

Code No: 151AF

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B. Tech I Year I Semester Examinations, December - 2018

CHEMISTRY

(Common to EEE, CSE, IT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c or sub questions.

PART - A

(25 Marks)

2. a) Give the reason for crystal field splitting of d-orbitals. [2]
b) Why do you express hardness of water in CaCO_3 equivalents. [2]
c) Salt bridge is not required in Lead-acid storage cell. Explain. [2]
d) Why Markownikoff's rule fails in the addition of HBr to propene in presence of H_2O . [2]
e) How many fundamental vibrations are possible in HCN , CH_4 . [2]
3. a) Write the energy level diagram for N_2 molecule. [3]
b) What is Caustic embrittlement? How do you prevent it? [3]
c) Why coating of zinc on iron is called sacrificial anode. Explain. [3]
d) How enantiomers differs from diastereomers. [3]
e) Give reason why O_{16} , O_{17} , C_{13} do not exhibit NMR spectrum. [3]

PART - B

(50 Marks)

2. a) Explain about crystal field theory. [5+5]
b) Mention the difference between atomic and molecular orbitals. [5+5]
OR
3. a) Give an account of LCAO. [5+5]
b) Write notes on molecular orbital theory. [5+5]
4. a) Discuss the ion-exchange process of softening of hard water. How the exhausted resins are regenerated. [5+5]
b) Give the steps involved in the treatment of domestic water. [5+5]
OR
5. a) What is the principle involved in complex metric method in estimation of hardness of water. [5+5]
b) Differentiate between scales and sludge's. [5+5]

6.a) How can you determine the pH of an unknown solution by using quinhydrone Electrode.

b) Iron corrodes faster than aluminum. Explain. [5+5]

OR

7.a) Write an account of lithium ion batteries.

b) Explain the chemical reactions involved in electrochemical corrosion. [5+5]

8.a) What are S_N^1 and S_N^2 reactions. Write the mechanism with suitable examples. Give their stereochemistry.

b) Explain different conformations of butane with the potential energy diagram. [5+5]

OR

9.a) What are elimination reactions? Explain dehydro halogenations of alkyl halides with a suitable examples.

b) What is isomerism? How is it classified? Explain with suitable examples. [5+5]

10.a) What are various electronic transitions? Give a brief note with suitable examples.

b) Write the basic principle of IR spectroscopy. Give various molecular vibrations in the technique. [5+5]

OR

11.a) What are the selection rule in IR spectroscopy? Give any two applications of IR Spectroscopy.

b) What is the principle involved in Nuclear magnetic resonance Spectroscopy? [5+5]

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Code No: 152AB

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May - 2019

CHEMISTRY

(Common to CE, ME, KCE, EIE, MCE, MMT, AE, NIE, PTM)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

- 1.a) What are the differences between atomic and molecular orbitals? [2]
- b) What is Calgon? Write the reaction involved in Calgon conditioning. [2]
- c) Define standard electrode potentials. [2]
- d) Write the reaction involved in the addition of HBr to Propene in the presence of peroxide. [2]
- e) Explain why CO_2 is IR active. [2]
- f) What do you understand by Linear combination of atomic orbitals? [3]
- g) What is the significance of breakpoint chlorination in the treatment of municipal water? [3]
- h) Why galvanised sheets are not advised in making utensils? [3]
- i) Define Enantiomers, and give example. [3]
- j) Give any two selection rules for rotational spectroscopy. [3]

PART - B

(50 Marks)

- 2.a) Draw the molecular orbital diagram O_2 molecule and predict the magnetic behaviour of it.
 - b) Discuss the salient features of Crystal field theory and explain the crystal field splitting of transition metal ion d-orbitals in square planar geometries. [5+5]
- OR
- 3.a) Explain the band structure of solids. Discuss how the doping influences the conductance of them.
 - b) Draw neatly, the molecular orbital diagrams of Butadiens and Benzene. [5+5]
- 4.a) Explain how brackish water can be desalinated by reverse osmosis method with the help of a diagram.
 - b) A sample of water on analysis contains 4.2 mg/L of magnesium bicarbonate, 12.0 mg/L of magnesium sulphate, 16.2 mg/L of calcium bicarbonate, 22 mg/L of calcium chloride and 13.6 mg/L of calcium sulphate. Calculate the total, permanent and temporary hardness of the sample and express them in degree Clark and degree French. [5+5]
- OR
- 5.a) Explain Ion exchange method for softening water. [5+5]
 - b) What are the specifications of potable water?

