JARAMOGI OGINGA ODINGA 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 3415

COURSE TITLE: Energy and Built Environment 1

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 (COMPULSORY)

a. Describe energy and built environment. (3 marks)
b. What is energy conservation? (1 mark)
c. State and explain various passive solar energy systems. (10 marks)
d. As an upcoming energy expert, describe what or how tomorrow's energy efficient building should have? (5 marks)
e. Describe design objectives of a whole building design. (8 marks)
f. What does optimization of energy efficiency mean? (3 marks)

QUESTION TWO

a. State the general expression for the energy balance as used in energy conservation. (1 mark)
b. Describe the concept of intelligent lighting as used in energy and built environment. (5 marks)
c. Describe the three optimization control measures studied in this course. (6 marks)
d. Describe intelligent energy efficient buildings. (8 marks)

QUESTION THREE

a. State two major aspects that matter during the planning of technical services and logistics for building systems. (2 marks)
b. Describe either four of the principles of energy efficiency building system. (8 marks)
c. Discuss the concept of passive energy system as used in this course. (4 marks)
d. Describe triple bottom line goals as far as buildings and building efficiency is concerned. (6 marks)

QUESTION FOUR

a. From energy and environmental building concept standpoint, describe the strategy for design involved. (6 marks)
b. How can unwanted energy flows with too much energy leaving or entering building via windows be corrected? (3 marks)
c. As an upcoming renewable energy, describe how you can achieve cost-effectiveness from energy conservation measures? (5 marks)
d. State and explain the key characteristics of at least two buildings in Kenya that have embraced green energy technologies. (6 marks)

QUESTION FIVE

a. Under criteria for architectural, mechanical, electrical and building system components describe the following:
   i. Site and building orientation. (10 marks)
   ii. Envelope and façade design. (3 marks)
   iii. Daylight and lighting analysis. (2 marks)

b. Bondo County government housing department has invited all stakeholders in the building industry: owners, occupants and entire society to deliberate on the need for efficient buildings. Explain the benefits of efficient buildings to all this stakeholders. (5 marks)