Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Scholarship/Back Exam – 2082 Shrawan/Bhadra

Program:	**Engineering All**	**Full Marks: 60**
Year/Part:	**I/II (2021, 2022)**	**Pass Marks: 24**
Subject:	**Engineering Chemistry II**	**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 permanent and temporary hardness of water. How can you remove the hardness of water containing bicarbonate salt of calcium and magnesium? [2+2]
2. Describe the principle involved in the manufacture of ammonia by Haber's process with well labelled diagram. [4]
3. Discuss the manufacture of nitric acid by Ostwald's process with principle and diagram. [4]
4. Explain about nitrogen cycle. [4]
5. How can you prepare chlorine gas by applying heat in the laboratory? Explain with diagram. What happen when HCl reacts with ammonia? [3+1]
6. How can you prepare H_2S gas in laboratory? What happens when H_2S gas reacts with lead acetate? [3+1]
7. Give your knowledge on the principle of contact process for manufacture of H_2SO_4 and draw well labelled diagram. [4]
8. Define allotropes. Explain the structure of diamond and graphite. [1+3]
9. What do you mean by alloy? Distinguish between metal and non-metal. [1+3]

Cont. .....

10. What are alkali metals and why are they called so? What happen when sodium is heated with ammonia? Write down important uses of sodium. [1+1+2]

11. Differentiate between alkali metals and alkaline earth metals. [4]

12. Define coinage metals. What are properties of copper? [1+3]

13. Define homologous series with example. What are its characteristics? uses [2+2]

14. Write short notes on: [2×2]

    a. Markovnikov's rule

    b. Anti-Markovnikov's rule

15. Write down difference between aliphatic and aromatic compounds. Explain about preparation and uses of polythene. [2+2]

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Special Scholarship/Back Exam – 2082 Jestha

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

Year/Part: I/II (2021) | **Pass Marks: 24**

Subject: Engineering Chemistry II | **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 hard water? Explain the water treatment process for domestic purpose. [1+3]
2. How can you prepare (manufacture) ammonia by Haber's process? Explain. [4]
3. Describe the manufacture of nitric acid by Ostwald's process with labelled diagram. [4]
4. What do you mean by acid rain? Explain oxides of nitrogen as pollutants. [2+2]
5. How can you prepare chlorine gas in the laboratory with application of heat? What happens when chlorine is passed through sodium thiousulphate solution? [2+2]
6. How is H_2S gas prepared in the lab in pure and dry state? What happens when H_2S gas is passed through acidified solution of $KMnO_4$? [2+2]
7. What are oxidizing and dehydrating properties of H_2SO_4? [4]

OR

Explain the principle and well labelled diagram of manufacturing of H_2SO_4 by contact process. [2+2]

Cont. .....

8. What do you mean by allotropic forms of carbon? Explain the structure of diamond. [1+3]

9. What do you mean by alloys? Distinguish between metals and non-metals. [1+3]

10. Define alkali metals. Explain the chemical properties of sodium metal in detail. [1+3]

11. Write down the physical and chemical properties of calcium. [1+3]

12. What are general characteristics of coinage metals? What do you mean by plumbosolvency? [3+1]

13. What do you mean by functional groups and homologous series? Explain with examples. [2+2]

OR

What do you mean by saturated hydrocarbon? Explain the properties of methane. [1+3]

14. A compound 'x' when heated with ozone gives 'y' which upon hydrolysis in presence of zinc dust gives propanone and methanol. Identify 'x' and 'y'. [4]

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

    a. Chemical properties of benzene

    b. Aliphatic and aromatic compounds

    c. Polythene

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Scholarship/Back Exam – 2081 Bhadra/Ashwin

Program:	**Engineering All**	**Full Marks: 60**
Year/Part:	**I/II (2021)**	**Pass Marks: 24**
Subject:	**Engineering Chemistry II**	**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 hard water. How can you remove hardness of water by permutit process? [1+3]
2. How can you manufacture ammonia by Haber's process? Explain. [4]
3. Explain Ostwald's process of manufacture of nitric acid. (Principle and diagram only). [4]
4. What do you mean by term fertilizer? Write the types of fertilizer. [1+3]
5. How is chlorine prepared in the laboratory without application of heat? Explain with diagram. How does chlorine reacts with acidified ferrous sulphate? [3+1]
6. How can you prepare H_2S gas in laboratory? What happens when H_2S gas reacts with lead acetate? [3+1]
7. Explain the dehydrating and oxidizing properties of sulphuric acid. [2+2]

OR

Explain the principle and well labelled diagram of manufacture of H_2SO_4 by contact process. [2+2]

8. Define allotropes. Explain the structure of diamond and graphite. [1+3]

Cont. .....