XO XO XO XO XO XO

6.a) What is electrochemical series? Explain its applications with suitable examples. [5+5]
b) What is Cathodic protection? Explain sacrificial anode method?

OR

7.a) How pH of a solution is determined by Glass electrode? Discuss. [5+5]
b) Write a detailed note on electroless plating of Nickel.

8.a) Explain the Markownikoff's rule with suitable example. Why this rule is failed during the addition of HBr in the presence of a peroxide?
b) Write the synthetic methods for Paracetamol and Aspirin. Give their pharmaceutical applications. [5+5]

OR

9.a) What are Conformational isomers? Discuss them with special reference to n-Butane. Give the potential energy diagram for the conformers. [5+5]
b) Explain the mechanism of S_N1 and S_N2 reactions.

10.a) Describe various modes of electronic transitions when a molecule absorbs in UV-Visible region. [5+5]
b) Explain the principle involved in NMR spectroscopy.

OR

11.a) Write a note on Chemical Shift. [5+5]
b) Give an account of various fundamental vibrations.

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NARSIMHAREDDY ENGINEERING COLLEGE
(UGC AUTONOMOUS)

I B.Tech I Semester (NR21) Supplementary Examination, January/February 2024

CHEMISTRY

(Common to ECE, CSE (CS), CSE (AI&ML), CSE (DS))

Time : 3 hours Maximum marks: 70

- Note:**
- This question paper contains two parts, A and B
 - Part A is compulsory which carries 20 marks (10 sub questions are two from each unit carry 2 Marks). Answer all questions in Part A
 - Part B Consists of 5 Units. Answer one question from each unit. Each question carries 10 Marks and may have a, b sub questions

Part-A

Answer all questions

(20 Marks)

Q.No	Question	M	CO	BL
1) a.	Calculate the bond order of N ₂ .	2	CO1	L2
b.	How does doping of Si increase its conductivity?	2	CO1	L1
c.	Why does hard water consume a lot of soap?	2	CO2	L2
d.	What is the principle of internal treatment?	2	CO2	L1
e.	What is the effect of CO ₂ on corrosion of Fe?	2	CO3	L1
f.	Predict the nature of corrosion that would occur if an iron gutter is nailed using Al nails.	2	CO3	L2
g.	State the significance of pour point of lubricants.	2	CO4	L1
h.	Define composite material.	2	CO4	L1
i.	What is Nuclear magnetic resonance spectroscopy?	2	CO5	L1
j.	What do you understand by selection rule?	2	CO5	L1

Part-B

Answer all the Units

All Questions carry equal Marks

(50 Marks)

Q.No	Question	M	CO	BL
UNIT-I				
2) a.	Categorize d-orbitals based on the spatial orientation of electron density distribution of atomic d-orbitals in octahedral complexes.	5	CO1	L3
b.	Classify solids based on band theory. Explain each individually.	5	CO1	L3
OR				
3) a.	Illustrate the formation of MOs using LCAO method.	5	CO1	L4
b.	Predict the magnetic character of O ₂ molecule using MOT.	5	CO1	L3

UNIT-II				
4) a.	Justify why the ion-exchange process is also called deionisation process.	5	CO2	L4
b.	What is carbonate and noncarbonate hardness of water? List out various disadvantages of using hard water.	5	CO2	L2

OR

5) a.	Discuss briefly the method used for the analysis of residual Cl ₂ .	5	CO2	L2
b.	How can you determine if you are past breakpoint chlorination?	5	CO2	L3

UNIT-III

6) a.	Describe how iron can be made corrosion resistant by cathodic protection method.	5	CO3	L2
b.	Elucidate construction, working and applications of lead acid batteries.	5	CO3	L3

OR

7) a.	Write a detailed note on oxidation corrosion and discuss the role of nature of oxides formed.	5	CO3	L2
b.	Explain with an example how lithium primary cells are replacing the older traditional primary traditional cells.	5	CO3	L3

UNIT-IV

8) a.	What are elastomers? List out the engineering applications of elastomers.	5	CO4	L2
b.	Do you think conducting polymers are better than semiconductor materials?	5	CO4	L3

