TEVETA

Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN SCIENCE LABORATORY

LEVEL 6 YEAR 1 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY / AUGUST 2025

SUBJECT: CHEMISTRY 1

TIME: THREE (3) HOURS **TOTAL MARKS: 100**

PASS MARK: 50

INSTRUCTIONS TO CANDIDATES

1. Write your Examination number and National Registration Card (NRC) number on the answer booklet provided. Ensure you append your signature in the space provided on the answer booklet.
2. Write the ANSWER SCRIPT SERIAL NUMBER on the examination register and on the entry slip.
3. This paper has seven (7) questions. Answer Five (5) questions.
4. Diagrams may be used where necessary to clarify your answer.
5. Cell phone and programmable calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

(a) Define sampling. [3 marks]

(b) State four (4) apparatus/appliances which may be used for heating purposes in a chemistry laboratory. [4 marks]

(c) Explain the reason calibration of apparatus/equipment is important in a laboratory [5 marks]

(d). Describe the process of separating a mixture of sand, iron filings and table salt to a point where all the three substances are separate and in solid form. [8 marks]

Total: [20 Marks]

QUESTION 2

(a) State the four (4) components of a fire triangle. [4 marks]

(b) Explain the following term used in stopping fire:

(i) Cooling. [2 marks]

(ii) Smothering. [2 marks]

(iii) Starving. [2 marks]

(iv) Interrupting. [2 marks]

(c) Describe how to use a modern fire extinguisher. [8 marks]

Total: [20 Marks]

QUESTION 3

(a) An organic compound has molecular formula C_2H_6O. For this compound:

(i) Calculate the molar mass. [2 Marks]

(ii) State the number atoms are there in the molecule. [2 Marks]

(iii) Calculate the number of moles of C_2H_6O that are present in 100 g of the compound. [3 Marks]

(iv) What is the mass percentage (%) of carbon in this compound? [3 Marks]

(b) Silver and nitric acid react according to the following balanced equation:

$$3\ Ag_{(s)} + 4\ HNO_{3\ (aq)} \rightarrow 3\ AgNO_{3\ (aq)} + 2\ H_2O_{(l)} + NO_{(g)}$$

(i) What mass of silver nitrate will be produced from 40 moles of nitric acid? [3 Marks]

(ii) Given 100g of nitric acid, what mass of water will be produced? [3 Marks]

(iii) 40 moles of nitric acid given in Part i, how many litres of nitrogen monoxide at STP will be made? [4 Marks]

Total: [20 Marks]

QUESTION 4

(a) Define the following terms:

(i) Hydrocarbon. [2 marks]

(ii) Functional group. [2 marks]

(b) State **four (4)** classes of organic compounds that form homologous series [8 marks]

(c) List **four (4)** members of the stipulated homologous Series in (b). [8 marks]

Total [20 marks]

QUESTION 5

(a) Show, by way of dot and cross, a diagram showing the chemical bonding in:
(i) Carbon dioxide. [3 marks]
(ii) Calcium chloride. [3 marks]

(b). A particular atom of lead has 82 protons and a nucleon number of 208. Calculate the number of neutrons in the nucleus of this atom of lead. [5 marks]

(c). Explain the reason the average relative atomic masses of most elements in the Periodic Table are not whole numbers. [6 marks]

(d). State three (3) uses of radiation. [3 marks]

Total: [20 Marks)

QUESTION 6

(a) With reference to the periodic table, what is a period? [2 marks]
(b) Explain isotopes. [2 Marks]
(c) Define ionization energy [2 Marks]
(d) State a halogen in period three (3). [1 Mark]
(e) Phosphorus (atomic number 15) and Silicon (atomic number 14) are non-metals.
(ii) Write the orbital electronic configuration of phosphorus. [4 Marks]
(iii) State the period where phosphorus and sulphur belong. [1 Mark]
(iv) Which of the two (2) has a greater electronegativity? [2 Marks]
(v) Which of the two (2) has a smaller atomic radius? [2 Marks]

(f) The element boron is composed of two isotopes: About 19.9% of all boron atoms are ^{10}B with a mass of 10.0129 amu, and the remaining 80.1% are ^{11}B with a mass of 11.0093 amu. Deduce the average atomic mass for boron. [4 Marks]

Total: [20 Marks]

QUESTION 7

(a) Define First aid. [2 marks]
(b) Write five (5) laboratory safety rules. [5 marks]
(c) Describe how the following case can be handled in the laboratory:
(i) Acid spillage. [5 marks]
(ii) A student inhales ammonia. [4 marks]
(iii) Disposing sodium hydroxide. [4 marks]

Total: [20 Marks]