

# Formulae

$$(i) \quad d = \sqrt[3]{\frac{q^2 \times 25 \times L \times 10^5}{H}}$$

$$(ii) \quad N = \sqrt[3]{\left(\frac{D}{d}\right)^5}$$

$$(iii) \quad V = C \sqrt{mxi}$$

$$(iv) \quad C = \left(\sqrt[m]{m}\right)^{\frac{1}{n}}$$





W1-2-60-1-6

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION 2017/2018**

**SEMESTER IV EXAMINATION FOR THE DIPLOMA IN ARCHITECTED**

**ABA 0209: BUILDING SERVICES 1**

**DATE: AUGUST 2018**

**TIME: 1 ½ HOURS**

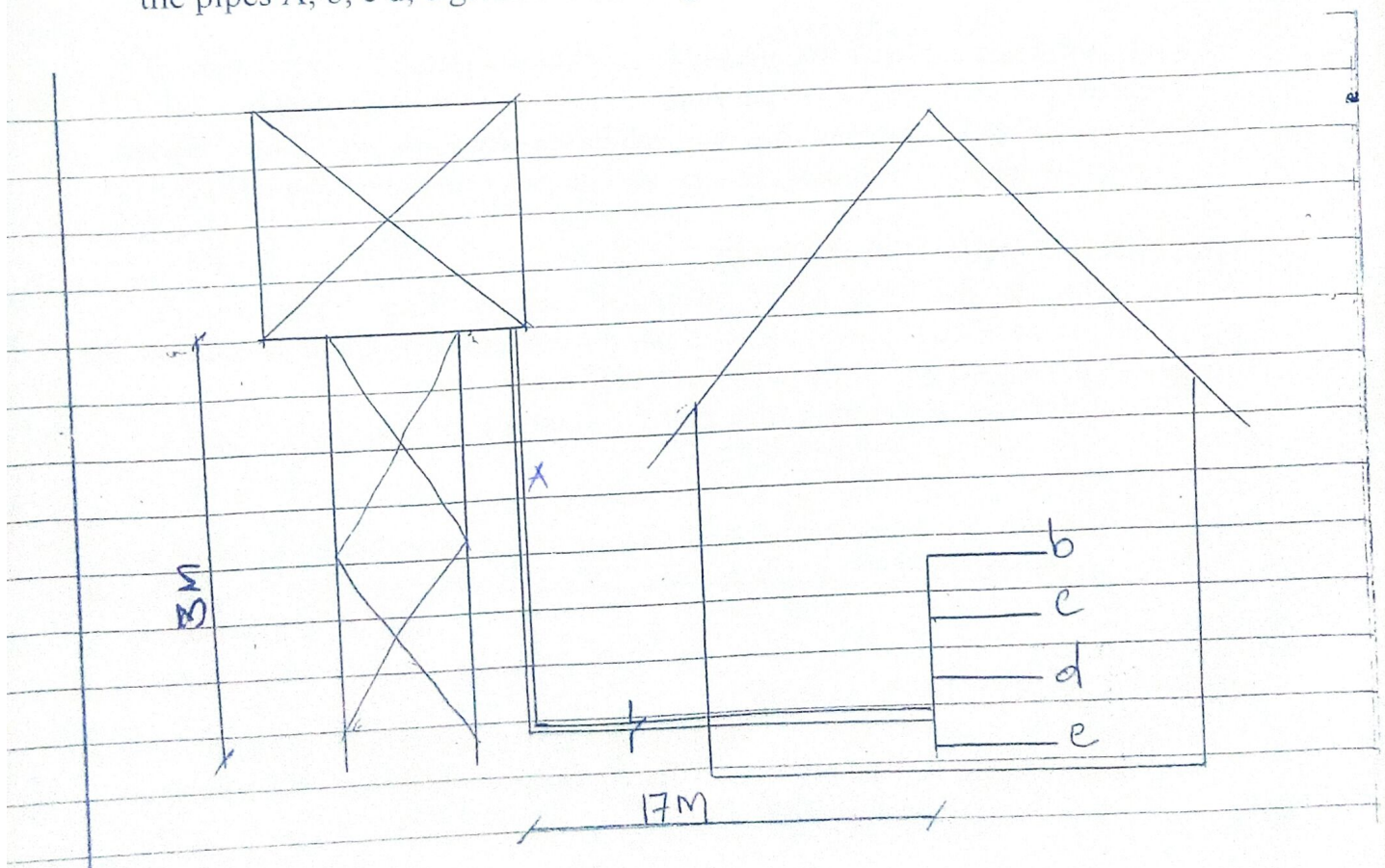
**INSTRUCTIONS:**

**ALL QUESTIONS CARRY EQUAL MARKS**

**ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**  
**SYMBOLS OF THE FORMULAS PROVIDED CARRY THE USUAL**  
**MEANING**

**QUESTION ONE [30 MARKS]**

- (a) Define the term "Building Services". [2 marks]
- (b) Name and explain FOUR (4) building services installations you will consider vital for a public library in the heart of Nairobi city. [8 marks]
- (c) The diagram below illustrates a part of the cold water supply system. Size the pipes A, b, c, d, e given the discharge is 1L/S. [10 marks]





Standard pipes are available in the following sizes in mm. 12, 14, 18, 22, 28, 35, 42, 65, 88, 100.

## QUESTION TWO [20 MARKS]

(a) Briefly describe the following water-based systems of fire fighting with aid of sketches. [10 marks]

- (i) Sprinklers
- (ii) Dry risers
- (iii) Wet risers
- (iv) Hose reels
- (v) Hydrants

(b) Describe the escape route by use of the following guide lines (use sketches where necessary) [10 marks]

(i) Definition

(ii) Construction

(iii) Design and planning

Continuous path by way of a space where any one can pass from any point to a safe without aided effort  
growth, depth and spread.

[2 marks]


[3 marks]

[5 marks]

## QUESTION THREE [20 MARKS]

(a) Express what you understand by the following as used in the drainage systems. [5 marks]

(i) Water trap

(ii) Air gap  missing part

(iii) Vent pipe

(iv) Valve

(v) Invert level

(b) Demonstrate at least five instances that should guide the provision of access points on the drainage runs. [10 marks]

(c) Describe back drop manholes and schematically show where they are used. use well labeled neat diagrams to explain your answer. [5 marks]

## QUESTION FOUR [20 MARKS]

An estate has 600 dwellings with 4 persons in each dwelling. Each person's estimated to consume 125liters of water per day. You are required to estimate the diameter of a drain pipe for the above estate given that: -

- (i) The water in the drain flow half full bore (0.5 proportioned depth).
- (ii) The velocity of flow is 0.8m/s
- (iii) There is a maximum of 5 times average flow
- (iv) Standard pipes are available in the following pipes with the following internal diameters in millimeters; 150, 220, 280, 350, 420, 540, 670, 760 and 820. [20 marks]

## QUESTION FIVE [20 MARKS]

Calculate the discharge in liters of the flow given that the circular pipe of diameter 300mm is laid in 1:60 gradient. the discharge is half bore in a PE pipe with pipe roughness of 0.01 [20 marks]

End of paper  
Examiner