9. What do you mean by alloy? Distinguish between metals and non-metals. [1+3]

10. What are alkali metals and why are they called so? What happen when: [1+3]

a. sodium is heated with ammonia

b. sodium burnt in the atmosphere of carbon dioxide

c. sodium is reacted with water

11. How do alkali metals differ from alkaline earth metals? What are uses of calcium and zinc? [2+2]

12. What do you mean by plumbosolvency? What are the general characteristics of coinage metals? [1+3]

13. How does vital force theory decline? What do you mean by homologous series? Explain its characteristics. [1+1+2]

OR

What do you mean by saturated hydrocarbon? Explain the properties of methane. [1+3]

14. What happens when: [4×1]

a. Ethylene is treated with alkaline potassium permanganate

b. Ethylene is subjected to ozonolysis

c. Acetylene is passed through ammonical silver nitrate solution

d. Acetylene is passed through red hot iron tube at high pressure

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

a. Friedel craft reaction

b. Polythene

c. Polyvinyl chloride

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Special Scholarship Exam-2081 Jestha/Ashad,

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

Year/Part: I/II (2021) | **Pass Marks:** 24

Subject: Engineering Chemistry II | **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) Mention the salts responsible for hardness of water? A tap water contains soluble bicarbonates of magnesium and calcium. How can it be made soft? Explain. [1+3]

   b) Write down chemical reaction involved in manufacture of ammonia by Haber's process. [1+3]

2. a) Describe in detail the manufacture process of nitric acid by Ostwald's process with labelled diagram. [4]

   b) Explain nitrogen cycle with flow chart diagram. [4]

3. a) How is chlorine prepared in a laboratory with application of heat? Write down action of chlorine with NaOH at different conditions. [2.5+1.5]

   b) Write down action of hydrogen sulphide with: [4×1]

   i. Acidified potassium permanganate
   ii. Sulphur dioxide
   iii. Ferric chloride
   iv. Lead acetate

4. a) Write down principle and conditions for manufacture of sulphuric acid by Contact process. [4]

   b) Draw structure of diamond. Write down uses of diamond and graphite. [1+3]

Cont. ……..

5. a) Write one general method for the preparation of metallic carbonate. Describe in brief types of alloys. [1+3]

   b) Alkali metal always exhibit +1 oxidation state. Why? Why is aluminium used for making parts of air craft. [2+2]

6. a) Write the differences between alkali metals and alkaline earth metals. [3]

   b) What are coinage metals? Can copper displace hydrogen from dil. sulphuric acid? Justify. [1+2]

   c) Mention position of alkali metal and alkaline earth metal in periodic table. [2]

7. a) Define homologous series. Write down characteristics of homologous series. [1+3]

   b) Write short notes on: (any **FOUR**) [4×2]

   i. Functional group
   ii. Markovnikovs's rule
   iii. Saturated hydrocarbon
   iv. Friedel craft alkylation reaction
   v. Polythene
   vi. Natural rubber

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2080, Mangsir/Poush

Program:	**Diploma in Engineering ALL**	**Full Marks: 60**
Year/Part:	**I/II (2021)**	**Pass Marks: 24**
Subject:	**Engineering Chemistry II**	**Time: 3 hrs.**

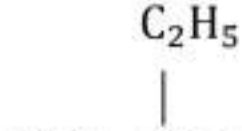
Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt All questions.

