MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF PURE, APPLIED AND HEALTH SCIENCES

DEPARTMENT OF HEALTH SCIENCES

TVET EXAMINATION

2023/2024 ACADEMIC YEAR

FIRST YEAR **SECOND** SEMESTER EXAMINATION FOR DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

SLT-CU-SL-CC-02-6-A – LABORATORY INSTRUMENTATATION

DURATION: 3 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer question one and any other three questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

a) Define the term glass. (2 marks)
b) State two differences between soda lime glass and borosilicate glassware. (4 marks)
c) State the role of the following glassware in the laboratory. (3 marks)
   i. Graduated pipettes
   ii. Round bottom flask
   iii. Glass filter holder
d) State two applications of flame photometry. (3 marks)
e) Explain how flame photometer work. (5 marks)
f) State two components of flame photometer. (4 marks)
g) Give two examples of fuel and oxidants used in flame photometer. (2 marks)
h) Define the term chromatography. (2 marks)
i) Differentiate between mobile phase and stationary phase. (3 marks)
j) Explain three precautions that must be considered while working with glass blowing equipment. (6 marks)
k) Define glassblowing. (2 marks)
l) State the role of annealing oven in glass blowing industry. (1 mark)
m) Explain the annealing process in glassblowing technique. (4 marks)

SECTION B – ANSWER ANY THREE QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

a) State the role of the following tubes used in laboratory: (8 marks)
   i. U – tube
   ii. Y – tube
   iii. T – tube
   iv. L – tube
b) Account on how the following hazards from working in glass producing industry can be avoided: (12 marks)
   i. Eye protection
   ii. Respiratory hazards
   iii. Cut s and burns

QUESTION THREE (20 MARKS)

a) Describe the steps involved in calibrating PH mater used in the science laboratory. (6 marks)
b) Calculate the PH of a solution with 1.2345×10^{-4} MHCl. (3 marks)
c) Explain how column chromatography is used to separate samples in the laboratory. (10 marks)
d) State one application of chromatography technique. (1 marks)

QUESTION FOUR (20 MARKS)

a) State four care and maintenance of water bath. (4 marks)
b) State two importance of lubricating equipment in the laboratory giving examples of laboratory equipment that can be lubricated. (4 marks)
c) Give two equipment's used in glass blowing industry, explaining how they operate. (8 marks)
d) State four applications of flame photometry. (4 marks)

QUESTION FIVE (20 MARKS)

a) Explain how flame photometer used to analyse samples in the laboratory. (10 marks)
b) Explain the importance of maintaining laboratory equipment. (10 marks)