

1305/314
CRAFT THEORY
June/July 2011
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN PLUMBING

CRAFT THEORY

3 hours

INSTRUCTIONS TO CANDIDATES

You should have the following for this examination:

*Answer booklet;
Drawing instruments.*

*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 3 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) State **four** building construction operations a plumber performs. (2 marks)
- (b) Explain **two** purposes of safety regulations on sites. (3 marks)
- (c) (i) Explain **two** properties of metals that makes cast iron an ideal material for plumbing works.
- (ii) Outline how stainless steel resists rusting. (6 marks)
- (d) Use labelled sectional sketches to show **three** methods of sheet metal weathering details to a chimney stack penetrating a pitched roof 1m from the ridge. (9 marks)
2. (a) Sketch and label **one** hand tool used for each of the following operations:
- (i) pipe cutting;
- (ii) fitting a gate - valve. (4 marks)
- (b) With the aid of sketches, outline the **four** stages of the hydrological cycle. (6 marks)
- (c) With aid of a labelled sketch, describe the installation of a Viking Johnson compression joint for steel water mains. (10 marks)
3. A ten storey block is to be installed with indirect cold water system. The mains pressure can only feed sufficiently upto fifth floor. Each floor should be supplied with drinking water separate from other appliances. If the method of supply to be used is automatic pneumatic cylinder to boost the pressure:
- (a) draw and label a single line diagram to illustrate possible layout; (10 marks)
- (b) with a labelled diagram, show all the mountings; (5 marks)
- (c) outline the operations of the pneumatic vessel suitable for the system. (5 marks)
4. (a) Name **four** boiler mountings and explain the importance of each. (8 marks)
- (b) Draw a typical arrangement of a solar assisted indirect hot water system for a domestic house given the following information:
- (i) the solar heating is applied on the primary circuit with circulator pump connected;
- (ii) the secondary circuit with a return pipe feeds Wash Hand Basin (WHB), kitchen sink, Bath tub, and Dobie sink. (12 marks)



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Malleable

ridge

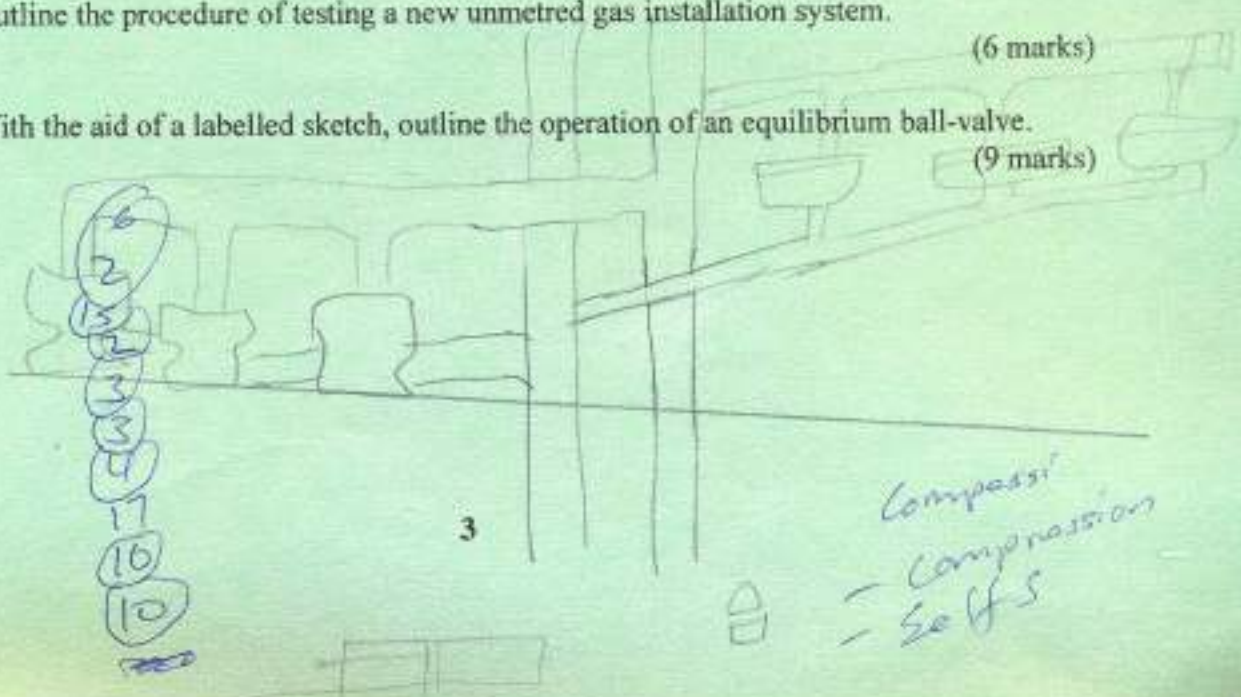


5. (a) Explain **two** precautionary measures that would make running an electric heated hot water system economical. (4 marks)
- (b) State **two** advantages and **two** disadvantages of connecting sanitary appliances to direct cold water system. (4 marks)
- (c) With the aid of a labelled sectional sketch, outline the working principle of a flushing valve. (12 marks)

6. (a) State **six** by-law requirements pertaining to soil waste and vent stacks for the fully vented one pipe drainage system. (3 marks)
- (b) With the aid of labelled sketches, outline **two** types of trap seal loss in sanitary pipework resulting from pressure difference. (7 marks)
- (c) With the aid of a labelled diagram, illustrate the layout of a fully vented one pipe drainage system suitable for a three storey hostel with a range of 3 water closets (wc), and three wash hand basins (WHB) on each floor. (10 marks)

7. (a) (i) Sketch and label a section through a manhole not exceeding 1m deep. (ii) State **six** by-laws pertaining to manhole construction. (8 marks)
- (b) With the aid of labelled sketches distinguish the following below ground drainage systems:
- (i) combined;
 - (ii) separate;
 - (iii) partially separate.
- (12 marks)

8. (a) Make a pictorial sketch to show the left hand gas welding technique on a horizontal butt joint on mild steel 3 mm thick. (5 marks)
- (b) Outline the procedure of testing a new unmetred gas installation system. (6 marks)
- (c) With the aid of a labelled sketch, outline the operation of an equilibrium ball-valve. (9 marks)



Compass
- Compression
- Self