



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2018/2019

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN CONSTRUCTION MANAGEMENT
BCM 209: MECHANICAL AND ELECTRICAL SYSTEMS

DATE: THURSDAY 13TH DECEMBER 2018

TIME: 8.00 A.M. - 10.00 A.M.

INSTRUCTIONS

- This paper consists of TWO Sections
- Section A: Question 1 (Compulsory) shall carry 30 marks
- Section B: Answer any TWO questions . Each question carries 20 marks

SECTION A

Question One (compulsory) 30 marks)

- a) Define the following terms
- i) Mechanical ventilation
 - ii) Permanent vents
 - iii) Sprinkler water systems (1 mark)
 - iv) Portable fire Extinguishers (1 mark)
- b) Differentiate the following:
- i) Ventilation and air conditioning systems giving THREE advantages and Two disadvantages of each system (12 marks)
 - ii) Surface and underground water sources giving THREE outlets for each source (5 marks)
 - iii) Direct and Indirect cold water supply systems (2 marks)
 - iv) Natural and Mechanical Ventilation systems (2 marks)
 - v) Heat and Smoke fire detectors (2 marks)
- c) With the aid of neat sketches, show THREE strategies for Natural Ventilation (3 marks)

SECTION B

Answer any Two question form this section

Question Two (20 marks)

- a) List FIVE reasons for ventilating an enclosed space (5 marks)
- b) A building has a floor area of 5m by 10m and 5 No. window openings. Using the $1/10^{\text{th}}$ formula for natural ventilation design, design a suitable Permanent Vent with a depth of 0.2m for each window. (2 marks)
- c) To achieve simultaneous control in Air conditioning process, state THREE factors that are considered in maintaining the health and comfort of the building occupants. (3 marks)
- d) With the aid of a neat diagram, show and label an Air conditioning central plant and describe the procedure on how it operates. (10 marks)

Question Three (20 marks)

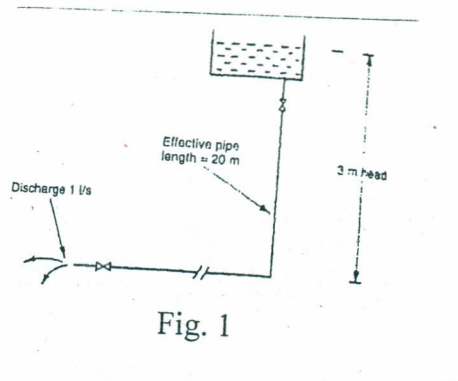
- a) Discuss Wet and Dry Sprinkler systems as applied in buildings (10 marks)
- b) Show and label a schematic diagram for installation of a Wet Sprinkler system. (5 marks)
- c) State items that a well-functioning fire detection and alarm systems may contain (5 marks)

Question four (20 marks)

- a) State FIVE requirements for water supply as stipulated in the Kenya building code (5 marks)
- b) With the aid of neat drawings show the difference between direct and indirect water supply in a two storey building, indicating the location and size of pipes. (10 marks)

- c) Using Thomas Box formula and given the following information q = flow rate as 1 l/s, H = Head or pressure as 3m, L = effective length of pipe as 20m, constants are 25×10^5 , calculate the diameter of the pipes to the nearest commercial size (fig. 1).

(5 marks)



Question 5 (20 marks)

- a) Electrical installations must be tested on completion to verify that the system will operate efficiently and safely. List and explain THREE tests that are carried out for inspection (6 marks)
- b) Describe the following electrical installation methods in a residential building
- Lighting circuit
 - Ring main circuit
 - Cooker circuit
- c) The Building Regulations require that reasonable installation of electrical fixtures be provided at areas and locations in a building where they can be operated without causing danger or harm to people. Using the interior wall of a dwelling having an open able door as an example show the installation location (height measurements) of the following electrical fixtures from the floor level: (5 marks)
- Telephone socket/TV socket
 - Power socket
 - Light switch
 - Cooker