1. What is the cause of hardness in water? Describe permutit method for the removed of permanent hardness in detail. [1+3]
2. How can you prepare ammonia by Haber's process explain with diagram? [4]
3. Explain the principle of manufacture of nitric acid by Ostwald's process with labelled diagram. [4]
4. How does oxides of nitrogen (NO & NO_2) can act as pollutant's? Explain nitrogen cycle in brief. [4]
5. Write short notes on: **(Any Two)** [2×2=4]
   a) Hydrogen sulphide as analytical reagent.
   b) Aqua-regia
   c) Lab preparation of HCl
6. How can you prepare chlorine with application of heat in the laboratory? Explain. [4]
7. Define allotropy. Illustrate the structure of diamond and graphite in brief. [1+3]
8. Explain the principle of contact process in detail with well labelled flow chart diagram. [1+3]
9. Differentiate between metals and non-metals in six points with exceptional cases. [4]
10. What do you mean by alkali metals? Describe the properties of sodium. [4]
11. Describe the chemical properties of calcium. [4]
12. What are coinage metals? Discuss about chemical properties of coper metal. [1+3]

Cont.....

13. What are functional groups and homologous series? [1+1+1+1]
Give the IUPAC name for following compound.



i) CH_3-CH(-C_2H_5)-COOH ii) CH_3-O-CH_2-CH_3

14. Describe Markonikov's rule and peroxide effect. Also [3+1]
suggest a chemical reaction to differentiate, wheather the given compound is ethane of ethane.

15. What do you mean by polymer? Explain the properties [1+3]
of benzene.

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back/Special Exam-2080, Mangsir/Poush

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

Year/Part: I/II (old + Very old) **Pass Marks: 24**

Subject: Engineering Chemistry II **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) Define hardness of water. How can yo permanent hardness of water by permutit process?
   b) Describe the manufacture process of ammonia by Haber's process. What happens when excess amount of ammonia reacts with chlorine. [4+1]

2. a) How do you prepared hydrochloric acid in laboratory? Describe with labelled diagram. [5]
   b) Describe the manufacture process of nitric acid by Ostwald's process with a neat and labeled diagram. [5]

3. a) Define acid rain and discuss its effect. Why farmer focus on synthetic fertilizer over organic fertilizer. [3+2]
   b) Describe the manufacturing process of sulphuric acid by contact process (principle and diagram only). [5]

4. a) What do you mean by amalgam? Why alloys are prepared, and also explain the types of alloys. [5]
   b) What do you mean by alkali metals? Explain properties of sodium. [5]

5. a) What do you mean by homologous series? Explain it's characteristics. [5]
   b) What do you mean by saturated hydrocarbon? Explain the properties of methane. [5]

6. a) Write short notes on: **(Any Two)** [2.5×2=5]
   i) Functional group ii) Polythene
   iii) Synthetic rubber
   b) What happens when: **(Any Two)** [2.5×2=5]
   i) Steam is passed over red hot iron
   ii) Benzene reach with conc H_2SO_4
   iii) Zinc reacts with dilute H_2SO_4

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2079, Phagun/Chaitra

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

Year/Part: I/II (2021) | **Pass Marks: 24**

Subject: Engineering Chemistry II | **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 hard water. How can you remove hardness of water by permutit process? [1+3]
2. How can you manufacture ammonia by Haber's process? Explain. [4]
3. Explain Ostwald's process of manufacture of nitric acid (principle and diagram only). [4]
4. What do you mean by chemical fertilizer? Explain its types and characteristics of fertilizers. [1+3]
5. How can you prepare chlorine gas by applying heat in the laboratory? What happen when chlorine reacts with hydrogen and ammonia? [2+2]
6. How can you prepare HCl gas in the laboratory? What happen when HCl reacts with ammonia and $AgNO_3$. [2+2]
7. What are the oxidizing and dehydrating properties of H_2SO_4? [4]

OR

Explain the principle and well labelled diagram of manufacture of H_2SO_4 by contact process. [2+2]

8. What do you mean by allotropic of carbon? Explain the structure of diamond. [1+3]
9. What do you mean by alloys? Distinguish between metals and non-metals. [1+3]
10. Explain the chemical properties of sodium. What are the uses of aluminum. [3+1]
11. What are the properties of calcium? Mention the uses of zinc. [3+1]

Cont. .....

