NEPAL COLLEGE OF INFORMATION TECHNOLOGY
ASSESSMENT SPRING-2023

Level: Bachelor
Programme: BE Computer

Year : 2022
Full Marks : 100
Pass Mark : 45
Time : 3 hrs

Course: Applied 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 the questions.

1. a) Define Corrosion. Write the mechanism of electrochemical corrosion. From the following data, calculate the emf of cell at 27^0C. 8

E^0 Zn/Zn^{2+} = + 0.76V

E^0 Pb/ Pb^{2+} = + 0.13V

$[Zn^{++}]$ = 0.1M, $[Pb^{2+}]$ = 0.02M

R = 8.314 J mol^{-1} K^{-1}

F = 96500C

b) Define batteries. Write construction, working and applications of Nickel-Cadmium batteries.

OR

Define single electrode potential. How single electrode potential is originated? How do you measure the single electrode potential of silver electrode experimentally? 7

2. a) Define air pollution. Write causes, effects and control measures of air pollution. 8

b) Define hardness of water. How is it determined in the laboratory? 7

3. a) Define transition metals. Explain the properties of transition metals with regards to the complex formation and electronic configuration. 7

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OR

Explain the striking features of transition metals with regards to the variable oxidation states and catalytic properties. 8

b) Give reasons:

i) Mn can form complex compounds but not Mg.

ii) Zinc, Cadmium and Mercury are not considered as true transition metals

iii) Copper sulphate is coloured.

iv) Transition metals are mostly paramagnetic.

4. a) Write the kinetics, mechanism and stereochemistry of SN^2. 8

b) Define elimination reaction. Write the kinetics and mechanism of E_1. 7

5. a) What are photovoltaic cells? Write working principle and importan applications of photovoltaic cells. 7

b) What are paints? Write requisites of good paints. Write functions o pigments and drying oils in paints. 8

6. a) Write preparation, properties and uses of PVC and Teflon.

b) Define degradable and non degradable polymers. Classify degradable polymers and mention their important applications. 7

7. Write short notes on (any two) 2

a) Electrochemical series

b) Particulates

c) Manufacture of Portland cement

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COSMOS COLLEGE
OF MANAGEMENT AND TECHNOLOGY

Term Test I

Date: 2080/03/04			
Level	BE	Full Marks	50
Programme	BCE	Time	
Semester	II	1.5 hrs	

Subject: - Applied Chemistry

- ✓ *Candidates are required to give their answers in their own words as far as practicable.*
- ✓ *Attempt All questions.*
- ✓ *The figures in the margin indicate* ***Full Marks.***
- ✓ *Assume suitable data if necessary.*

1. a) Define alkalinity. How is it estimated in the laboratory? [8]
   b) How cement can be manufactured? Write the stepwise chemical reaction involved during setting of cement. [7]

2. a) Explain about the preparation and uses of Teflon and Silicon polymer. [8]
   b) Write the preparation, properties and uses of TNT and TNG. [7]

3. Write short notes on: (*Any four*) [4*5 = 20]
   a) Paints
   b) Photovoltaic cell
   c) Sensors
   d) Conducting polymers
   e) Bio-degradable polymers
   f) Condensation polymers

National Academy of Science and Technology

(Affiliated to Pokhara University)

Dhangadhi, Kailali

Pre-University Examination

Semester: II Fall

Level: Bachelor

Program: B.E. Computer

Course: Applied Chemistry

Year : 2023
F.M : 100
P.M : 45
Time : 3Hrs.

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 the questions.

1.a) Define Electrochemical series. Write any three applications electrochemical series. A cell is formed by dipping Zn -rod in 0.01M Zn^{++} solution and Ni-rod in 0.5M. Ni^{++} solution. Write the cell notation, cell reaction and calculate the emf of the cell. [8]

$E^0 Zn^{++}/Zn = -0.76V$

$E^0 Ni^{++}/Ni = -0.25V$.

b) Explain the principle, working and application of Daniell cell. [7]

OR

What is electrochemical corrosion. Write about electrochemical theory of rusting.

2.a) Define is meant by paramagnetism? What are the application of transition elements in various engineering fields? [7]

b) Give reason [8]

i). Zn, Cd Hg are not regarded as typical transition element.

ii). Cu^{+} is colorless but Cu^{++} is colored.

iii). Transition elements shows complex compounds

iv). Transition elements shows variable oxidation states.

