UNIVERSITY OF JOHANNESBURG

FACULTY OF SCIENCE

DEPARTMENT OF GEOGRAPHY, ENVIRONMENTAL MANAGEMENT & ENERGY STUDIES

MODULE **ENS0047**
ENERGY TECHNOLOGY

CAMPUS **APK**

EXAM **NOVEMBER 2014**

DATE **12 NOVEMBER 2014** **SESSION** **12:30 – 15:30**

ASSESSOR(S) **DR JOHN LEDGER**

EXTERNAL MODERATOR **MR W VAN NIEKERK**
(UNIVERSITY OF NORTH WEST)

DURATION **3 HOURS** **MARKS** **100**

NUMBER OF PAGES: 2 PAGES

INSTRUCTIONS:

Please answer Question 1 (compulsory) and any TWO of the following FOUR questions. Question 1 comprises ten short questions that can be answered in one paragraph each. The other two answers should be in the form of a comprehensive essay, with sketches and diagrams where these may be appropriate to enhance your answer. Alternatively you may provide your answer in point form. Each answer is worth the same number of marks (33.3%)

QUESTION 1 (COMPULSORY)

1. Short questions

a). How is fly ash extracted from the flue gas at Lethabo Power Station?

b). Two different forms of water are used in coal-fired power stations like Lethabo. Explain.

c). At what frequency does the South African electricity grid operate, and how is this kept on target?

d). Name two liquid biofuels and the plants you might use to make them.

e). Which plants should not be used in South Africa's proposed biofuel production, and why not?

f). Name and briefly describe the only nuclear power station in Africa.

g). Draw and label a sketch of a pumped storage electricity facility.

h). Two groups of wild creatures may be adversely affected by wind turbines. Explain briefly.

i). Briefly describe three energy technologies that use natural gas from Mozambique.

j). Describe the progress made in recent years with energy efficient lighting.

[33.3]

QUESTION 2

2. Electricity Generation from the Sun. Describe the various energy technologies that can be used to generate electricity from the solar energy of the Sun.

[33.3]

QUESTION 3

3. Hybrid and Electric Vehicles. Most car makers have hybrid and/or electric vehicles in production or under development. Describe the failed efforts to introduce electric cars in California in the 1990s, the renewed interest in the technology, recent advances in battery technology, and the potential benefits and disadvantages of electric and hybrid vehicles.

[33.3]

QUESTION 4

4. Solar Water Heating Technology. Describe solar water heating technology, how these appliances work, how the challenge of damage by freezing can be addressed, and some of the different designs that are available on the market.

[33.3]

QUESTION 5

5. Reducing domestic electricity consumption in South Africa. Describe the different technologies that home owners can implement to reduce their domestic consumption of electricity.

[33.3]

SUB-TOTAL [33.3]

TOTAL [100]