EXTERNAL MODERATOR

MS JOANNE CALITZ (CSIR)

DURATION 3 HOURS

MARKS 300

NUMBER OF PAGES: 2 PAGES

INSTRUCTIONS:

1. Please answer any **THREE** of the five questions below.
2. Answers are to be written as comprehensive essays, with graphs and diagrams where these may be appropriate to enhance your answer.
3. Each answer is worth the same number of marks.
4. Calculators are permitted

A handwritten signature in cursive script, reading "K E Langerman".

Dr K.E. Langerman

A handwritten signature in cursive script, reading "J Calitz".

Ms J. Calitz

QUESTION 1

Describe the different types of hydroelectric power stations. Evaluate the potential for exploiting further hydropower resources in Africa, with reference to specific examples.

[100]**QUESTION 2**

Compare and contrast the negative environmental impacts of coal- and natural gas-fired power stations, and assess the extent to which the negative environmental impacts may be mitigated through the use of emission abatement technologies.

[100]**QUESTION 3**

Compare and contrast the way in which electricity is generated from a solar photovoltaic system to the way in which it is generated by a nuclear power station. Evaluate the relative advantages and disadvantages of the two types of generation systems.

[100]**QUESTION 4**

Consider that you have been appointed as a consultant by City Power to advise them on adapting to the energy transition. Discuss how their role in supplying electricity to their customers has changed in the last ten years, the challenges and opportunities that they are confronted with, and the new technologies which are enabling the transition.

[100]**QUESTION 5**

With reference to the first and second laws of thermodynamics, discuss the energy transformations that occur in a combined cycle gas turbine and evaluate the factors that determine the efficiency of the power station.

[100]**TOTAL [300]**