12. What are the general characteristics of coinage metals? What do you mean by plumbosolvency? [2+2]

13. What do you mean by saturated hydrocarbon? Explain the properties of methane. [1+3]

OR

How does vital force theory decline? What do you mean by homologous series? Explain its characteristics. [1+1+2]

14. What do you mean by Markonikov's rule and peroxide effect? Explain with examples. [4]

15. Write short notes on: (any <u>TWO</u>) [2×2]
    a. Chemical Properties of Benzene
    b. Aliphatic and Aromatic Compounds
    c. Polythene

Good Luck !

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2078, Magh/Falgun (Scholarship+Regular)

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

Year/Part: I/II (New + Old Course) | **Pass Marks: 24**

Subject: Chemistry II | **Time: 3 hrs**

Candidates are required to give
The figures in the margin indi

Group 'A'

Attempt <u>All</u> questions. **[6x(5+5)=60]**

1. a) What do you mean by hardness of water? How can you remove the temporary hardness of water? [2+3]
   b) How nitric acid is manufactured by Ostwald's process? Explain with diagram? [5]
2. a) How is ammonia manufactured by Haber's process? Explain what happen when excess ammonia reacts with chlorine. [4+1]
   b) Define acid rain. Explain oxides of carbon as pollutants. [5]
3. a) Explain contact process of manufacture of Sulphuric acid with labelled diagram. [5]
   b) How can you prepare hydrochloric acid in laboratory? Explain with figure. [5]
4. a) What do you mean by vital force theory? Why is it failed now? [4+1]
   b) What is meant by nitrogen fixation? Describe the nitrogen cycle with flow sheet diagram. [4+1]
5. a) What do you mean by alkali metals? Explain the properties of sodium. [5]
   b) Define allotropes. What are the properties of calcium as alkaline earth metal? [5]
6. a) Explain the properties of methane in brief. [5]
   b) Write short notes: **<u>(Any Two)</u>** [2x2.5=5]
      i) Homologous series
      ii) Functional group
      iii) Polymer
      iv) Aeromatic compounds

Good Luck !

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur
Regular/Back Exam-2077, Chaitra

Program: Diploma in Engineering ALL
Year: I / II [2008 to 2018]
Subject: Engineering Chemistry II

Full Marks: 60
Pass Marks: 24
Time: 3 hrs

Candidates are require... as practicable. The figu...

Attempt Any Six questions.

1.a) Define hardness of water. How can you remove permanent hardness of water by permutit process? What are the natural sources of water? [1+4]

b) Describe in detail the manufacture process of nitric acid by Ostwald's process with well labeled diagram. [5]

2.a) Describe the manufacturing process of sulphuric acid by contact process (principle and diagram only). [2+3]

b) Define acid rain. Explain the chemical fertilizer in detail. [2+3]

3.a) Explain the laboratory preparation of hydrochloric acid with required diagram. [5]

b) What are the allotrophs of carbon? Explain the structure of diamond. [5]

4.a) What do you mean by bleaching action of chlorine? What are effect of oxides of carbon on environment and human? [5]

b) Describe the manufacture process of ammonia by Haber's process. [5]

5.a) Define alkaline earth metal. What are the chemical properties of alkaline earth metals? (Specially of calcium). [1+4]

b) Define coinage metals? What are the properties of capper? [1+4]

6.a) What do you mean by functional group? Explain the properties of methane [1+4]

b) Define Polymer? Explain the types and uses of rubber. [5]

7.a) What happen when: [2x2=4]

(i) Steam is passed over red hot iron.
(ii) Sodium is heated with ammonia.

b) Write short notes on: [3x2=6]

a Homologous series
b Polyethene
c) Alloys

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2076, Shrawan/Bhadra

Program: Diploma in Civil/ DAE/DEE/DAE/DME/ Ref.A/C /DIT/ DCE/ DEEX/ DEX/ DGE/ Architecture/Hydro Engineering

Full Marks: 60

Year/Part: I/II (Old+New Course)

Pass Marks: 24

Subject: Engineering Chemistry-II

Time: 3 hrs

Candidates are required to practicable. The figures in

Attempt All Questions.

