Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur
Regular/Back Exam-2075, Falgun/Chaitra

Program: Diploma in DCE/ DAT/DRE/DME/DAE/DIT/ DEE/DEEX/DEX/DGE/DCOM/ Engineering — **Full Marks: 60**, **Pass Marks: 24**
Year/Part: I/I (New+Old Course) — **Time: 3 hrs**
Subject: Engineering Chemistry

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt All questions.

1. a) Define equivalent weight. Find out the equivalent weight of followings: i) H_2SO_4 ii) $Ca(OH)_2$ [4]
   b) Define Avogadro hypothesis. 0.15gm of volatile liquid when treated with victor Meyer's apparatus displaced 40.5cm^2 air collected over water at 15°C and 746mm Hg Pressure. Calculate the molecular weight of liquid (Aqueous tension at 15°C= 13.17 mm Hg). [6]
2. a) A Example Rutherford's atomic model with it's alpha -ray scattering experiment. [2+3]
   b) What do you mean by oxidation and reduction according **Modern Concept** reaction by oxidation number method? [2+3]
   $Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NH_4NO_3 + H_2O$
3. a) Define acid and base according to Arrhenius concept. Also mention its limitations. [5]
   b) How does equivalent weight determined by oxide formation method. (Explain direct and indirect oxide formation method). [5]
4. a) State and explain Dulong's and Petit's law in detail. [5]
   b) Explain limitations and qualities of the chemical equations with suitable examples. [5]
5. a) State Mendaleev's periodic law. Explain the Mendaleev's periodic table with its limitations. [5]

   b) Define normality and morality. What are the prerequisite (characteristics) of primary standard substances? [5]
6. State faradays laws of electrolysis. A current of 10 ampere was passed through a solution of $CuSO_4$ for a hour 20 minutes and 25 second. The weight of copper deposited was 15.86gm. If the atomic weight of copper is 63.56. What is its valency? [2+3]
   b) Write short notes on: **(Any Two)** [5]
   i) Buffer solution ii) Quantum number
   iii) Electrochemical series.