

1305/314  
PLUMBING CRAFT THEORY  
June/July 2018  
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.*

*Answer any FIVE of the following EIGHT questions.*

*All questions carry equal marks.*

*Maximum marks for each part of a question are as 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 the principle of the fire triangle and state how it may be used in fire fighting. (5 marks)
- (b) Sketch and label each of the following tools used in plumbing:
- (i) chain pipe wrench;
- (ii) wheel cutter. (6 marks)
- (c) With the aid of a labelled sketch, explain the operation of an equilibrium ball valve. (9 marks)
2. (a) Explain each of the following water treatment processes:
- (i) coagulation;
- (ii) disinfection. (5 marks)
- (b) With the aid of a labelled sketch explain the operation of a pressure water filter. (8 marks)
- (c) State **four** safety precautions observed when using oxy-acetylene gas welding equipment. (4 marks)
- (d) Illustrate each of the following defects in gas welding:
- (i) undercut;
- (ii) poor penetration. (3 marks)
3. (a) Sketch and label a fully vented one-pipe system to a two storey building serving **three** appliances on each floor. (9 marks)
- (b) Outline **four** causes of loss of seal water in a trap. (6 marks)
- (c) Explain **two** below ground drainage tests. (5 marks)
4. (a) With the aid of a labelled sketch explain the operation of a hydraulic ram. (12 marks)
- (b) Sketch and label a bimetal flame-failure device and describe how it works. (8 marks)

5. (a) List **six** points in a drainage system where a manhole must be provided. (3 marks)
- (b) Sketch and label a septic tank and explain how it operates. (11 marks)
- (c) Sketch the symbols used for the following appliances:
- (i) water closet;
  - (ii) wash hand basin;
  - (iii) kitchen sink
- (6 marks)
6. (a) (i) Sketch and label as direct domestic hot water system.
- (ii) Outline the situation that would necessitate the use of an indirect hot water system. (10 marks)
- (b) With the aid of a labelled sketch explain how a delay action ball valve operates. (6 marks)
- (c) State **four** factors that influence the selection of a pump. (4 marks)
7. (a) State **four** sources of heat of boilers. (2 marks)
- (b) With the aid of a labelled sketch, explain the operation of a gas storage water heater. (8 marks)
- (c) Sketch and label a cold water storage cistern and explain **three** specifications for pipe connections. (10 marks)
8. (a) Sketch each of the following arc welding joints:
- (i) butt joint;
  - (ii) fillet
- (4 marks)
- (b) Sketch and label a grease trap and outline its operation. (5 marks)
- (c) Illustrate each of the following pipe joints:
- (i) cast iron joint;
  - (ii) screwed joint;
  - (iii) PVC cement weld joint;
  - (iv) copper silver soldered joint.
- (6 marks)

- (d) A 32 mm diameter black mild steel pipe is to be heat bent to the shape shown in figure 1.

Calculate the total length of the pipe required.

(5 marks)

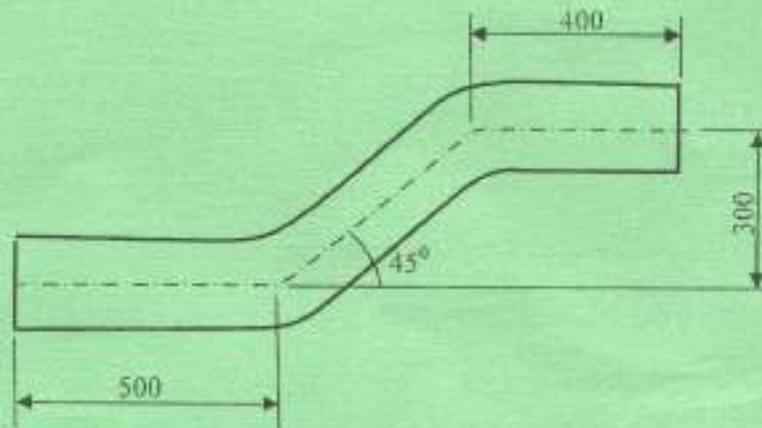


Fig. 1

NB all dimensions in mm.

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