1.a) What do you mean by hardness of water? Describe the permutit method of hardness of water? [1.5+3.5]

b) Describe the manufacture process of nitric acid with it's principle and well labeled diagram. [5]

2.a) Define allotrophs of carbon? Explain the structure of Diamond and Graphite. [5]

b) How does hydrochloric acid is prepared in the laboratory? Explain, the properties of hydrochloric acid. [2.5+2.5]

3.a) Explain the dehydrating and oxidizing properties of sulphuric acid. [5]

b) What do you mean by acid rain? Mention the types of chemical fertilizer with its features (Characteristics). [2.5+2.5]

4.a) What are the characteristics of alkali metals? Explain the properties of sodium? [1+4]

b) What are the characteristics of aromatic compounds? Explain the chemical properties of benzene? [1+4]

5. Write short notes on: **(Any Five)** [2x5=10]

a) Aqua-regia b) bleaching action c) Functional group
d) Polyethene e) Alkali earth metals f) Homologous series.

6. What happen when: (**Any Five**) [2x5=10]

a) Ammonia gas is passed on concentrated hydrochloric acid?

b) Concentrated HCl and concentrated HNO_3 is mixed in 3:1 ratio

Contd.....

c) Benzene is treated with helpful chemical presence of Anhydrous $AlCl_3$ and ether.

d) Calcium metal is allowed to react with water molecule

e) Ammonia is passed over excess of chlorine.

g) Iron rod is immersed into copper sulphate solution.

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2075, Shrawan/Bhadra

Program: Engineering All — **Full Mark: 60**

Year/Part: I/II [New+Old Course] — **Pass Mark: 24**

Subject: Engineering Chemistry-II — ***Time: 3 hrs.***

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racticable. The figures in

Attempt All Questions.

1. a) Define hard water. Describe the permutit process for the removal of hardness of water. Why the water containing soluble salts of Ca and Mg doesn't provide lather with soap? [6]

   b) Describe the manufacture process of Ammonia gas by Haber's process.(Principle, reaction and diagram). [4]

2. a)Explain the manufacture process of nitric acid by Ostwald's process with well labeled diagram. [5]
   b) What is aqua regia? How does it dissolve noble metals. [3]
   c) What are the necessary conditions for the better yield of sulphuric acid. [2]

3. a) Write down the general characteristics of Alkali metal. [3]

   b) How Co and Co_2 are harmful for human being? explain. [4]

   c) Define pollution. [3]

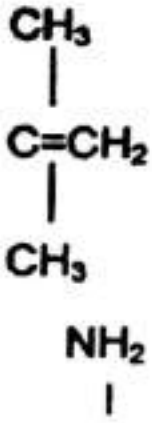
4. a) What is called functional group? Write short notes on homologus series? [1+2]

Contd.....

b) Write IUPAC name of following organic compounds [2]
(Any Two)

i) $CH_3-\overset{\overset{O}{\|}}{C}-CH_3$

ii) $CH_2=CH-CH_2-OH$

iii)


iv) $CH_3-CH_3-CH_2-CH_3$

c) How is chlorine gas prepared in the lab without heating? What happens when moist rose is introduced inside the chlorine gas containing jar. [4+1]

5. What happens when(**Any Five**) [5x2]

i) Copper is treated with dilute HNO_3

ii) Acetylene is passed into ammonical solution of Cu_2Cl_2

iii) Ethglene is subjected to ozonolysis

iv) Benzene is treated with chlorine in presence of $Fecl_3$ as a catalysit in dark

v) H_2S is passed through an aciditied solution of $Kmno_4$.

vi) Conc H_2So_4 is dropped on sugar.

6. a) Write short note on (**Any two**) [2x2]

i) Diamond ii) Aromatic compounds

iii) Polymerisation reaction

b) Write down the differentiate between aliphatic and aromatic compounds. [3]

c) Describe the uses alloys. [3]

Good Luck!