3.a) Define SN^1 reaction with mechanism and stereochemistry. [8]

OR

Define SN^2 reaction with mechanism and factor affecting SN^1 and SN^2 reaction. [8]

b) Describe the E^2 reaction with mechanism. [7]

4. a) Write the preparation, properties and uses of PVC and Teflon and silicone rubber. [7]

b) What are biodegradable and non-biodegradable polymer. Also write their applications. [8]

5.a) Define cement. Describe about setting of cement in different steps. [8]
b) Define explosive substance. How TNT and TNG are prepared. Write their application. [7]

6. a) What is hardness of water? How it is measured in laboratory? [8]
b) Define soil pollution. Mention its main causes of soil pollution also point out its adverse effect as well as control of soil pollution. [7]

7. Write short notes on any two: [2×5=10]
a) Constituent of Paint
b) Lithium ion battery
c) Alkalinity

Best of Luck

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UNITED TECHINICAL COLLEGE

QT Exam

Semester: Spring

Year : 2023

Level: Bachelor

Full Marks: 50

Programme: B. E Computer

Pass Marks: 23

Course: Applied Chemistry

Time : 1.5hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt any three question from 1 to 6.(Q.N. 7 is compulsory)

1	a.	What is electrolytic cell? How is it different from Galvanic cell? Explain Daniel cell with cell notation and also calculate its emf.	7
	b.	What is electrochemical series? Calculate emf of the cell at 25° c $Zn/Zn^{++}(0.2M)//Ag^{+}(0.002M)/Ag$ The standard emf of the cell is 1.54 V.	8
2	a.	What is air poilution? Write its cause effect and control measure?	7
	b.	What is hard water? How can you determine total hardness of water experimentally?	8
3		Give reasons for i. Transition elements show variable oxidation state. ii. Salts of zinc are white iii. Zinc is diamagnetic but Cr is paramagnetic iv. $KMnO_4$ is black in solid but its solution is purple.	15
4	a.	Explain SN1 reaction and also factors affecting it.	7
	b.	What is elimination reaction? Explain E2 reactions and also saytzeef's orientation.	8
5	a.	What are conducting polymers? Explain their types	7
	b.	What is natural rubber? Explain about vulcanization of rubber.	8
6	a.	What are photovoltaic cell write their basic principle and also Explain about sensors and their applications.	8
	b.	Write about setting and hardening mechanism of cement.	7
7		Write short notes on (any one) i. TNT ii. Electrochemical theory of corrosion. iii. Silicones	5

Best of Luck

LUMBINI ENGINEERING COLLEGE (LEC)

Final Internal Exam

Level: Bachelors Degree
Program: Computer 2nd sem.
Course: Applied Chemistry

Year: 2023
Full Mark:100
Pass Mark: 45
Time:- 3 hrs

1.a) What is Galvanic cell? Construct a galvanic. Calculate the e.m.f of the cell at 30^0C. (7)

$Sn/sn^{++}(0.2M)$ // $Ag^{+}(0.1M)$ Ag

where k^0 $Sn/sn^{++}=+0.14V$

E^0 $Ag/Ag^{+}=-0.80V$

$R= 83.14\ Jmol^{-1}k^{-1}$ $F= 96500C$

b) What is electrochemical series? Give its significances. Explain about the electrochemical mechanism of corrosion. (8)

2.a) What is air pollution? Explain about the causes, effects and suitable remedies of air pollution. (7)

b) How can you determine the hardness of water present in water in your lab by complexometric titration method. (8)

3.a) Give reasons for the followings (i) $TiCl_3$ is coloured but $TiCl_4$ is colourless.
ii) Transition elements show variable oxidation state.
iii) Transition elements are generally paramagnetic in nature.
iv) Cadmium is not considered as transition elements. (8)

b) Differentiate between E_1 and E_2 reaction. (7)

4.a) Explain the manufacture method of Portland cement. (8)

b) What are the characteristics of good paint. Explain the constituents of paint. (7)

5.a) How can you determine free chlorine present in water in your lab. 7)

b) What is lead storage battery? Give its principle and applications? (8)
Differentiate between Li-ion battery and sodium in battery,

6.a) Differentiate between addition and condensation polymerization. What are conducting polymers. Explain its types. (8)

b) Give the preparation metho, properties and uses of Telfon and Neoprene. (7)

7. Write short notes on (any two) **(2*5=10)**

a) Dissolved oxygen
b) Sensors
c) Photovoltaic cell
d) Biodegradable polymers.

