Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur
Regular/Back 2076, Falgun/Chaitra

Program: **Diploma in Civil/Arch/Ref & A/C/Mech/**

Ele/Elx/Geom/IT/Com/Hyd/Auto/Ele & Elx

Engineering   **Full Mark:60**

Year/Part: **I/I (New+Old)**   **Pass Mark:24**

Subject: **Engineering Chemistry I**   **Time: 3 hrs.**

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) Write the qualitative and quantitative significance of [3] following chemical equation.

    $$NaOH + H_2SO_4 \longrightarrow Na_2SO_4 + H_2O$$

    b) Define equivalent weight. 0.175 gm of a metal gave 152 [1+2] ml of H_2 at NTP on treatment with dil. H_2SO_4. Calculate the equivalent wt of metal.

2. a) Write down the postulates of Dalton's atomic theory. [3]

    b) 0.45 gm of metal when dissolved in dil. HCl gave 760 cc [3] of H_2 at 27°c and 640 mm Hg pressure. The specific heat at metal is 0.23. Calculate the exact atomic wt. of metal. (ag.at 27°c=26.74 mbHg:

3. a) Define Avogadro's hypothesis. Show that the molecular [1+2] weight of the compound is twice of it's vapour density.

    b) What is mole? Calculate the no of mole in [3]

    i) 11.2ltr of CO_2 at NTP.

    ii) 20 gm of $CaCO_3$

4. a) Define acid and base in terms of Arrhenivs concept with [3] one examples of each. [3]

    b) 10^{-3} mole of NaOH is dissolved in 10 liters of water. What will be the pH of the solution?

5. a) Write down the Rutherford atomic model in brief. [3]

b) Write any two differences between orbit and orbital's? Write the electronic configuration of cr in tem of S,p,d and f. [2+1]

6. a) Define oxidation and reduction in terms of oxidation number. State with example. [3]

b) Balance the given equation by O.N. method. [3]

$$Cu + HNO_3 \longrightarrow Cu(NO_3)_2 + NO_2 + H_2o$$

7   a) Define Allcalimetry and acidimetry. What indicator would you use during the titration between HCl and Na_2Co_3 and why? [3]

b) 200 ml of 0.8N H_2SO_4 is mixed with 250 ml of 0.6N NaOH. Is the resulting solution acid or basic? Calculate the normality of the resulting solution. [3]

8. a) State and explain Faraday's 2nd law of electrolysis. [3]

b) 25 ml of NaOH Solution required 20 ml of decinormal solution of HCl for complete neutralization. Find the strength [3] of NaOH in terms of Normality, gram/litre and percentage strength.   Website :- https://www.arjun00.com.np

9. a) Define Modern periodic law. Write down the advantage of Modern periodic table. [1+2]

b) Define the term electrovalency. Draw the Lewis structure of H_2SO_4 [2+1]

10. Write short notes on: (Any Three) [3x2=6]

   a) Assumption of electronic theory of valency
   b) Electrochemical series
   c)   Af ball principle
   d) Preventions from corrosion
   e) Radicals

Good Luck!