Council for Technical Education and Vocational Training

Office of the Controller of Examinations

Sanothimi, Bhaktapur

Regular/Back Exam-2074, Shrawan/Bhadra

Program	Diploma in Civil/Architecture/Electronics/ Mechanical/Electrical/IT/Automobile/IT/ Computer/E&E/Geomatics Engineering	Full Marks: 60
Year/Part:	I/II [New+ Old Course]	Pass Marks: 24
Subject:	**Chemistry-II**	*Time:* 3:00 *hrs*

Candidates are required to ... cticable. The figures in th...

Attempt **All** Questions.

1. a)What are the types of hardness of water. Discuss washing soda method for the removal of hardness of water. [2+2=4]
   b)Describe the principle involved with well labeled diagram for the manufacture of ammonia by Haber's process. [6]
2. a)Define chemical fertilizers, their types and oxides of nitrogen as pollutants. [1+2+2=5]
   b)Describe diamond and graphite with their structure. [5]
3. a)Give the principle and well labeled diagram for the manufacture of Sulpheruic acid by contact process. [6]
   b)Define alkalimetals? Explain the chemical properties of sodium in detail. [1+3=4]
4. a)Explain the Ostwald's process of manufacture of nitric acid in detail with labeled diagram. [5]
   b)Define acid rain? describe the laboratory preparation of HCL with clean diagram. [5]
5. What happen when (**Any Five**) [2x5=10]
   a)Ammonia react with hydrochloric Acid.
   b)Methane react with chlorine in presence of diffused sun light.
   c)Lead is heated to air.
   d)Steam is passed over red hot iron.
   e)Carbon monoxide react with iron at 120^0c.
   f)Benzene react with methyl chloride in presence of anhydrous AlCl3 and ether.
6. Write short notes on (**Any Five**): [5x2=10]
   a)Functional group b)Rubber c)Use of benzene
   d)Saturated and unsaturated hydrocarbons e)Alloys
   f)Aromatic compounds

Good Luck!

Council for Technical Education and Vocational Training
Office of the Controller of Examinations
Sanothimi, Bhaktapur
Regular/Back Exam-2073 Bhadra/Ashwin

Program: Diploma in Civil/Architecture/Mechanical/ Automobile/ Information Technology/ Computer/ Electrical/ Electrical & Electronics/Electronics/ Geomatics/Engineering — **Full Mark: 60**

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

Subject: Chemistry II — ***Time: 3 hrs.***

Candidates are required t… practicable. The figures in…

Attempt All question

1. a) Describe the manufacture of Nitric Acid by Ostwald's process giving a neat and well labeled diagram. [5]
   b) Given the structure of diamond and graphite. [3]
   c) Write the preparation reaction of Ammonia and also write its two physical properties. [2]
2. a) How do you prepare hydrochloric acid? Describe with labeled diagram. [5]
   b) Define Rubber and describe its types. [3]
   c) Describe in short acid rain. [2]
3. a) What do you mean by hardness? Describe its types and then mention in brief one method of removing permanent hardness. [5]
   b) Describe in brief oxides of carbon. [2]
   c) How are metallic carbonates prepared? [3]
4. a) Write differences between metals and nonmetals. [4]
   b) What do you mean by alloys? Describe in brief types of alloys. [3]
   c) What are aromatic compounds? Write two chemical properties of Benzene. [3]
5. a) Write short note on: [4+4+2=10]
   i) Polythene (ii) Homologous series
   b) What do you mean by saturated hydrocarbons and unsaturated hydrocarbons? Describe with examples.
   c) Is copper a coinage metal? Why?
6. What happens when: **(Any five)** [5x2=10]
   i) Hydrogen chloride is treated with potassium dichromate?
   ii) Hydrogen chloride is treated with lead acetate?
   iii) Ethylene is subjected to Ozonolysis?
   iv) Zinc is treated with caustic soda solution?
   v) Calcium carbonate is heated?
   vi) Zinc reacts with dilute nitric acid?

Good Luck!