OR

9) a.	List out the different ingredients used in the compounding of plastics and their advantages.	5	CO4	L3
b.	Compare and contrast the properties and applications of Bakelite, PVC and Teflon.	5	CO4	L2

UNIT-V

10) a.	Explain the mechanism and selection rules of rotational spectra.	5	CO5	L3
b.	Write a note on applications of UV-Visible spectroscopy.	5	CO5	L2

OR

11) a.	What is the principle of NMR spectroscopy?	5	CO5	L2
b.	Write the basic principle of IR spectroscopy. Give the various molecular vibrational modes.	5	CO5	L3

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NARSIMHAREDDY ENGINEERING COLLEGE

(UGC AUTONOMOUS)

I B.Tech I Semester (NR23) Regular Examination, January/February 2024

ENGINEERING CHEMISTRY

(Common to CE, EEE, ME, ECE, CSE (CS), CSE (AI&ML))

Time : 3 hours

Maximum marks: 60

- Note:**
- This question paper contains two parts, A and B
 - Part A is compulsory which carries 10 marks (10 sub questions are two from each unit carry 1 Marks). Answer all questions in Part A
 - Part B Consists of 5 Units. Answer one question from each unit. Each question carries 10 Marks and may have a, b sub questions

Part-A

Answer all questions

(10 Marks)

Q.No	Question	M	CO	BL
1)	a. How can temporary hardness be removed?	1	CO1	L3
	b. Define caustic embrittlement.	1	CO1	L1
	c. Write the applications of solid-oxide fuel cell	1	CO2	L2
	d. Mention the factors affecting rate of corrosion.	1	CO2	L2
	e. What are the advantages of biodegradable polymers?	1	CO3	L2
	f. What are the applications of conducting polymers?	1	CO3	L1
	g. What is transesterification?	1	CO4	L2
	h. Define octane rating.	1	CO4	L1
	i. Mention the engineering applications of Poly acryl amide.	1	CO5	L2
	j. Outline the properties of Lubricants.	1	CO5	L2

Part-B

Answer all the Units

(50 Marks)

All Questions carry equal Marks

Q.No	Question	M	CO	BL
UNIT-I				
2)	a. Determine the Fluoride ion by ion selective electrode method.	5	CO1	L3
	b. What is potable water? Explain the steps involved in the treatment of potable water.	5	CO1	L2
OR				
3)	a. Give an account on Boiler Troubles.	5	CO1	L2
	b. Explain internal treatment of boiler feed water.	5	CO1	L3
UNIT-II				
4)	a. Classify the Batteries with examples. Write the basic requirements for commercial Batteries.	5	CO2	L4
	b. Mention different types of corrosion. Write a note on pitting corrosion.	5	CO2	L2
OR				

OR

5)	a. What are Reserve Batteries outline their applications. Write about Microbial fuel cells.	5	CO2	L3
	b. Write the construction and applications of Hydrogen-Oxygen fuel cell.	5	CO2	L3

UNIT-III

6)	a. Define polymeric materials? Write a note on addition polymerization.	5	CO3	L2
	b. Define Elastomer. Write the properties and applications of Thiokol Rubber.	5	CO3	L3

OR

7)	a. Discuss briefly about the mechanism of conduction in Trans poly acetylene.	5	CO3	L2
	b. Write the properties and applications of Nylon 6,6.	5	CO3	L3

UNIT-IV

8)	a. Define calorific value of fuel. Classify fuels with examples.	5	CO4	L2
	b. What is Natural Gas? Give the composition and applications of Natural gas.	5	CO4	L2

OR

9)	a. Explain briefly about Refining of petroleum with neat labelled diagram.	5	CO4	L3
	b. Discuss about the proximate analysis of coal.	5	CO4	L3

UNIT-V

10)	a. Classify the lubricants with examples and Mention the characteristics of good Lubricant.	5	CO5	L3
	b. What is cement? Write the composition of Portland cement and write about Hardening of Portland cement.	5	CO5	L2

OR

11)	a. Define Thermo responsive materials and write about Poly vinyl amides.	5	CO5	L2
	b. Write about viscosity, cloud point and pour point properties of Lubricants.	5	CO5	L3

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