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|  | **MUTHAYAMMAL ENGINEERING COLLEGE**  **(An Autonomous Institution)**  (Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)  Rasipuram - 637 408, Namakkal Dist., Tamil Nadu. |

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| **Department of Chemistry**  **Question Bank – 19th Regulation** | | |
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| **Course Code & Course Name** | **:** | **19BSS11 - ENGINEERING CHEMISTRY** |
| **Year/Semester** | **:** | **I / I** |

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| **Unit-I: WATER TECHNOLOGY**  **Part-A (2 Marks)** | |
|  | Why is water softened before using in boiler? |
|  | Write any two disadvantage of hard water in boilers. (Apr 2015, Dec 2015, Dec 2016) |
|  | What are boiler compounds? (Apr 2015) |
|  | What are the disadvantages of Scale formation? |
|  | State importance of carbonate conditioning. (June 2017) |
|  | Distinguish between internal and external conditioning of water. (Nov 2014) |
|  | Define softening of water. How it is carried out? |
|  | What is meant by priming and foaming? How can they be prevented? (Nov 2014) |
|  | What is Blow down operation? |
|  | What is meant by caustic embrittlement? How is it prevented? (May 2014. Dec 2015) |
|  | What are the advantages of ion-exchange process? |
|  | How is water demineralised is an ion-exchanger? |
|  | Give a brief note on choice of phosphate salt in phosphate conditioning. (Dec 2016) |
|  | Name the gases dissolved in water that cause corrosion. |
|  | What is the role of phosphates in the internal treatment of water? |
|  | What is calgon conditioning? How is it better than phosphate conditioning? (May 2014, June 2016) |
|  | Soft water is not Demineralised water whereas Demineralised is a soft water. Justify. |
|  | What are boiler compounds? |
|  | List out the requirements of boiler feed water. (June 2016, June 2017) |
|  | Define Reverse Osmosis.(Jan 2019) |

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| **Part-B (16 Marks)** | | |
| 1. (i)   (ii) | What are Scales and Sludge’s? Describe the disadvantages of Scale and Sludge formation.(Apr 2015)  Discuss the causes and prevention of Priming and Foaming.(Dec 2015) | (16) |
| 1. (i)   (ii) | What are boiler troubles? Suggest steps to minimize the boiler troubles.  How will you protect boiler form corrosion? (June 2017) | (16) |
| 1. (i)   (ii) | Describe de-mineralization process of water softening. (8) (May 2014, Dec 2015, June 2016, Dec 2016, June 2017)  What are permutits? With a neat sketch, explain how the hard water externally treated using permutits or Zeolite. (Apr 2015, June 2016, Dec 2016) | (8)  (8) |
| 1. (i)   (ii) | How is internal treatment of boiler water carried out using Colloidal, Phosphate, Calgon & Carbonate. (8) (June 2016, June 2017)  Define the term desalination. With a neat diagram, describe desalination by reverse osmosis method. (8) (Dec 2016, June 2017, Jan 2019 | (8)  (8) |
| 1. (i)   (ii) | Explain breakpoint chlorination. (8) (Dec 2016)  Describe Ozonation, UV treatment and chlorination disinfection methods. (8) | (8)  (8) |

