



# MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)  
University Examinations for 2014/2015

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

SECOND YEAR SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN  
PLUMBING

1305/313: PLUMBING THEORY

DATE: 16/3/2015

TIME: 8:30 – 10:30 AM

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## *Instructions*

- *Answer any five questions out of the eight questions on this paper*
- *All questions carry equal marks*
- *Maximum marks for each part of a question are as indicated*

1. A) With regard to fire fighting systems
    - i) Differentiate between a wet riser and a dry riser.
    - ii) Explain the following types of sprinkler systems
      - Wet system
      - Dry system (4 marks)
    - b) With the aid of a neat labeled sketch, illustrate a hose reel installation for a ten storey building in which water is pumped indirectly from a break tank. (12 marks)
  2. a) With the aid of a labeled diagram, explain how a lift and force pump operates, stating its advantages and disadvantages. (8 marks)
  - b) With the aid of a labeled sketch, explain the operation of a multi point instantaneous gas water heater. (6 marks)
  - c) Calculate the total energy required to raise 20<sup>0</sup> litres of water from 40c-78<sup>0</sup>c. The water is held in a copper container which weighs 10 kg.
- Data – specific heat of water – 4.186kj/kg

Specific heat of copper – 0.385 kJ/kg (6 marks)

3. ) List six requirements of a good underground drainage system. (6 marks)
- b) With the aid of a sketch illustrate an arc welding circuit. (4 marks)
- c) Sketch and label a section through a quartzoid bulb sprinkler head and explain how it works. (6 marks)
- d) Estimate the cost of installing the sanitary appliances shown in the table 2 in an ablution block.

Item no.	Sanitary Appliances	No. of appliances	Cost of each appliance Ksh.
1	Water closet and	2	3750
2	Bath tub	1	7850
3	Wash hand basin	2	1900

- % allowances
- Labour @ 10% cost of appliances
- Overheads @ 5% cost of appliances
- Profit @ 8% cost appliances (4 marks)

4. A) Sketch the following appliances and state where each is used.

- i) Plunger type flushing cistern.
- ii) Portsmouth ball valve (8 marks)

- b) i) State two classifications of sanitary appliances and give two examples under each classifications. (4 marks)

– Bonning rod methods

- Water hose (8 marks)

5. a) Define the following terminologies in relation to water supply in a building

- Feed cistern, storage cistern, warning pipe, Supply pipes services pipe, distribution pipe. (8 marks)

- b) Name and sketch the sheet metal flashing that is used to weather a chimney passing through the ridge of a roof. (6 marks)

- c) State three advantages of each of the following materials:

- Mild steel compared to pvc.

- Copper compared to other metal (6 marks)
6. A) Sketch and label a single stack drainage system for a three story building and state five design requirements. (10 marks)
- b) i) State four factors that govern the circulation of water in hot water systems.  
ii) State the causes of hot water system and state its effects. (6 marks)
- c) Explain each of the following as used in water supply to high rise buildings
- Zoning – delayed action ball valve
  - Pipe line switch, break tank (4 marks)
7. A) Using a single line diagram, sketch and label a one pipe drainage system above ground for a two storey building and indicate pipe diameter. (10 marks)
- b) With the aid of a neat sketch, explain how a grevack resealing trap works. (6 marks)
- c) Sketch detailed sections to show.
- i) Standing seam
  - ii) Battens roll covered with sheet metal. (4 marks)
8. a) i) Name three classes of mild steel pipes stating their colour codes and where each is suitably used. (3 marks)
- b) i) Identify five materials used for the manufacturing of sanitary appliances. (5 marks)
- ii) State five requirements of sanitary appliances.
- c) Differentiate between attached and integral traps. (1 mark)