

1305/314  
PLUMBING CRAFT THEORY  
June/July 2022  
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/ scientific calculator.*

*This paper consists of EIGHT questions.*

*Answer FIVE 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 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) Explain **one** negative effect of the following behaviour prohibited in a workshop:
- (i) shouting;
  - (ii) unclean workshop floor;
  - (iii) operating a machine without permission.
- (6 marks)
- (b) Use sketches to explain the hydrological cycle. (6 marks)
- (c) Sketch the following tools:
- (i) G-clamp;
  - (ii) pipe reamer.
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- (4 marks)
- (d) Explain how each of the following tools is maintained:
- (i) cold chisel; *through whipping after use*
  - (ii) ratchet stock and die. *through oiling moveable parts*
- (4 marks)
2. (a) Sketch and label a diaphragm ball valve. (6 marks)
- (b) Explain the **four** causes of fall in water level during drain testing. (6 marks)
- (c) Illustrate **two** causes of loss of trap seal in a drainage system. (8 marks)
3. (a) (i) Sketch and label an indirect cold water system for a domestic house.
- (ii) State **two** advantages of an indirect cold water supply system.
- (8 marks)
- (b) Sketch the following pipe joints:
- (i) union joint on steel pipe;
  - (ii) copper soldered capillary joint.
- (6 marks)
- (c) Outline **three** negative effects of hard water. (6 marks)
4. (a) Define the following terms as used in metals:
- (i) malleability;
  - (ii) ductility;
  - (iii) hardness.
- (6 marks)



- (b) Illustrate leftward and rightward gas welding techniques. (8 marks)
- (c) Sketch and label a vertical section through a prismatic cylinder. (6 marks)
5. (a) State five factors considered during pump selection. (5 marks)
- (b) Sketch and label a two-pipe system of above the ground drainage. (10 marks)
- (c) State five situations where manholes are located in a drainage system. (5 marks)
6. (a) (i) Define the term 'thermal insulation'. (6 marks)
- (ii) State four advantages of thermal insulation. (8 marks)
- (b) Sketch and label an indirect hot system for a domestic house. (6 marks)
- (c) Name two soil appliances and two waste appliances and where each is used. (5 marks)
7. (a) Using the Thomas Box formula, calculate the diameter of a pipe to discharge two litres of water per second when the head is 5 metres and the effective length is 50 metres. (10 marks)
- (b) (i) Name four roof covering materials. (5 marks)
- (ii) Figure 1 shows part of a roof section. Name and sketch two weathering flashings suitable for the chimney stack where it protrudes from the roof. (10 marks)

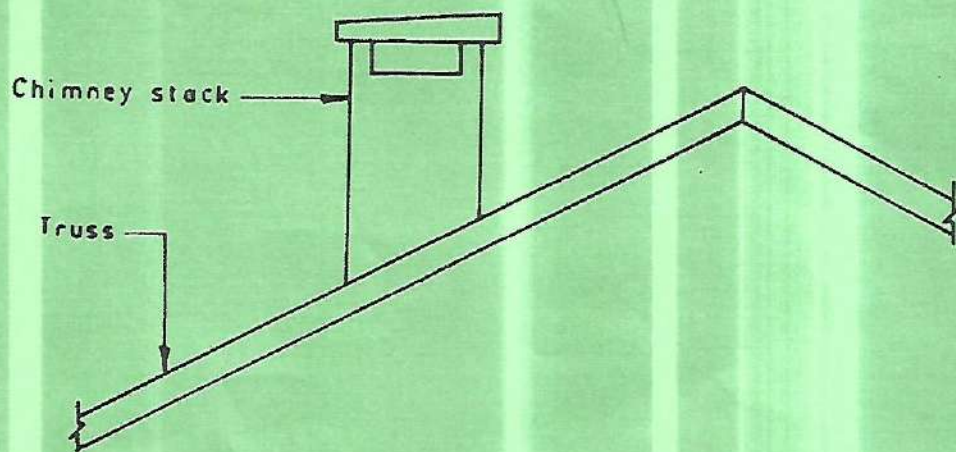


Fig.1



- (c) State **five** safety precautions observed while arc-welding. (5 marks)
8. (a) Explain how each of the following water impurities are removed during the treatment process:
- (i) unpleasant smell;
  - (ii) suspended matter;
  - (iii) pathogenic organisms.
- (9 marks)
- (b) Sketch and label a pneumatic vessel. (8 marks)
- (c) Name **six** non-ferrous metals. (3 marks)

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