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| **Unit-II : CORROSION AND CORROSION CONTROL**  **Part-A (2 Marks)** | |
|  | Distinguish between Dry corrosion and Wet corrosion (May 2014, Dec 2015) |
|  | What is corrosion and mention its types? (Apr 2015, Jan 2019) |
|  | What is Rust? What is meant by rusting of iron? |
|  | What is Pitting corrosion? |
|  | What is acid pickling? |
|  | What are the characteristics of stable oxide layers? |
|  | What is Pilling-Bedworth rule? |
|  | What is galvanic corrosion? How can it be prevented? (Nov 2014) |
|  | Write the effect of pH of the conducting medium on corrosion of metals. |
|  | What is an electrochemical series? (Nov 2014) |
|  | Define Pigment Volume Concentration (PVC) of paint. |
|  | What are the factors affecting rate of corrosion? |
|  | What is corrosion inhibitor? Give an example. |
|  | Distinguish between electro and electroless plating methods. (June 2017) |
|  | Define paint and write important constituent of paints. (June 2016) |
|  | Write function of extender in a paint. (Dec 2016) |
|  | Explain advantage of electroless plating over the electroplating. (Dec 2016) |
|  | Write about the possibilities for differential aeration corrosion. (June 2017) |
|  | Mentioned the concept of electroless plating of nickel. (June 2017) |
|  | Differentiate paints and lacquers. (Jan 2019) |
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| **Part-B (16 Marks)** | | |
| 1. (i) | What is corrosion of metals? Explain type of wet corrosion.(Apr 2015, Dec 2016) | (8) |
| (ii) | Explain in detail the mechanism of three types of dry corrosion. | (8) |
| 1. (i) | Explain the electrochemical theory of corrosion with suitable example. | (8) |
| (ii) | Describe about the differential aeration corrosion and Galvanic corrosion with examples. How can it be prevented? (May 2014, Dec 2016, Jan 2019) | (8) |
| 1. (i) | Explain about the factors influencing the rate of corrosion.(Apr 2015, June 2017) | (8) |
| (ii) | What is cathodic protection? Write a briefly note on Cathodic protection by sacrificial anode production method | (8) |
| 1. (i) | Impressed current cathodic production method. June 2017, (Jan 2019)) | (8) |
| (ii) | What are the important constituents of paint? Explain the function of the various constituents. (Dec 2015, Dec 2016) | (8) |
| 1. (i) | Discuss the importance of design and materials selection in control of corrosion. (June 2016) | (8) |
| (ii) | Give an account of the method used in electroplating of gold on copper.(Dec 2015) | (8) |
| 1. (i) | Write short notes on Electro less Nickel plating. Discuss its uses, advantages and disadvantages.(Nov 2014, Apr 2015, June 2017) | (8) |
| (ii) | What is corrosion inhibitors? Explain vapour phase, anodic and cathodic inhibitors with an example. (June 2017) | (8) |

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| **Unit-III : POLYMER CHEMISTRY**  **Part-A (2 Marks)** | |
|  | Define Polymer. Give an example. (Jan 2019) |
|  | Define Monomer. Give an example. |
|  | What is meant by Polymerization? |
|  | What is meant by Degree of Polymerization? (Jan 2014) |
|  | Give the difference between Oligomer and High polymer. |
|  | What is functionality of polymers? (Jun 2014, June 2017) |
|  | What is natural and synthetic polymer? Give examples. |
|  | What are Plastics? List out its advantages. |
|  | In what way is copolymerization different from homo polymerization? (Dec 2016) |
|  | Thermosetting plastics cannot be remolded. Why? |
|  | Differentiate thermoplastics and thermosetting plastics (Dec 2014). |
|  | Give two examples for initiators. |
|  | Define tacticity. Mention its types with example. |
|  | Mention any two uses of SBR rubbers. (Jan 2014) |
|  | What is the repeating unit of Nylon 6,6? (Jun 2014, June 2016, Dec 2016, June 2017) |
|  | Define Glass Transition Temperature. |
|  | What is meant by Number – Average molecular mass? |
|  | What is Step-wise polymerization? |
|  | What are elastomers? Give an example. |
|  | What us the role of sulphur in the vulcanization process? |

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| **Part-B (16 Marks)** | | |
| 1. (i) | Explain the free radical mechanism of addition polymerization. (Dec 2016) | (8) |
| (ii) | Give the difference between addition and condensation polymerization (Jan 2019) | (8) |
| 1. (i) | Explain the types of polymerization with an example. (June 2016, June 2017) | (8) |
| (ii) | Classify the polymers with example. (June 2017) | (8) |
| 1. (i) | Give the preparation, properties and uses of Teflon and Nylon 6. (Dec 2016, Jan 2019) | (8) |
| (ii) | Give the preparation, properties and uses of Nylon-6,6. (Jan 2014, Dec 2014,Dec 2016) | (8) |
| 1. (i) | Distinguish thermoplastics and thermosetting plastics. (Jan 2014, June2014, June 2016) | (8) |
| (ii) | Give the preparation, properties and uses of SBR and butyl rubber. (June 2017) | (8) |
| 1. (i) | Describe preparation, properties and uses of PET. (Dec 2016) | (8) |
| (ii) | Explain the properties of polymer.(Jan 2014, Dec 2014, June 2016, Jan 2019) | (8) |
| 1. (i) | Details out preparation, properties and uses of PVC. (8) (June 2017) | (8) |
| (ii) | What are limitations of raw rubber? Explain process of vulcanization. (Jan 2019) | (8) |

