1305/314
PLUMBING CRAFT THEORY
June/July 2020
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN PLUMBING

PLUMBING CRAFT THEORY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:
Answer booklet;
Mathematical tables/scientific calculator;
Drawing instruments.
*Answer **FIVE** of the following **EIGHT** questions.*
All questions carry equal marks.
Maximum marks for each part of a question are indicated.
Candidates should answer the questions in English.

This paper consists of 3 printed pages.

Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

Turn over

1. (a) (i) State **four** safety precautions observed in relation to tools and equipment.
(ii) State **four** classes of tools used in plumbing and name **one** example of each.
(8 marks)

(b) Define the following properties of metals:

(i) ductility;
(ii) malleability.

(4 marks)

(c) Explain the procedure of hot bending a PVC pipe. (8 marks)

2. (a) (i) Distinguish between permanent hardness and temporary hardness in water.
(ii) Explain the 'base exchange' process.
(8 marks)

(b) Outline **four** disadvantages of the direct system of cold water supply. (6 marks)

(c) With the aid of sketches, illustrate **four** welding joints. (6 marks)

3. (a) Explain the following terms as used in cold water supply:

(i) cistern;
(ii) waterline;
(iii) communication pipe;
(iv) distributing pipe.

(6 marks)

(b) Differentiate between a stop valve and a gate valve. (6 marks)

(c) Sketch and label an automatic flushing cistern for urinals. (8 marks)

4. (a) Differentiate between brazing and soldering. (4 marks)

(b) Explain **two** components of an arc welding machine. (4 marks)

(c) With the aid of labelled sketch, explain the auto-pneumatic system in boosted cold water installation. (12 marks)

5. (a) Explain the purpose of the following components in gas installation:

(i) meters;
(ii) condensate receiver.

(4 marks)

(b) Outline **four** properties of insulating materials for hot water systems. (6 marks)

(c) Explain **four** advantages and **one** disadvantage of the centralised water heating system. (10 marks)

6. (a) (i) Outline **three** methods of roof drainage.
(ii) Sketch and label a vertical section through a detached water outlet for a flat roof. (10 marks)

(b) State **two** steam system components and give **one** use of each. (3 marks)

(c) Sketch a labelled vertical section through a rainwater shoe. (7 marks)

7. (a) Explain **three** systems of solar water heating. (6 marks)

(b) Explain the functions of the following pump components:

(i) suction valves;
(ii) strainers;
(iii) priming devices;
(iv) float switches.

(8 marks)

(c) (i) State the **two** requirements in relation to the termination of stacks.
(ii) State **two** disadvantages of resealing and anti-siphon traps.

(6 marks)

8. (a) (i) State where the following stack diameters are suitable in a single stack system:

(I) 75 or 89 mm diameter;
(II) 100 mm diameter;
(III) 125 mm diameter;
(IV) 150 mm diameter.

(ii) Outline **four** design requirements of a single stack system. (10 marks)

(b) Calculate the velocity of flow in a rectangular channel given the following information:

(i) breadth (b) of channel - 500 mm;
(ii) depth (d) of channel - 300 mm;
(iii) gradient of channel of 1 in 80.

[Chezy constant = 55]

(10 marks)

THIS IS THE LAST PRINTED PAGE.