TEVETA

Technical Education, Vocational and Entrepreneurship Training Authority

DIPLOMA IN SCIENCE LABORATORY

LEVEL 6 YEAR I EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: JULY/AUGUST 2026

SUBJECT: CHEMISTRY I THEORY

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

PASS MARK: 50

INSTRUCTIONS TO CANDIDATE

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 any 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 ONE

(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 TWO

(a) Define the following terms:
(i) Alkane [2 marks]
(ii) Carboxyl group. [2 marks]

(b) Describe **four (4)** classes of inorganic compounds. [16 marks]

Total 20 marks

QUESTION THREE ✓

(a) Define First aid. [2 marks]

(b) Outline five essential First Aid measures after a chemical accident in the laboratory. [5 marks}

(c) Explain how the following cases should be managed in the chemistry laboratory:
(i) Chemical burns. [5 marks]
(ii) Inhalation of toxic laboratory [4 marks]
(iii) Accidental ingestion of laboratory chemicals. [4 marks]

Total 20 marks

QUESTION FOUR ✓

(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 FIVE

(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 SIX

(a) Define isotopes? [2 marks]

(b) Outline the term period in the period table. [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 SEVEN ✓

(a) Define decantation. [3 marks]

(b) State four (4) pieces of glassware or apparatus used for measuring liquid in a chemistry laboratory. [4 marks]

(c) Explain the reason calibration of apparatus/equipment is important in a laboratory [6 marks]

(d). Describe how you would separate a mixture of sawdust, common salt, and small stones so that each substance is obtained separately. [7 marks]

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Total: 20 Marks