Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back/Scholarship Exam – 2081 Chaitra/Baishakh

Program:	**Engineering All**	**Full Marks: 60**
Year/Part:	**I/I (2021)** © Arjun	**Pass Marks: 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. What do you understand by radical? What are its types? Give one example of each type. [1+3]
2. Give the significance of following chemical equation: [4]

$$N_2+3H_2 \xrightarrow{Fe} 2NH_3+24 \text{ K Cal}$$

3. Discuss Dalton's atomic theory in the light of modern knowledge. [4]
4. State Avogadro's hypothesis and deduce the relationship between the vapour density and molecular weight of volatile substance. [1+3]
5. Define equivalent weight of an element 3.36 gm of zinc displaced 121.0 cc of dry hydrogen measured at 10.7°C and 748.8 mmHg pressure from dilute hydrochloric acid. Calculate the equivalent weight of zinc metal. [1+4]
6. What is mole? Calculate weight of two molecule of $CaCO_3$.
7. Discuss Arrhenius concept of acid and bases with examples. Write its two limitations. [4]

OR

What are Lewis acids and bases? Explain with appropriate examples. [1+3]

8. What do you understand by normal solution? 25 cc of an alkali solution is mixed with 10 cc of 0.75 N acid solution and for complete neutralization it further required 20 cc of 0.8 N acid solution. Find the strength of the given alkali solution. [1+3]

Cont. .....

9. Define covalent bond. Draw Lewis dot formula for the formation of following compounds. (any **THREE**) [1+3]

a. SO_3 b. CO_2 c. HNO_3 d. $CaCO_3$

10. State and explain Faraday's first law of electrolysis. Mention what is ECE. [3+1]

11. What are the anomalies of Mendeleev's periodic table? [4]

12. Give difference between oxidizing and reducing agent. Write short note on auto-oxidation with example. [2+2]

13. Balance the following equation by oxidation number method: [4]

$$H_2S + HNO_3 \rightarrow NO + S + H_2O$$

14. What is orbit? Write the postulates of Bohr's atomic model. [1+3]

15. Write short notes on: (any **TWO**) [2×2]

a. Aufbau principle b. Isotopes and isobars

c. Sub-atomic particles d. Rusting of iron

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Back Exam – 2081/2082 Chaitra/Baishakh

Program: Engineering All | **Full Marks: 60**

Year/Part: I/I (2013) | **Pass Marks: 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. Define symbol? Also mention its significance. [1+2]
2. What is radical? Describe the different types of radical. [1+2]
3. What are limitations of chemical equations? [3]
4. State the modifications made in Dalton's atomic theory. [4]
5. State Avogadro's hypothesis. In a Victor Meyer experiment, 0.12 g of a volatile liquid displaced 45.6 ml of air at 27°C and 752 mmHg pressure. Calculate the molecular weight and vapour density of the liquid. (Aqueous tension at 27°C is 22 mm of Hg) [1+3]
6. What are the assumptions of electronic theory of valency and bonding? [2]
7. Mention the postulates of Bohr's atomic model. [4]
8. Write the electronic configuration of chromium (atomic number 24). [2]
9. State modern periodic law. List the characteristics features of periodic table. [1+3]
10. Explain about equivalent weight of acid. [2]
11. What do you mean by pH scale? Write about types of salt. [2]
12. Give the Lewis dot formula of: a. NaCl b. NH_3 [1+1]
13. Define redox reaction. Explain in terms of electronic concept. [3]

Cont. .....

14. Determine the oxidation number of manganese in $KMnO_4$. [2]

15. Calculate the mass of copper deposited by electrolysis on passing 2.5 A current for 45 minute through the solution of $CuSO_4$. (Atomic weight of copper = 63.5) [3]

16. What do you mean by acid and base according to Arrhenius concept? Explain. [3]

17. Calculate the pH of: [2+2]

    a. 0.001 molar HCl b. 0.005 molar H_2SO_4

18. Calculate the amount of Na_2CO_3 required to prepare decinormal $\left(\frac{N}{10}\right)$ solution of it in 250 ml. [4]

19. Write short notes on: (any **TWO**) [2×3]

    a. Corrosion b. Quantum numbers

    c. Electrochemical series d. Buffer solution

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back/Scholarship Exam - 2080/2081, Chaitra/Baishakh

Program: Diploma in Engineering All — **Full Marks: 60**

Year/Part: I/I (2021) — **Pass Marks: 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. What do you mean by formula? Explain the significance of formula with suitable example.
2. What are the essentials of chemical equations? Explain its limitations.
3. Explain the modern position of Dalton's atomic theory.
4. Write Avogadro's hypothesis. Explain Dulong's and Petit's law.
5. The specific heat of metal is 0.259 and its equivalent weight is 12 g. What is the exact atomic weight of that metal?
6. What do you mean by equivalent weight of metal? How can you determine equivalent weight by indirect oxide formation method?
7. Define buffer solution. Explain Lewis acid base concept with example.

