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|  | Question Bank | **2019** |  |
| **SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR**(AUTONOMOUS)Siddharth Nagar, Narayanavanam Road, Puttur – 517583**QUESTION BANK** **Subject with Code :** Chemistry (18HS0801)  **Course & Branch**: B.Tech CIVIL, MECH &EEE**Year & Sem:** I-B.Tech & II-Sem **Regulation :** R18**UNIT -1** **ATOMIC,MOLECULAR STRUCTURE AND PERIODIC PROPERTIES**1. a) Give any two difference between Bonding and anti bonding molecular orbitals.[2M]
	1. Define effective nuclear charge. [2M]
	2. Differentiate Hard, Soft acid and base with example. [2M]
	3. Write schrodinger wave equation. [2M]
	4. Define aromaticity and non aromaticity. [2M]
2. Write down the Schrodinger wave equation for the wave mechanical model of an atom. Give the significance of wave function. [10M]
3. Explain pi- molecular orbitals of benzene with neat sketch. [10M]
4. Explain the energy level diagrams of oxygen and fluorine with magnetic behavior. [10M]
5. a) Explain bonding and antibonding orbitals [2M]
	1. Give these molecules energy level diagram and explain its magnetic behavior. [8M]
		1. NO, CO,
		2. N2 , N2+ ,
6. Explain the following
7. Pi - molecular orbitals of butadiene [5M]
8. Molecular geometries [5M]
9. a) Define aromaticity. Write a note on concept of aromaticity. [2M]
	1. Justify the following compounds are aromatic or not. [8M]
		1. Cyclo octatetraene ii. Thiophene iii.Cyclopropenyl cation iv.Cyclopentadienyl anion
10. a) Illustrate the postulates of crystal field theory [2M]
	1. Explain the crystal field splitting of orbital’s in octahedral, tetrahedral and square planar fields in complexes [8M]
11. Explain the following

CHEMISTRY Page 1 |



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|  | Question Bank | **2019** |  |
| 1. Effective nuclear charge & its calculation using slaters rule. Give any molecule calculations of EFNC [5M]
2. Variation of oxidation states in periodic table [5M]

10. Describe the trends of atomic, ionic sizes of S,P,d and f block elements. [10M] 11.Explain HSAB concept and its applications. [10M]**UNIT-II:****USES 0F FREE ENERGY AND CHEMICAL EQUILIBRIA**1. a) What is meant by corrosion. [2M]
	1. Define internal energy. [2M]
	2. Define entropy. [2M]
	3. What is meant by Anodic inhibitors? [2M]
	4. Define cell potential. [2M]

2 .Define cell potential.Derive Nernst equation for the calculation of cell emf.What are its applications ? [10M]1. Define Entropy.Entropy changes in reversible and irreversible process. [10M]
2. A) Define Free energy. [5M]
	1. Write a note on solubility product. [5M]
3. A)Write a note on Oxidation and Reduction [5M]
	1. Discuss the various factors influencing the rate of corrosion based on nature

of metal [5M]1. A) Write a note on sacrificial anodic protection? [5M]
	1. Discuss about Impressed Current Cathodic protection ? [5M]
2. Discuss in detail about electrochemical or wet corrosion? [10M]
3. Explain various factors influencing the rate of corrosion ? [10M]
4. Define corrosion ? Discuss in detail about chemical or dry corrosion. [10M]
5. A) What is electroplating ? [4M]
	1. Explain electroplating of Nickel and copper ? [6M]
6. A) What is electroless plating ? [4M]
	1. What is meant by cathodic and anodic inhibitors [6M]

CHEMISTRY Page 2 |

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|  | Question Bank | **2019** |  |
| **UNIT-III****WATER TECHNOLOGY**1. a)Write the structure of EDTA. [2M]
	1. Define brakish water ? What type of methods used in purification ? [2M]
	2. Which salts caused to temporary and permanent hardness. [2M]
	3. Define hard water and soft water. [2M]
	4. Define sludges and scales. [2M]
2. A) write short notes on Break point Chlorination [5M]

