

2914/103  
2915/103  
LABORATORY AND  
WORKSHOP PRACTICE  
June/July 2019  
Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

DIPLOMA IN APPLIED BIOLOGY  
DIPLOMA IN ANALYTICAL CHEMISTRY

MODULE I

LABORATORY AND WORKSHOP PRACTICE

**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.**

SECTION A (40 marks)

Answer ALL the questions in this section.

1. State four safety features in the design of a laboratory. *Safety shower, ventilation, fire extinguishers, floor* (4 marks)
2. Explain the application of the following floor surfaces in the laboratory.
  - (i) Linoleum (1 mark)
  - (ii) Terrazzo (1 mark)
  - (iii) Asphalt (1 mark)
  - (iv) Wood - *used in labs where there's no moisture.* (1 mark)
3. Explain why it is dangerous and unsafe to pour inflammable solvents down the sink. *They may corrode the pipe.* (4 marks)
4. State four causes of error in weighing while using an open balance. *vibration, when the balance is not set at zero, placing the product directly* (4 marks)
5. Outline how crucibles are cleaned in the laboratory. (4 marks)
6. Distinguish between first degree burn and third degree burn. (4 marks)
7. Draw the symbols that represent following hazards:
  - (a) Irritant; (1 mark)
  - (b) Flammable; (1 mark)
  - (c) Dangerous for environment; (1 mark)
  - (d) Oxidising. (1 mark)
8. Describe how hazardous chemical waste is disposed. *then solution is first diluted then flushed into the drainage - strong acids neutralisation - radioactive material placed in the sun to decay then sealed in lead* (4 marks)
9. Describe:
  - (a) the dove tail saw and carcass saw; (2 marks)
  - (b) state application of each of the saws above. (2 marks)
10. Draw the diagrams of the following metal work tools:
  - (a) Slip joint pliers; (2 marks)
  - (b) Long nose pliers. (2 marks)



SECTION B (60 marks)



Answer any **THREE** questions from this section.

11. (a) Describe how the blade of a plane is sharpened. (7 marks)
- (b) Outline how a dovetail joint is made. (9 marks)
- (c) Give **four** precautions that should be taken when handling nitric acid in the laboratory. (4 marks)
12. (a) Describe the steps involved in weighing process in the laboratory using a digital balance. (7 marks)
- (b) State **four** ideal conditions that should be met in a balance room. (4 marks)
- (c) Explain the classification of flammable chemicals in the laboratory. (9 marks)
13. (a) Describe the steps involved in making a blazing joint. (6 marks)
- (b) List any **five** properties of aluminium alloys. (5 marks)
- (c) Describing first aid treatment for the following burns: (3 marks)
- (i) Hydrochloric acid; (3 marks)
  - (ii) Phosphorous; (3 marks)
  - (iii) Alkali.  $\text{NH}_4\text{Cl}$ ; (3 marks)
14. (a) Outline how surgical gauze can be sterilized using bench autoclave. (10 marks)
- (b) List any **five** factors that determine size of gangway in the laboratory. (5 marks)
- (c) List **five** factors that should be considered when selecting materials for bench tops. (5 marks)
15. (a) Outline the steps for creating an isomeric drawing. (4 marks)
- (b) Distinguish between first angle and third angle projections. (8 marks)

WHICH  
to follow

good conditions up to lead  
realistic & durable  
good mechanical strength  
up to 250

liquids  
& solids  
physical method of sterilization

Affordability  
Mechanical strength

Reachability with chemicals  
Electrical conductivity  
Rm to moisture

Resistance to rust attack

laboratory must do  
people using the lab  
purpose of the work being done  
Type of equipment in the lab

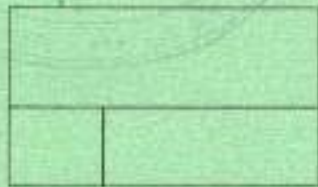
Handle with care

Important to autoclave to ensure effectiveness  
Allow the load to stand for 5 mins  
in the autoclave  
Open the autoclave to release vapour

Get the balance is not at a  
Place the balance on a firm flat surface free  
from vibration  
Wipe the bench to prevent dust  
Do not place substances directly on the  
balance.

(c) The figures 1, 2 and 3 shows the side views, front view and top view of a machine block.

**Figure 1**



Side view

**Figure 2**



Front view

**Figure 3**



Top view

Draw isometric view of the machine block

(8 marks)

**THIS IS THE LAST PRINTED PAGE.**