OR

Calculate the $[H^+]$ and $[OH^-]$ ion in solution of 4 gram sodium hydroxide are dissolved in 2 litre solution.

8. What do you mean by molarity? Mention the characteristics of primary standard solution.
9. What do you mean by electrovalent bond? Write down the electron dot structure of H_2SO_4, NH_3 and Cl_2.

Cont. .....

10. What do you mean by electrolysis? Calculate the mass of copper deposited by electrolysis on passing 1.5 A current in 30 minutes through the solution of $CuSO_4$. (At. wt. of Cu 63.5)

OR

Explain Faraday's first law of electrolysis.

11. State modern periodic law. What are the uses and anomalies of Mendeleev's periodic table?
12. Define redox reaction. Explain classical concept of oxidation and reduction.
13. Balance the given reaction by oxidation number method.
$Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NO + H_2O$
14. Explain Rutherford's atomic model and it's limitation.
15. What are main postulates of Bohr's atomic model? Explain.

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Back/Scholarship Exam-2080/2081, Chaitra/Baishakh

Program: Diploma in Engineering All **Full Marks: 60**

Year/Part: I/I (2013,2014, 2015, 2016, 2017, 2018) **Pass Marks: 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. State Avogadro's hypothesis. Show that molecular weight of substances is twice of its vapour density. [1+4]

   b. Define equivalent weight of an element 0.212 gms of a reactive metal when dissolved in dil. HCl evolved 218.2 cc of hydrogen at 17°C and 754.5 mm of Hg pressure over water. Find the eq. wt. of the metal. (Aq. tension at 17°C=14.4 mmHg) [1+4]

2. a. Write down assumptions of electronic theory of valency. [3]

   b. Show the difference between electrovalent and covalent compounds with examples. [3]

   c. State Faraday's first and second law of electrolysis. [2+2]

3. a. Balance the chemical equation by oxidation number method: [4]

   $Zn + HNO_3 \longrightarrow Zn(NO_3)_2 + NO + H_2O$

   b. Discuss the Lewis concept of acid and base giving appropriate examples. [1.5+1.5]

   c. Calculate the pH of the following solutions: [1.5+1.5]

   i. 0.5 M H_2SO_4 ii. 0.1 M NaOH

4. a. Define mole. Find the weight in grams and number of molecules in 0.5 moles of $Ca(OH)_2$. [1+3]

   b. State Mendeleev's periodic law and modern periodic law. What are characteristics of Mendeleev's periodic table? [1.5+1.5+3]

Cont. .....

5. a. What are the postulates of Bohr's atomic model? [4]

   b. What do you mean by standard solution and unknown solution? 25 cc of N/10 HCl neutralized 21 cc of sodium carbonate solution. How much water must be added to one litre of Na_2CO_3 to make it exactly decinormal solution? [2+4]

6. Write short notes on: (any **FOUR**) [4×2.5]

   a. Requisites of primary standard substance

   b. Lowry and Bronsted concept of acid and base

   c. Anomalies of Mendeleev's periodic table

   d. Quantum number

   e. Postulates of Dalton's atomic theory

   f. Auto-oxidation

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back/Scholarship Exam-2080, Baishakh / Jestha

Program:	**Diploma in Engineering All**	**Full Marks: 60**
Year/Part:	**I/I (2021)**	**Pass Marks: 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 <u>All</u> questions.

1. What do you mean by radicals? Explain its types with examples. Also, explain significance of formula. [4]
2. What are the essentials and limitations of chemical equations? [4]
3. Define atomic weight. State Duleng's and Petit's law and its methods to determine atomic weight. [4]
4. State Avogadro's hypothesis? What is the relationship between Molecular weight and vapour density? Explain. [4]
5. Define equivalent weight of an element. How can you determine equivalent weight by indirect oxide formation method. [4]
6. 0.0396 gram of metal was completely decomposed in hydrochloric acid and the hydrogen evolved gas mixed with O_2 and sparked to form water. 13.75 cc of dry H_2 at 27°c and 680mm kg pressure were required for complete combination. Find the equivalent weight of metal. [4]
7. What do you mean by acid and base according to Arrhenius concept? Also, explain its limitations. [4]

OR

Calculate the $[H^+]$ and $[OH^-]$ in a solution in which 2 gram NaOH are dissolved in 2 liter solution.