B) What are the units to express hardness of water? [5M]1. Describe the estimation of hardness by EDTA method. [10M]
2. A) How water gets hardness. Distinguish between hard water and soft water? [3M]
	1. Explain Boiler corrosion. [7M]
3. A) What is Priming and Foaming? [5M]
	1. Explain sludge and Scale formation in boilers ? [5M]
4. Describe briefly boiler troubles and their treatment? [10M]
5. Describe the Zeolite or permutit process for softening of water. what are the

advantages and disadvantages of zeolite process. [10M]1. Describe the Ion exchange process for demineralization of water ?what are the advantages and disadvantages of ion exchange process ? [10M]
2. Write short notes on

(a) Electrodialysis (b) Reverse osmosis [10M]10. Describe the Lime soda process for softening of water? What are the advantagesand disadvantages of lime soda process. [10M] 11.Explain with a neat sketch the various steps involved in municipal solid waste water [10M]treatmentCHEMISTRY Page 3 |

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|  | Question Bank | **2019** |  |
| **UNIT-IV****ORGANIC REACTIONS AND ORGANIC POLYMERS**1. a) Why does benzene does not undergo electrophilic substitution reactions? [2M]
	1. Why cannot thermosetting plastics be reused and restored? [2M]
	2. Name four substances which are added during moulding of plastics. [2M]
	3. Define conducting polymers. [2M]
	4. Name the reactants used in the preparation of paracetamol and aspirin. [2M]
2. a) Describe a fabrication method used for thermoplastics. [5M] b) Write the preparation ,properties&uses of Bakelite. [5M]
3. Briefly outline the various methods of moulding process. [10M]
4. a) Describe with a neat sketch the process of compressing moulding.

How does it compare with injection moulding. [5M]* 1. Write a note on thermosetting and thermoplastic resins. [5M]
1. a) Give the preparation,properties & uses of Teflon ,Nylon 6, 6. [5M] b)Distinguish between thermoplastics &thermosetting plastics. [5M]
2. What are conducting polymers? How are they classified? Write the synthesis

And engineering applications of conducting polymers ? [10M]1. Explain the synthesis of the following
2. Paracetamol. [5M]
3. Aspirin. [5M]
4. Explain the synthesis of the following
	1. Penicillin. [5M]
	2. Sulfa Drug. [5M]
5. a) Define addition and Elimination reactions. [2M]

b) Explain the addition and elimination reactions with examples. [8M]1. a) Define Oxidation and Reduction [4M] b) Explain oxidation and reduction reactions with examples. [6M]
2. a) What are Substitution reaction. [2M] b)Explain different types of substitution reactions with examples. [8M]

CHEMISTRY Page 4 |

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|  | Question Bank | **2019** |  |
| **UNIT-V****SPECTROSCOPIC TECHNIQUES AND APPLICATIONS** 1.a) What are the differences between atomic and molecular spectroscopy [2M]* 1. What are chromophores? What are auxochromes? Give some examples. [2M]
	2. What is finger print region? Mention its importance. [2M]
	3. What is flame photometry? Name few metals which can be easily detected by this method. [2M]
	4. What are the limitations of Beer-Lambert’s law ? [2M]
1. Explain principle and instrumentation of UV-visible spectroscopy [10M]
2. Explain the working principle of atomic absorption spectrometer and How will you determine the nickel using by AAS? [10M]
3. Give an account on principle and instrumentation of IR spectroscopy. Explain stretching and bending vibrations. [10M]
4. Give applications of

(a) IR-Spectroscopy (b) UV- visible Spectroscopy [10M]1. Draw the schematic diagram of a flame photometer and explain how you will determine sodium by using flame photometer. [10M]
2. Give a brief account on
	1. Derive Beer-Lambert’s law (b) Interference and limitation of flame photometry

[10M]1. Explain principle, instrumentation and its applications of Fluorescence spectroscopy

[10M]1. Explain principle, instrumentation and its applications of Scanning Electron microscopy (SEM) [10M]
2. Give a brief account Principle, Instrumentation and its applications of X- ray Crystallography.
3. Discuss the principle, instrumentation and applications of Transmission electron microscopy [10M [10M]

CHEMISTRY Page 5 |

**2018**

Question Bank

CHEMISTRY Page 7