

1305/314
PLUMBING CRAFT THEORY
June/July 2010
Time: 3 hours

THE KENYA NATIONAL EXAMINATIONS COUNCIL

PLUMBING CRAFT CERTIFICATE

PLUMBING CRAFT THEORY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

- Answer booklet*
- Drawing instruments*
- Mathematical tables/Calculator*

*Answer any FIVE of the following EIGHT questions.
All questions carry equal marks.
Maximum marks for each part of a question are as shown.*

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) (i) With the aid of sketches, explain the use of the following tools:
pipe reamer,
wheel cutter.
- (ii) State any **two** safety rules to be observed when using ladders. (5 marks)
- (b) List any **three** classes of fire and state the types of materials involved in each class. (6 marks)
- (c) (i) Briefly describe the following properties of materials:
ductility,
brittleness,
toughness.
- (ii) Briefly explain the following heat treatments of materials.
annealing,
case-hardening,
normalising. (9 marks)
2. (a) (i) State the main constituents of the following alloys and state where each could be used in plumbing services:
brass,
bronze.
- (ii) Describe the main properties of any **two** types of non-ferrous metals. (10 marks)
- (b) Briefly describe the main classifications of water. (3 marks)
- (c) With the aid of a sketch, describe the water cycle. (7 marks)

3. (a) Using neat sketches, describe the following joints in copper:
manipulative compression joint,
capillary solder joints. (6 marks)
- (b) Sketch and name the following types of pipework supports:
saddle clip,
double spacing clip. (3 marks)
- (c) Briefly explain **three** advantages and **three** disadvantages of a direct cold water supply system over an indirect cold water supply system. (6 marks)
- (d) Briefly describe the following methods of softening water:
lime soda,
base exchanger. (5 marks)
4. (a) With the aid of a labelled diagram, show a direct system of domestic water supply and indicate the minimum pipe diameters. (4 marks)
- (b) Briefly describe the following as used in steam heating:
latent heat,
Sensible heat,
Saturated steam,
Dry Saturated steam. (8 marks)
- (c) With the aid of sketches, describe the operation of instantaneous water heaters. (8 marks)
5. (a) With the aid of sketches, describe the use of the following valves:
(i) equilibrium valve,
(ii) safety valve. (6 marks)

- (b) (i) State **two** classes of sanitary appliances.
- (ii) Using a sketch, describe the operation of an automatic flushing cistern. (8 marks)
- (c) List any **five** types of sanitary appliances and indicate where any **two** are used. (6 marks)
6. (a) With the aid of a labelled sketch, explain the operation of a lift and force pump. (8 marks)
- (b) With the aid of a sketch, explain the operation of an automatic pneumatic cylinder. (8 marks)
- (c) List any **four** types of weathering apartments. (4 marks)
7. (a) State **six** safety precautions to be observed when using gas welding cylinders. (6 marks)
- (b) (i) Outline the procedure of setting up the gas welding equipment. (5 marks)
- (ii) State any **two** welding defects and list their causes. (6 marks)
- (iii) Briefly describe any **two** types of gas welding flames. (9 marks)
- (c) With aid of a diagram, briefly describe the installation of gas entry into a building. (6 marks)
8. (a) With the aid of a sketch, describe the operation of bi-metallic strip flame failure device. (6 marks)
- (b) Using sketches, explain the following types of water flow in pipes:
- turbulent flow;
- streamline flow. (5 marks)
- (c) With the aid of a labelled sketch, explain the working principle of a wet sprinkler system in a two storey building. (6 marks)
- (d) List **three** types of wells. (3 marks)