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| **Unit-IV : NON CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES**  **Part-A (2 Marks)** | |
|  | Given any two differences between nuclear fission and fusion. (Nov 2014, June 2016) |
|  | What is nuclear chain reaction? Write nuclear fission reaction of 92U235. (Dec 2015) |
|  | What is super critical mass and sub-critical mass of U235? |
|  | Give any one nuclear fission reaction; mention the factors that impede the chain reaction. (Apr 2015) |
|  | What are fissile nuclides and fertile nuclides? |
|  | What are the draw backs of nuclear reactor? (May 2014) |
|  | What are non-conventional energy sources? Give two examples. |
|  | Write how wind energy is generated. (Dec 2015) |
|  | EMF of battery vary with size? Give reason for your answer? (May 2014) |
|  | How are the nuclear wastes disposed? |
|  | What are batteries? How do they differ from a cell? (Nov 2014) |
|  | What are fuel cells? Write application of H2-O2 fuel cell? (Apr 2015, Dec2016) |
|  | Why solar energy is considered important in the present situation? (June 2017) |
|  | What is a primary battery? Give an example. (June 2016) |
|  | Write the overall equation for the reaction taking place in an alkaline battery. |
|  | Write the charging and discharging reaction of lead accumulator. |
|  | How are anodic and cathodic electro active materials made in Ni-Cd battery. |
|  | What are the limitations of the lead acid battery? (June 2017) |
|  | Write the cell representation of Lead-acid and NICAD batteries. (Dec2016) |
|  | What are the applications of lithium batteries? |

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| **Part-B (16 Marks)** | | |
|  | What is nuclear reactor? Describe the components of nuclear power plant with a suitable block diagram. (Dec 2016, Jan 2019) | (16) |
| 1. (i) | Describe the breeder reactor. (Dec 2016) | (8) |
| (ii) | Explain nuclear fusion reaction with an example.(Dec 2015) | (8) |
| 1. (i) | What are solar cells? State the principle and applications of solar cells (June 2017) | (8) |
| (ii) | Describe the methods of harvesting the solar energy? (June 2017, Jan 2019) | (8) |
| 1. (i) | Justify why wind energy is considered green energy.(June 2017) | (8) |
| (ii) | Write a note on Alkaline Battery. | (8) |
| 1. (i) | Write a brief note on lead acid storage cell.(June 2017) | (8) |
| (ii) | Write a note on Nickel cadmium battery. (Apr 2015, June 2017) | (8) |
| 1. (i) | Write a note on Lithium battery.(Dec 2015, June 2017, Jan 2019) | (8) |
| (ii) | What are fuel cells? Describe the construction and working of H2- O2 fuel cell. | (8) |

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| **Unit-V : ENGINEERING MATERIALS**  **Part-A (2 Marks)** | |
|  | Mention the characteristics (or) requisites of a good refractory. |
|  | Define refractoriness of a refractory? (Apr 2015, June 2016, Dec 2016) |
|  | What is meant Pyrometric Cone Equivalent (PCE) of a refractory? |
|  | What are the industrial applications of refractories? (June 2017) |
|  | Name the stages in the manufacture of refractory. |
|  | What is RUL? How is RUL test carried out? |
|  | What do you understand by dimensional stability of a refractory material? (May 2014) |
|  | What are abrasives? Give two examples for natural abrasives? (Nov 2014, Dec 2015) |
|  | What is carborundum? How is it prepared? |
|  | How are silicon carbide used conventionally? (June 2017) |
|  | Give few examples for natural and synthetic Abrasives. (June 2016) |
|  | How the thermal conductivity of a refectory related to its porosity? |
|  | What is glass? Mention its composition and two uses. (Nov 2014) |
|  | What are the general properties of glass? |
|  | What are the compositions of boro-silicate glass? (Apr 2015) |
|  | Give an example for non-siliceous and siliceous abrasives. (Dec 2016) |
|  | What are the differences between acidic and basic refractories? |
|  | What are the various classification of refractories? (Jan 2019) |
|  | Give any four application of abrasives? (Jan 2019) |

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| **Part-B (16 Marks)** | | |
| 1. (i) | What are refractories? Explain the requirement of refractories. (Dec 2016) |  |
| (ii) | Classify the refractories based on their chemical composition. |  |
| 1. (i) | Explain the properties refractories in detail. (Dec 2015, June 2016) |  |
| (ii) | What are the different types of abrasives? Describe the applications of abrasives. |  |
| 1. (i) | Discuss the preparation, properties and uses of Alundum and Boron carbide.  (May 2014, Jan 2019) |  |
| (ii) | Discuss the preparation, properties and uses of Silicon carbide.(June 2017, Jan 2019) |  |

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| **Course Faculty** |  | **HoD** |