8. What do you mean by Normality? Explain the prerequisite of primary standard substances. [4]

Cont.....

9. What do you mean by electrovalent and covalent bond? Write down the electron dot structure of: [4]

a) H_2SO_4 b) SO_3 c) CH_4

10. What do you mean by electrolytes? explain Faraday's First law of electrolysis. [4]

OR

What do you mean by corrosion? Explain the types and prevention of corrosion.

11. State Modern periodic law. What are the uses and anomalies of Mendeleev's periodic table? [4]

12. What do you mean by oxidation and reduction according to classical concept? Explain with example. Also explain oxidation and reduction go side by side. [4]

13. Balance the redox reaction by oxidation number method:- [4]

$$Zn + HNO_3 \longrightarrow Zn(NO_3)_2 + NH_4NO_3 + H_2O$$

14. Explain Rutherford's atomic model and its drawbacks. [4]

15. Explain about quantum numbers in detail. [4]

Good Luck!

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur

Regular/Back/Scholarship Exam-2080, Baishakh / Jestha

Program: Diploma in Civil/Architecture/Electrical/ Mechanical/Electronics/Computer/Survey /IT/Geometrics Engg. **Full Marks: 60**

Year/Part: I/I (Old/Very Old) **Pass Marks: 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) State Avogadro's hypothesis. Derive a relation molecular weight = 2 × Vap. Density. [1+4]

   b) Define equivalent weight of an element. What is meant by gram equivalent? 0.54gm of a metal gives 0.90gm of its oxide. Calculate the eg. wt. of the metal. [1+1+3]

2. a) Write down the significance of following chemical equation. [4]

$$Na_2CO_3 + 2Hcl \rightarrow 2Nacl + H_2O + CO_2$$

   b) What are the limitations of chemical equation? [2]

   c) Discuss the anomalies of Mendeleev's periodic table. [4]

3. a) Explain the Rutherford's atomic model with X-ray scattering experiment, with labelled diagram. [5]

   b) State and explain Faraday's second law of electrolysis with labelled diagram. [5]

4. a) Explain the oxidation and reduction according to classical concept with example. Balance the following equation of oxidation number method:- [5]

$$Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NO + H_2O$$

   b) State and explain Arrhenius concept of acid and base with its limitations. [5]

5. a) Calculate the amount of Na_2Co_3 required to prepare it's decinormal solution in 650ml solution. Also mention the characteristics of primary standard substances. [3+2]

Cont.....

b) What do you mean by covalent bond? Explain with examples. [2.5+2.5]
Write down Lewis structure of H_2SO_4, $CaCO_3$.

6. Write short notes on: (**Any Four**) [4×2.5=10]

a) Corrosion
b) Electrochemical series
c) Buffer Solution
d) Postulates of Dalton's atomic theory
e) Redox reaction
f) Hund's rule

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular Exam-2079, Ashad

Program: Diploma in Engineering All | **Full Marks:** 60

Year/Part: I/I (2021 New Course) | **Pass Marks:** 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. What do you mean by valeancy and variable valency? Explain symbol and its significance. [4]

2. What is the significance of given chemical equation: [4]

$$C_aCO_3+2HCl \longrightarrow C_aCl_2+H_2o+CO_2$$

3. What do you mean by atomic mass unit? 0.5302 gram of metal yield 0.7052 gram of its chloride. The specific heat of the element is 0.059. Calculate the exact atomic weight of Metal. [4]

4. What do you mean by gram molecular weight? How can you prove that hydrogen, chlorine and nitrogen are diatomic gases according to Avogadro's hypothesis? [4]

5. What do you mean by equivalent weight of metal? Explain, the determination of equivalent weight of metal by indirect oxide formation method. [4]

6. 0.212 gram of metal where dissolved in dilute HCL evolves 218.2cc of hydrogen at 17°c and 745.5 mm Hg pressure over water. Find the equivalent weight of the metal (Aq. tension at 17°C=14.4 mm Hg). [4]

7. Explain Arrhenius concept of acid and base with its limitations. [4]

OR

Calculate the $[H^+]and[OH^-]$ in 0.2M HCl solution.

8. What do you mean by molarity? Also mention the characteristics of primary standard substances. [4]

Cont.....

