(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS 2019/2020 ACADEMIC YEAR

FIFTH YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL ENGINEERING EAND BACHELOR OF TECHNOLOGY EDUCATION IN CIVIL ENGINGINEERING

COURSE CODE: CSE 562/TEB 462

COURSE TITLE: BUILDING SERVICES ENGINEERING

DATE: FRIDAY 23RD OCTOBER 2020 TIME: 8.00 – 10.00 AM

INSTRUCTIONS:

1. This paper consists of five questions. Answer **Question 1** and any other **Two** questions.
2. All marks are indicated on the parenthesis.
3. Provide neat sketches and diagrams where required.
4. Examination duration is **2 Hour**

SECTION A: ANSWER QUESTION 1

Question I (30 marks)

(a) Outline the various building services required in a building. State the main players that are involved. *(10 marks)*

(b) Differentiate between direct and indirect systems of cold water supply in a building stating the advantages and disadvantages of each system. *(10 marks)*

(c) By use of neat illustrations explain the following types of ventilation systems used in buildings: (i) Exhaust Ventilation system (ii) Supply Ventilation system *(10 marks)*

SECTION B: ANSWER ANY OTHER TWO QUESTIONS

Question 2 (20 marks)

(a) Explain the difference between a dry riser and wet riser. Sketch the wet riser installation in a building.` *(5 marks)*

(b) Describe any FIVE types of portable fire extinguishers installed in buildings. *(10 marks)*

(c) Outline the FIVE primary sources of moisture occurring inside a building *(5 marks)*

Question 3 (20 marks)

(a) What is an Energy Audit? When carrying out an energy audit on a commercial building, describe the typical energy improvement measures you could recommend and the justification for each measure described. *(10 marks)*

(b) By the use of a suitable sketch, illustrate the heat exchange processes which occurs between a building and the external environment. *(5 marks)*

(c) Explain the term "sick building syndrome". How can it be prevented inside a building? *(5 marks)*

Question 4 (20 marks)

(a) A large public hall in Kakamega County measuring 25m length by 20m width with a height of 10m requires mechanical ventilation. The ceiling height is at 9m. Determine the airflow rates for the mechanical system given the following:

Occupancy = 750 seats
Supply air ventilation rate = 10 air changes per hour
Outdoor air recommended minimum rate (non-smoking) = 8 l/s/p

(10 marks)

(b) Discuss the some of the security enhancement systems that can be installed in a building. Mention the advantages of each. *(10 marks)*