



1305/314
PLUMBING CRAFT THEORY
June/July 2017
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;

Drawing instruments;

Mathematical tables/calculator.

The paper consists of EIGHT questions.

Answer FIVE questions.

ALL questions carry equal marks.

Maximum marks for each part of the question are indicated.

Candidates should answer the questions in English.

This paper consists of 4 printed pages.

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

1

(a) Outline how safety is observed in each of the following:

- (i) clothing,
- (ii) behaviour,
- (iii) self care,
- (iv) storage of tools.

(6 marks)

(b) Sketch and label the following plumbing hand tools:

- (i) hacksaw,
- (ii) pipe reamer.

(8 marks)

(c) Differentiate between ferrous and non-ferrous metals, stating two examples in each case.

(4 marks)

(d) State:

- (i) the chemical name of water
- (ii) the chemical symbol of water

(2 marks)

2 (a) Name **three** major sources of water.

(3 marks)

(b) Sketch and label a flange joint for a mild steel pipe water main.

(5 marks)

(c) A 14 storey building is to be supplied with water from the main. If the pressure on the main is 300 Kpa, show the pipe arrangements for supplying the building with water, if the local water authority allows a direct pumping from the mains. (12 marks)

(a) Outline **four** design principles of direct system of hot water supply.

(6 marks)

(b) Differentiate between a tap and a valve in plumbing installations.

(3 marks)

(c) Sketch and label pipe connection to a water tank.

(4 marks)

(d) List **four** Kenya building code requirements for sanitary appliances.

(2 marks)

(e) (i) Define the term alloy.

(1 mark)

(ii) Describe the following alloys:

- (I) brass, → copper, zinc
- (II) bronze, → copper, tin

(4 marks)

Handwritten notes:
 3. My water used off pipes should be lead in pipes.
 Valve - stops flow of water where there is a leakage or only other than allowing to be done.
 All continuous flow of water after straight



4. (a) Explain the following water treatment processes:
- (i) screening,
 - (ii) sedimentation,
 - (iii) chlorination.
- (6 marks)

(b) With the aid of a labelled sketch, explain the operation of a double trap siphonic water closet.

(8 marks)

(c) Sketch and label a single stack drainage system.

(6 marks)

5. (a) Name **three** types of gas welding flames.
- (3 marks)

(b) (i) With the aid of labelled sketches, differentiate between rightward and leftward gas welding techniques.

(8 marks)

(ii) Name **four** gas welding defects.

(2 marks)

(c) Calculate the power output of a centrifugal pump which can lift 200 litres of water from a shallow well 6 m deep in 10 seconds.

(7 marks)

6. (a) Name **two** physical and chemical properties of water.
- (4 marks)

(b) List **two** examples of the following:

- (i) soil appliances,
 - (ii) waste appliances.
- (4 marks)

(c) Sketch and label an indirect hot water supply system for a domestic house.

(8 marks)

(d) Sketch and label a running joint on mild steel pipe.

(4 marks)

7. (a) Outline **four** reasons for arc welding electrode coating.
- (6 marks)

(b) Sketch and label an alternating current arc welding set.

(7 marks)



- (c) Estimate the cost of installing sanitary appliances using the information shown in table 1.

Table 1

| S/No. | Description | Quantity | Unit | Unit cost |
|-------|--------------------|----------|------|-----------|
| 1 | Water closet suite | 2 | No | 3,750.00 |
| 2 | Bath tub | 1 | No | 7,850.00 |
| 3 | Wash hand basin | 2 | No | 1,900.00 |

Assume any other relevant information

Labour @ 10% cost of appliance

Overheads @ 5% cost of appliance

Profit @ 8% cost of appliance

(7 marks)

8. (a) Describe the procedure of tinning a soldering bit. (4 marks)
- (b) State **four** positions where manholes are used in drainage systems. (4 marks)
- (c) List **two** reducing agents used in water treatment. (2 marks)
- (d) (i) Outline the **four** properties of a coagulant. (4 marks)
- (ii) Outline **four** characteristics of below ground drainage system. (6 marks)

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