



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2020/2021

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF
ENVIRONMENTAL STUDIES AND COMMUNITY DEVELOPMENT

BCM 209: MECHANICAL AND ELECTRICAL SYSTEMS

DATE: Tuesday, 30th March 2021

TIME: 2.00p.m-4.00p.m

INSTRUCTIONS:

SECTION A

Question One (Compulsory)

- (a) State **six** different types of building structure (3marks)
- (b) Explain **four** impacts of mechanical and electrical systems in buildings (4marks)
- (c) State **five** functions of HVAC in buildings (5marks)
- (d) Outline **six** design criteria of ventilation system in a building (6marks)
- (e) Explain how sprinkler systems function, and state **five** suitable sources of water for sprinklers. (8marks)
- (f) State **four** goals of sustainable design in buildings (4 marks)

SECTION B: Answer any TWO questions from this section

Question Two

- (a) Describe **five** methods and equipment used to fight fires within buildings. (10marks)
- (b) Explain **five** ways in which fire and smoke are detected and fire-fighting systems are brought into action (10marks)

Question Three

- (a) Explain **ten** design parameters for cold-water mains and storage systems within buildings, giving particular information on protection from frost damage, suitability for drinking and protection of the mains against contamination from the building. (10marks)

- (b) Draw the layout of an indirect hot-water system employing a central-heating boiler and secondary circulation. Show all the pipe work and control arrangements. (10marks)

Question Four

Describe, with the aid of sketches, ten ways in which the water seal can be lost from a trap and the precautions taken to avoid this happening. (20marks)

Question Five

- (a) Explain, with the aid of sketches, the meaning of the terms 'single-phase' and 'three phase' electricity supplies and show how they are used within buildings. (8marks)
- (b) Calculate the power consumption and resistance of a 240V filament lamp if it has 1.5A passing through it. (5marks)
- (c) Briefly describe four methods of testing electrical installations. (7marks)