National Academy of Science and Technology
(Affiliated To Pokhara University)
Dhangadhi Kailali
Accredited by University Grants Commission, Nepal (2022)

First Terminal Examination

Semester : II_Spring

Year: 2022
F.M.: 100
P.M. : 45
Time: 3 hrs.

Level: Bachelor
Program: B.E. Computer
Course: Applied 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 the questions.

1.a) Define electrode potential. How can you determine emf of cell? Calculate the emf of cell at 25°C. Mg/ Mg^{++}(1.5M) //Ag^{+}(0.05 M)/ Ag. Given E^0 Mg^{++}/ Mg= -2.37V and E^0 Ag^{+}/Ag= +0.80V. [8]

b) Explain the principle, working of lead storage Battery. [7]

2.a) Define d- block elements. What are the application of d- block elements in various engineering fields? [7]

b) Give reason [8]

i) Transition metals show Catalytic property.
ii) Cu (I) compounds are colourless.
iii) Transition elements shows complex compounds
iv) Transition elements shows variable oxidation states.

3.a) Define SN^2 reaction with mechanism and stereochemistry. [8]

b) Describe E^1 reaction with mechanism. [7]

4.a) Write the preparation, properties and uses of PVC and Teflon [7]

b) What are silicon rubber?. write their properties and applications. [8]

5.a) Define cement. Describe about setting of cement in different steps. [8]

b) Define conducting and non-conducting polymer and their application [7]

6. a) What is air pollution? Mention its main causes, its adverse effect as well as control measure. [8]

b) Define water pollution. Mention its main causes of water pollution also point out its adverse effect as well as control of water pollution. [7]

7. Write short notes on any two: [2 × 5=10]

a) Sensor
b) Constituent of paint
c) Primary cell

NEPAL ENGINEERING COLLEGE

Changunarayan, Bhaktapur

Assessment Examination-023

Level : Bachelor (BE) Full Marks: 100

Program: Comp & CRE Pass Marks: 45

Course: Applied Chemistry I/II Time : 3hrs.

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 the questions.

1a. Explain and illustrate the Daniel cell. Calculate the emf of given cell at 25^0 C with necessary cell reactions. (5+3)
Fe / Fe^{2+} (a= 0.001) // Ag^+ (a=0.1) / Ag
given that $E^0_{Fe^{2+}/Fe} = -0.440$ V and $E^0_{Ag^+/Ag} = +0.779$ V

1b. How do you show that corrosion is electrochemical process? Explain it with necessary reaction. (7)

2a. What are the different ways by which drinking water can be polluted/ unsafe for drinking? Discuss the ways by which we can control water pollution. (7)

2b. Solid waste/liquid waste management is directly related to air pollution. explain it. Discuss the issues going on in Kathmandu valley and the efforts made by the municipality to manage the solid/liquid wastes. (8)

3a. Explain why i) zinc sulphate salt is colorless compound, ii) $Fe(NH_3)_6^{3+}$ and $Fe(CN)_6^{3-}$ have different colors as well as magnetic behavior. (2+3+3)

3b. What are transition metals? Discus why transition elements act as a good catalyst, form colorful compounds, and form complexes. (1+2+2+2)

4a. Write the mechanism of E2 reaction. Why strong base is required for this reaction? (7)

4b. SN1 reaction proceeds via first order kinetics, explain with suitable example. (8)

5a. What is paint? Explain its essential components. (2+5)
OR
How do you obtain (manufacture) Portland cement from its raw materials? Why gypsum salt is added to the cement? (5+2)

5b. What are explosives? How do you prepare TNT in laboratory? Write down its properties. (2+4+2)

6a. Explain laboratory preparation, general properties and some applications of: i) neoprene rubber ii) teflon. (7)

6b. Differentiate between i) addition and condensation polymer ii) biodegradable and non biodegradable polymers with suitable examples. (4+4)

7. Write short notes on any two. (2x5)
   a. Sensor
   b. Estimation of Dissolved oxygen in water sample
   c. Conducting polymer and its applications

National Academy of Science and Technology

(Affiliated to Pokhara University)

Accredited by University Grant Commission Nepal 2022

Dhangadhi, Kailali

First Terminal Examination

Level: Bachelor | Semester I, Fall | Year : 2022

Program: B.E. Civil | F.M : 100

Course: Applied Chemistry | P.M : 45

Time : 3Hrs

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 the questions.

