

1305/314

PLUMBING CRAFT THEORY

June/July 2019

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.

This 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) List **four** items found in a first aid kit. (2 marks)
- (b) State **two** precautions to be observed when using each of the following tools:
- (i) chisel;
 (ii) hammer;
 (iii) hacksaw. (6 marks)
- (c) Sketch the following tools used in plumbing works, stating one use for each:
- (i) fixed jaw basin wrench;
 (ii) straight pein hammer. (6 marks)
- (d) With the aid of a sketch, describe the hydrological cycle. (6 marks)
2. (a) (i) List **four** sources of water.
 (ii) State **four** impurities that make water unsuitable for drinking. (4 marks)
- (b) Explain the following processes of water treatment:
- (i) filtration;
 (ii) coagulation. (4 marks)
- (c) Describe the following fire fighting systems:
- (i) wet riser;
 (ii) dry riser. (4 marks)
- (d) Outline the procedure of cutting a thread on a steel pipe using stocks and dies. (8 marks)
3. (a) Differentiate between ferrous metals and non-ferrous metals giving **one** example in each case. (4 marks)
- (b) (i) State **four** advantages of direct cold water supply system.
 (ii) Sketch and label a section through a domestic cold water storage cistern indicating positions of all connections. (10 marks)
- (c) Explain the following types of flows in pipes:
- (i) steady flow;
 (ii) turbulent flow;
 (iii) laminar flow. (6 marks)



4. (a) State **four** factors considered when selecting a pump for water supply. (4 marks)
- (b) With the aid of a labelled sketch, explain the working principles of a reciprocating pump. (8 marks)
- (c) Distinguish between 'separate system' and 'combined system' of drainage. (4 marks)
- (d) State the metal composition of the following alloys:
- (i) brass;
- (ii) bronze. (4 marks)
5. (a) (i) State **four** precautions observed when using gas welding equipment.
- (ii) With the aid of sketches, describe **two** types of oxy-acetylene welding flames. (10 marks)
- (b) State **four** defects in arc welding. (2 marks)
- (c) Illustrate the following welded joints:
- (i) butt joint;
- (ii) angle joint;
- (iii) lap joint. (6 marks)
- (d) State **two** precautions observed when installing a gas system in a building. (2 marks)
6. (a) Explain the working of instantaneous electrical water heater. (2 marks)
- (b) Illustrate the direct hot water system indicating the direction of flow of water. (6 marks)
- (c) State **one** function of each of the following components in pipework giving **two** examples of each:
- (i) valves;
- (ii) taps. (4 marks)
- (d) (i) Explain the term furring as used in hot water systems stating **two** of its effects.
- (ii) Sketch and label a direct solar water heating system. (8 marks)



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- (a) (i) State **four** materials used for sanitary appliances.
 - (ii) Differentiate between waste appliances and soil appliances giving **two** examples in each case. (10 marks)
 - (b) State **four** items considered when estimating the cost of plumbing works. (4 marks)
 - (c) Sketch and label a detail of the flashing at a roof valley. (6 marks)
- 8.
- (a) State **five** locations where manholes are provided in a drainage system. (5 marks)
 - (b) Sketch and label a section through a soakway. (5 marks)
 - (c) With reference to setting out of drains, state:
 - (i) **two** instruments used;
 - (ii) **two** pieces of equipment used. (2 marks)
 - (d) Explain **four** causes of loss of water seal in traps. (8 marks)

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