JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF SPATIAL PLANNING AND NATURAL RESOURCE MGT

UNIVERSITY EXAMINATION FOR DIPLOMA IN LAND SURVEY

2nd Year 1st SEMESTER 2024/2025 ACADEMIC YEAR

MAIN REGULAR

COURSE CODE: PCD 1212

COURSE TITLE: ENVIRONMENTAL ANALYTICAL TECHNIQUES 1

EXAM VENUE: LAB 10 **STREAM: (DIPLOMA IN ENV. SCIENCE)**

DATE:

TIME: 2 HOURS

Instructions:

i. Attempt Question **ONE** (**COMPULSORY**) and any other **THREE** questions.

ii. Candidates are advised not to write on the question paper.

iii. Candidates must hand in their answer booklets to the invigilator while in the examination room.

QUESTION ONE (40 MARKS)

a) Highlight five importance's of laboratory analysis (5 Marks)

b) Explain how you understand the following terms

i. Chromatography (2 Marks)
ii. Environmental analytical techniques (2 Marks)
iii. Titration (2 Marks)
iv. Volumetric / titrimetric analysis (2 Marks)
v. Distillation (2 Marks)

c) State four different types of volumetric/titrimetric analysis (4 Marks)

d) Highlight advantages of volumetric analysis over other methods of analysis (4 Marks)

e) Outline 4 factors that determine the choice of heat source to be used during heating in the laboratory (4 Marks)

f) Outline two different types of chromatography (2 Marks)

g) State any three different types of distillation (3 Marks)

h) Different the following

i) Crystallization and recrystallization (4 Marks)

ii) Heterogeneous and homogeneous mixtures (4 Marks)

QUESTION TWO (20 MARKS)

a) With the aid of a diagram, explain fractional distillation as a separation technique (10 Marks)

b) Highlight areas of application of fractional distillation technique (10 Marks)

QUESTION THREE (20 MARKS

a) Define filtration and explain with the aid of a diagram filtration process (7 Marks)

b) State and explain areas of application of filtration technique (10 Marks)

c) State any three types of mixtures that can be separated by filtration (3 Marks)

QUESTION FOUR (20 MARKS)

a) Discuss paper chromatography (10 Marks)

b) Explain decantation process and give two examples of mixtures that can be separated though decantation (10 Marks)

QUESTION FIVE (20MARKS)

a) Draw a well labelled diagram of analytical balance (6 Marks)

b) Outline seven procedures for operating analytical (14 Marks)

Q**UESTION SIX (20MARKS**

In titration 15.50 ml of 0.048M standard solution of potassium permanganate required 25.00ml of iron (ll) suplate solution to reach end point.

I) Write the balanced redox equation for the reaction (4 Marks)

ii) Calculate the number of moles of the Iron (ii) solution (ii. (6 Marks)

c) Outline preparation of a 0.0167M at potassium dichromate soli(4) ii) Outline the steps taken in standardizing the potassium dichromate solution prepared in (i) 4 (10 Marks)