9. What are the basic assumptions of the electronic theory of valency? Write down the electron dot structure of: [4]

a) H_2O b) NH_3 c) C_2H_2

10. What do you mean by electrolysis? Calculate the mass of copper deposited by electrolysis on passing 2.5A current for 45 minutes through the solution of $CuSO_4$. (Atomic weight of copper is 63.5). [4]

OR

Define Faraday? Explain about Faraday's first law of electrolysis.

11. State Mendeleev's periodic law. Explain the periodic table of Mendeleev's. What are it's advantages? [4]

12. What do you mean by redox reaction? Explain how the oxidation and reduction go side by side. [4]

13. Balance the redox reaction by oxidation number method:

$$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO + H_2O$$

14. What do you mean by quantum numbers; explain. [4]

15. Explain the postulates of Bohr's atomic model. [4]

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2079, Ashad

Program: Diploma in Engineering All **Full Marks: 60**

Year/Part: I/I (Old + Very Old Course) **Pass Marks: 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. **[5×2) ×6 = 60]**

1. a) Define chemical equation. What are it's significance according to given equation? [5]

$$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$$

Also mention the limitations of chemical equation.

b) What do you mean by radicals? Explain the Daltons atomic theory. [5]

2. a) State Dulong's and petit's law. How can you determine the atomic weight by this method? [5]

b) What is Avogadro's hypothesis. Also establish, molecular weight = 2xV.D. [5]

3. a) Valency of metal is 3 and it's oxide Contains 31.6% of oxygen. Calculate the atomic weight of metal. [5]

b) How can you determine equivalent weight of metal by indirect oxide formation method? [5]

4. a) State and explain Bronsted and Lawry concept of acid and base. Why water is called amphoteric substance? [5]

b) State Modern periodic law. Describe the anomalies and advantages of Mendeleev's periodic table. [5]

5. a) What are the basic assumptions of electronics theory of valency? Explain covalent bond with example. [5]

b) Explain the main postulates of Bohr's atomic model. [5]

6. a) What do you mean by electrolytes? Explain the Faradays First laws of electrolysis. [5]

b) What do you mean by oxidation and reduction according to electronic concept? Balance the equation by oxidation number method:- [5]

$$Zn + HNO_3 \rightarrow Zn(NO_3)_2 + NO + H_2O$$

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2078, Bhadra

Program:	**Diploma in Engineering All**	**Full Marks: 60**
Year/Part:	**I/I (New + Old)**	**Pass Marks: 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) What do you mean by Eq. wt. of element? Prove that ; Molecular wt. = 2 x Vapour density. [1+4]

   b) How is Dalton's atomic theory modified in the light of Modern Knowledge? [5]

2. a) State and explain Faraday's First law of electrolysis. Calculate the mass of copper deposited by electrolysis on passing 2.5A current for 45 minutes through the solution of $CuSO_4$. (At. wt. of Copper = 63.5) [2+3]

   b) State drawback of Rutherford's atomic model. What are the basic postulates of Bohr's atomic Model? [2+3]

3. a) State Dulong's and Petit's law. 0.444 gram of Metal when dissolved in dilute HCl gave 177 ml of dry hydrogen at $10°c$ and 750 mm Hg pressure, the specific heat of the metal is 0.107. Calculate exact atomic wt. of metal. [1+4]

   b) State Mendeleev's periodic law? Explain Mendeleev's periodic table in brief. Also mention it's anomalies. [1+2+2]

4. a) What is redox reaction? Balance the following chemical Equation by oxidation number method. [1+4]

$$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO + H_2O$$

   b) What do you mean by acid and base according to Arrhenious concept? Also mention it's limitations. [3+2]

5. a) What are the significance of given chemical Equation? [3+2]
   $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$ Mention the limitations of chemical Equations.

Cont.....

b) How can you determine the Equivalent weight by indirect oxide formation method. [5]

6. Write short notes on : **(Any Five)** [5x2=10]

a) Radical b) Covalent bond

c) Hunds rule d) Titration

e) Normality f) Primary standard substances

Good Luck!

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 following chemical equation. [3]

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

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

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 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 moHg. [3]

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

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

i) 11.2ltr of CO_2 at NIP.

ii) 20 gm of $CaCO_3$

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

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 of NaOH in terms of Normality, gram/litre and percentage strength. [3]

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) Acefball principle
d) Preventions from corrosion
e) Radicals

Good Luck!

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**
Year/Part: I/I (New+Old Course) — **Pass Marks: 24**
Subject: Engineering Chemistry — **Time: 3 hrs**

Candidates are required to give th... words as far as practicable. The figures in the mar...

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.

Good Luck