



Strathmore
UNIVERSITY

SCHOOL OF COMPUTING AND ENGINEERING SCIENCES
MASTER OF SUSTAINABLE ENERGY TRANSITION
END OF SEMESTER EXAMINATION
MSSET 8504: ENERGY ECONOMICS

DATE: 19th December 2023

Time: 18:00-20:30 Hours

Instructions

1. This examination consists of **FOUR** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

QUESTION ONE **[20 MARKS]**

A company that is aspiring to become an independent energy producer has approached you. The company wants to install grid scale solar PV plant and sell all the electricity to the off taker through a power purchase agreement. The company wants you to advise them if their investment will make profits. Discuss with hypothetical examples how you can use the following indicators to offer guidance to the company. Clearly show how investment decisions will be made based on each of these indicators.

- | | |
|--|------------------|
| a) Simple Payback | [3 marks] |
| b) Discounted Payback | [4 marks] |
| c) Net Present Value | [3 marks] |
| d) Benefit to Cost Ratio/Profitability Index | [2 marks] |
| e) Internal Rate of Return | [3 marks] |
| f) Levelized Cost of Energy (LCOE) | [5 marks] |

QUESTION TWO **[15 MARKS]**

- a) Discuss with illustrations where applicable the following terms as related to energy demand analysis
 - i) Discretized Load Curve
 - ii) Demand Elasticity **[3 marks]**

- b) In a completely liberalised energy market, several players have unique roles to play. Identify any **FOUR** such players and taking Kenya as a reference, who do you think are better placed to play the identified roles in a case of completely liberalised electricity market. Give reasons and any institutional or operational changes that can be done to enhance the capacity to execute the function.

[You are free to select any other country within the EAC but not outside]

[12 marks]

QUESTION THREE **[15 MARKS]**

- a) Energy markets can fail due to reasons such as monopolisation, externalities among others. Explain the main signs of energy market failure **[5 marks]**
- b) Discuss how the following issues affect investments in the energy sector. Give examples to support your discussion.
- i) High cost of financing in developing countries;
 - ii) Risks in energy investments;
 - iii) Resource availability and mobilization and
 - iv) Investment and pricing links. **[10 marks]**

QUESTION FOUR **[15 MARKS]**

- a) Mini-grids have been identified as one of the means of reaching the underserved communities especially in developing countries. There exist different business models for such solutions that have been used. Discuss any **THREE** minigrids business models, giving applications examples, merits and demerits of each of them. **[9 marks]**
- b) Discuss the justification for demand side management (DSM) from the Energy Economics point of view. **[6 marks]**