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 as sub questions.

PART - A

(25 Marks)

1. 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]
   f) Write the energy level diagram for N_2 molecule. [3]
   g) What is Caustic embrittlement? How do you present it? [3]
   h) Why coating of zinc on iron is called sacrificial anode. Explain. [3]
   i) How enantiomers differs from diastereomers. [3]
   j) Give reason why O_{16}, O_{17}, C_{12} do not exhibit NMR spectrum. [3]

PART - B

(50 Marks)

2. a) Explain about crystal field theory.
   b) Mention the difference between atomic and molecular orbitals. [5+5]

OR

3. a) Give an account of LCAO.
   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.
   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.
   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: 152AH

R18

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech I Year II Semester Examinations, May - 2019
CHEMISTRY
(Common to CE, ME, ECE, EIE, MCT, MMT, AE, MIE, 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.
b) What are the specifications of potable water? [5+5]

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

OR

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

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.
b) Explain the mechanism of S_N1 and S_N2 reactions. [5+5]

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

OR

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

Q.P Code: CH1102BS

Hall Ticket No.:

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

			M	CO	BL
		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 Cl2.	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
All Questions carry equal Marks   (50 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			

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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Q.P Code: CH1202BS   Hall Ticket No:

NARSIMHAREDDY ENGINEERING COLLEGE
(UGC AUTONOMOUS)

I B.Tech II Semester (NR21) Supplementary Examination, July 2024

CHEMISTRY
(Common to CE, EEE, ME, CSE)

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.	What do understand by bonding molecular orbital?	2	CO1	L1
	b.	Define the term doping?	2	CO1	L1
	c.	Differentiate between scale and sludge?	2	CO2	L4
	d.	Mention the common units used for expressing hardness of water.	2	CO2	L2
	e.	What is Electrode potential?	2	CO3	L1
	f.	Why most of the metals undergo corrosion?	2	CO4	L1
	g.	Write any two applications of PVC.	2	CO5	L1
	h.	Mention the types of ceramics.	2	CO4	L2
	i.	What is the principle of spectroscopy?	2	CO5	L1
	j.	Define the term chemical shift.	2	CO6	L1

Part-B
Answer all the Units
All Questions carry equal Marks   (50 Marks)

Q.No		Question	M	CO	BL
		UNIT–I			
2)	a.	Draw the energy level diagram of oxygen molecule.	5	CO1	L3
	b.	Summarize the salient features of CFT.	5	CO1	L2
		OR			
3)	a.	Illustrate the crystal field splitting of transition metal ion in tetrahedral complex.	5	CO1	L2
	b.	Derive the bond order and magnetic behavior of N_2 molecule.	5	CO1	L2
		UNIT–II			
4)	a.	Describe ion-exchange process for water softening.	5	CO2	L4
	b.	Calculate the temporary and total hardness of a sample of water containing $Mg(HCO_3)_2 = 73mg/L$, $Ca(HCO_3)_2 = 162$ mg/L, $MgCl_2 = 95mg/L$, $CaSO_4 = 136mg/L$	5	CO2	L3
		OR			
5)	a.	Discuss in brief the boiler corrosion. How is it controlled?	5	CO2	L2
	b.	Explain the desalination of water by reverse osmosis method.	5	CO2	L2

Q.No		Question	M	CO	BL
		UNIT–III			
6)	a.	Describe the construction of Lead – Acid Battery with the reactions occurring during discharge.	5	CO3	L3
	b.	Compare Chemical corrosion with Electrochemical corrosion.	5	CO4	L4
		OR			
7)	a.	Outline the difference in the use of anodic and cathodic coating for corrosion prevention.	5	CO4	L2
	b.	Discuss the construction and working of calomel electrode with the help of neat diagram.	5	CO3	L2
		UNIT–IV			
8)	a.	Define p-doping of conducting polymers. Explain the conduction in p-doped polyacetylene.	5	CO5	L1
	b.	Explain properties of the following polymers. i) Bakelite ii) Nylon(6,6)	5	CO5	L2
		OR			
9)	a.	Explain the process of vulcanization of rubber.	5	CO5	L2
	b.	What are Lubricants? Discuss the mechanism of lubrication.	5	CO5	L2
		UNIT–V			
10)	a.	Compare Vibrational spectroscopy with rotational spectroscopy.	5	CO6	L4
	b.	List out the applications of Electronic spectroscopy.	5	CO6	L2
		OR			
11)	a.	Outline the introduction of MRI.	5	CO6	L2
	b.	Explain the selection rules in brief.	5	CO6	L2

