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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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| 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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| **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 advantages  and disadvantages of lime soda process. [10M] 11.Explain with a neat sketch the various steps involved in municipal solid waste water [10M]  treatment  CHEMISTRY Page 3 | |

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| **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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| **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 | |

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