1. a) Define Electrode potential. How can you determine emf of Zn-Cu Cell? Calculate the emf of cell at 25°C. Zn/ Zn^{++}(0.1M) // Cu^{++}(0.05 M)/ Cu. Given E° Zn^{++}/Zn = -0.76V and E° Cu^{++}/Cu = +0.34V. [8]

   b) Explain the principle, working of lead acid battery [7]

2. a) Define transition elements. What are the applications of transition elements in various engineering fields? [7]

   b) Give reason [8]

   i) Transition metals and their compounds show paramagnetic behaviour.

   ii) Zinc (II) compounds are white and diamagnetic.

   iii) Transition elements shows complex compounds.

   iv) Transition elements shows variable oxidation states.

3. a) Define SN^2 reaction with mechanism and stereochemistry. [8]

   b) Describe the E^1 reaction with mechanism. [7]

4. a) Write the preparation, properties and uses of PVC and Teflon [7]

   b) What are conducting and non-conducting polymer. Also write their applications. [8]

5. a) Define cement. Describe about manufacture of cement in different steps. [8]

   b) Define explosive substance. How TNT and TNG are prepared. Write their application. [7]

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b) Elimination reactions E1 and E2 depends on structure of substrate molecules. Explain it with relevant example.

5. Explain about the

a) TNT

b) Sensors

c) Setting and hardening of cements

6. a) Explain about the preparation and uses of PVC and Teflon

b) How do conducting polymers differ from nonconducting polymer? Explain with suitable examples.

7. Write short notes on: (Any two)

a) Paints

b) Air pollution

c) Photovoltaic cell

d) Salt bridge

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POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: Applied Chemistry

Semester: Fall

Year : 2022
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

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 the questions.

1. a) What is Daniell cell?Calculate the emf of given cell 8

Sn/Sn^{++}(0.2M)//Ag^{+} (0.1M)/Ag, where, $E^{0}_{Sn\,Sn^{++}}$ = +0.14V and Ag/Ag^{+} = -0.8V

OR

What is electrochemical series? Calculate the emf of cell at 20 ^{0}C obtained from the following electrodes

i) $Fe = Fe^{++} + 2e$, $E^{0} = +0.44V$

ii) $Cu = Cu^{++} + 2e$, $E^{0} = -0.34V$

b) Explain about the electrochemical mechanism of corrosion. 7

2. a) What is water pollution? Explain about the sources, impacts and suitable remedies of water pollution. 8

OR

Give a short account of soil pollution, its sources and impacts.

b) How can you determine free chlorine present in water in your lab? 7

3. a) Why all d-block elements are not true transition elements? Give the reasons for following 8

i) Zn

ii) salts are always colorless

iii) Transition elements represent variable oxidation states.

b) Why the transition elements are preferred to produce compounds? Give the applications of transition metals in your field of engineering. 7

4. a) How does SN2 reactions differ from SN1 reaction? Explain with their mechanism taking suitable examples. 8

b) Elimination reactions E1 and E2 depends on structure of substrate molecules. Explain it with relevant example. 7

5. Explain about the 3×5
   a) TNT
   b) Sensors
   c) Setting and hardening of cements

6. a) Explain about the preparation and uses of PVC and Teflon 8
   b) How do conducting polymers differ from nonconducting polymer? Explain with suitable examples. 7

7. Write short notes on: **(Any two)** 2×5
   a) Paints
   b) Air pollution
   c) Photovoltaic cell
   d) Salt bridge

National Academy of Science and Technology

(Affiliated to Pokhara University)

Dhangadhi, Kailali

Pre-University Examination

Semester: II Fall

Level: Bachelor

Program: B.E. Computer

Course: Applied Chemistry

Year : 2023
F.M : 100
P.M : 45
Time : 3Hrs.

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 the questions.

1.a) Define Electrochemical series. Write any three applications electrochemical series. A cell is formed by dipping Zn -rod in 0.01M Zn^{++} solution and Ni-rod in 0.5M. Ni^{++} solution. Write the cell notation, cell reaction and calculate the emf of the cell. [8]

$E^0 Zn^{++}/Zn = -0.76V$

$E^0 Ni^{++}/Ni = -0.25V$.

b) Explain the principle, working and application of Daniell cell. [7]

OR

What is electrochemical corrosion. Write about electrochemical theory of rusting.

2.a) Define is meant by paramagnetism? What are the application of transition elements in various engineering fields? [7]

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b) Describe the E^2 reaction with mechanism. [7]

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b) Lithium ion battery
c) Alkalinity

Best of Luck