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NARSIMHAREDDY ENGINEERING COLLEGE
(UGC AUTONOMOUS)

I B.Tech II Semester (NR21) Supplementary Examination, July 2024

CHEMISTRY
(Common to CE, EEE, ME, CSE)

Time : 3 hours   Maximum marks: 70

Note: • This question paper contains two parts, A and B
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• 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.	What do understand by bonding molecular orbital?	2	CO1	L1
	b.	Define the term doping?	2	CO1	L1
	c.	Differentiate between scale and sludge?	2	CO2	L4
	d.	Mention the common units used for expressing hardness of water.	2	CO2	L2
	e.	What is Electrode potential?	2	CO3	L1
	f.	Why most of the metals undergo corrosion?	2	CO4	L1
	g.	Write any two applications of PVC.	2	CO5	L1
	h.	Mention the types of ceramics.	2	CO4	L2
	i.	What is the principle of spectroscopy?	2	CO5	L1
	j.	Define the term chemical shift.	2	CO6	L1

Part-B
Answer all the Units   (50 Marks)
All Questions carry equal Marks

Q.No		Question	M	CO	BL
		UNIT–I			
2)	a.	Draw the energy level diagram of oxygen molecule.	5	CO1	L3
	b.	Summarize the salient features of CFT.	5	CO1	L2
		OR			
3)	a.	Illustrate the crystal field splitting of transition metal ion in tetrahedral complex.	5	CO1	L2
	b.	Derive the bond order and magnetic behavior of N_2 molecule.	5	CO1	L2
		UNIT–II			
4)	a.	Describe ion-exchange process for water softening.	5	CO2	L4
	b.	Calculate the temporary and total hardness of a sample of water containing $Mg(HCO_3)_2$ = 73mg/L, $Ca(HCO_3)_2$ = 162 mg/L, $MgCl_2$ = 95mg/L, $CaSO_4$ = 136mg/L.	5	CO2	L3
		OR			
5)	a.	Discuss in brief the boiler corrosion. How is it controlled?	5	CO2	L2
	b.	Explain the desalination of water by reverse osmosis method.	5	CO2	L2

Q.No		Question	M	CO	BL
		UNIT–III			
6)	a.	Describe the construction of Lead – Acid Battery with the reactions occurring during discharge.	5	CO3	L3
	b.	Compare Chemical corrosion with Electrochemical corrosion.	5	CO4	L4
		OR			
7)	a.	Outline the difference in the use of anodic and cathodic coating for corrosion prevention.	5	CO4	L2
	b.	Discuss the construction and working of calomel electrode with the help of neat diagram.	5	CO3	L2
		UNIT–IV			
8)	a.	Define p-doping of conducting polymers. Explain the conduction in p-doped polyacetylene.	5	CO5	L1
	b.	Explain properties of the following polymers. i) Bakelite ii) Nylon(6,6)	5	CO5	L2
		OR			
9)	a.	Explain the process of vulcanization of rubber.	5	CO5	L2
	b.	What are Lubricants? Discuss the mechanism of lubrication.	5	CO5	L2
		UNIT–V			
10)	a.	Compare Vibrational spectroscopy with rotational spectroscopy.	5	CO6	L4
	b.	List out the applications of Electronic spectroscopy.	5	CO6	L2
		OR			
11)	a.	Outline the introduction of MRI.	5	CO6	L2
	b.	Explain the selection rules in brief.	5	CO6	L2

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