



**JARAMOGI OGINGA ODONGA UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

SCHOOL OF ENGINEERING AND TECHNOLOGY

**UNIVERSITY EXAMINATIONS FOR THE DEGREE IN SCIENCE IN
RENEWABLE ENERGY TECHNOLOGY AND MANAGMENT**

FOURTH YEAR RESIT EXAMINATIONS 2020/21 ACADEMIC YEAR

CENTRE: MAIN CAMPUS

COURSE CODE: TET 3413

COURSE TITLE: Energy Conservation and Management

EXAM VENUE: STREAM: BSc REN TECH & MGT

DATE: ../11/2020 EXAM SESSION:

DURATION: 2 HOURS

Instructions

- 1. Answer question 1 (Compulsory) and ANY other two questions**
- 2. Candidates are advised not to write on question paper**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room**

QUESTION ONE

- a) Distinguish between ‘preliminary energy audit’ and ‘detailed energy audit’ [4 Marks]
- b) What do you understand by ‘plant energy performance’ (PEP) [4 Marks]
- c) Outline the four principles of energy management [4 Marks]
- d) Explain energy conservation opportunities in illumination and industrial sector [2 Marks]
- e) Write down the steps involved in ‘Energy management Strategy program’ (EMP)[8 Marks]
Outline steps involved in ‘detailed energy audit’ in a systematic order [8 Marks]

QUESTION TWO

- c) Illustrate using a block diagram and discuss the flow chart of conducting an Energy Audit [15 Marks]
- d) Outline Four benefits for been accredited with ISO 50001 for any institution [5 Marks]

QUESTION THREE

- a) Differentiate between energy conservation and energy efficiency. [2 Marks]
- b) Differentiate between reactive and active power. [2 Marks]
- c) A waste heat audit survey for a plant found that 1000 kg/hr of water at 90C is discharged to the sewer. How much heat can be saved by utilizing this fluid as makeup to the boiler instead of the 20C feed water supply? Fuel cost is Ksh. 800 per million kJ; boiler efficiency is 80% and hours of operation is 4000. [4 Marks]
- d) With the use of an illustration explain the concept of Thermal energy storage (TES)[3 Marks]
- e) Explain what is fuel substitution and give an example of fuel substitution used in an industry [3 Marks]
- f) Outline three reasons why investors are opting to install compact fluorescent light bulbs (CFLs) in their buildings than Incandescent bulbs [3 Marks]
- g) What are some of the factors to be considered before procuring fuels for energy efficiency and economics? [3 Marks]

QUESTION FOUR

- a) Discuss the format of an energy audit report [12 Marks]
- b) Discuss four steps followed in energy conservation planning. [8 Marks]

QUESTION FIVE

- d) Discuss three forms of demand side management that can be implemented in energy conservation and management [8 Marks]
- e) Compare and contrast between energy efficiency and energy conservation [7 Marks]
- f) Outline five responsibilities an energy manager [5 Marks]