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

Regular/Back Exam-2072, Bhadra/Ashwin

Program: Diploma in Civil/ Electrical / Electrical & Electronics/Electronics/ Mechanical/ Automobile/ Computer /IT/ Geomatics Engineering (New Course)

Full Marks: 60
Pass Marks: 24

Year/Part: I/II

Time: 3 hrs

Subject: Chemistry - II

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) Explain the manufacture of nitric acid by Ostwald's process with neat and well labeled diagram. [5]

   (b) Write down the structure and uses of Diamond. [3]

   (c) How is acid rain caused by the oxides of sulphur? [2]

2. (a) Write the differences between temporary and permanent hardness of water? Explain the permutit process to remove the hardness of water [2+3=5]

   (b) How is pure and dry hydrogen sulphide gas prepared in the laboratory? Explain with well labeled diagram. Write down its uses. [4+1=5]

   (a) How does ammonia reacts with [2+2=4]
   (i) Insufficient chlorine and (ii) Zinc sulphate solution

   (b) How can you show that concentrated sulphuric acid acts as oxidizing and dehydrating agents? Explain with examples each. [2+2=4]

   (c) Explain the bleaching action of chlorine. [2]

4. (a What are coinage metals and why are they called so? How does sodium reacts with (i) hydrogen (ii) ammonia and alkali metals (ii) carbon oxide.

(b) Write down general method of preparation and properties of metallic sulphates.

(c) What do you mean by plumb solvency? [2]

5. (a) Write down the differences between alkali metals and alkaline earth metals. [2]

(b) What happens when **(any Four)** [4x2=8]

(i) Sodium is heated with ammonia.

(ii) Calcium is heated with nitrogen.

(iii) Aluminum is treated with concentrated sulphuric acid.

(iv) Hydrogen chloride is passed into potassium permanganate.

(v) Steam is passed over red hot iron.

(vi) Zinc is treat with very dilute nitric acid.

6. (a) Give the IUPAC name of the following compounds. [2]

(i) $HCOOH$ (ii) $CH_3CH_2CH_2OH$

(iii) $CH_3CH_2NO_2$ (iv) $CH_3CH = CHCH_3$

(b) **What happens when** [4]

i) Ethylene is subjected to ozonolysis.

ii) Acetylene is passed over heated sodium

(c) Write short notes on **(Any Two)** [2x2=4]

i) Functional group

ii) Saturated and unsaturated hydrocarbons

iii) Friedel-crafts reactions

iv) Polyvinyl chloride.

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

Regular/ Back Exam-2071, Bhadra/Ashwin

Program: Diploma in Civil/ Electrical / Electrical & Electronics/Electronics/ Mechanical/ Automobile/ Computer /IT/ Geomatics Engineering (New Course)

Full Marks: 60
Pass Marks: 24

Year/Part: I/II

Time: 3 hrs

Subject: Chemistry - II

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) Why is hard water not suitable for washing purpose? Explain the permutit process of softening hard water. [1+3=4]

   (b) How nitric acid is manufacture by Ostwald's process Explain with diagram. [4]

   (c) What do you mean by the term fertilizer? Write the types of fertilizer. [1+1=2]

2 (a) Explain how ammonia is manufacture by Haber's process. [4]

   (b) Write the analytical uses of H_2S gas. [2]

   (c) How is sulphuric acid manufactured by contact process? [4]

3. (a) How chlorine is prepared in laboratory by the application of heat? Write the bleaching properties of chlorine gas. [3+3=6]

   (b) Diamond is hard but graphite is soft. Give reason. [2]

   (c) What will be the product, when iron reacts with very dilute nitric acid. [2]

4. (a) How metallic carbonates are prepared? [3]

(b) Write down the general characteristics of coinage metal. Why these are named as coinage metal? [3+1=4]

(c) What is plumbsolvency? What is the purpose of making alloys? [1+2=3]

5. What happens when, write with balance chemical equations. (Any Four) [4 x 2 = 8]

(i) Sodium metal is heated with ammonia gas.

(ii) Silver exposed to air containing H_2S gas.

(iii) Zinc is treated with caustic soda solution.

(iv) Acetylene gas is passed through Tollen's reagent.

(v) Calcium carbonate comes in contact with hydrochloric acid.

6. (a) Write short note on: [2x3=6]

(i) PVC (ii) Functional group

(b) Markonikov's rules and peroxide effect. [4]

(c) Homologous series. [2]