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.

Department of Chemistry
Question Bank

Course Code & Course Name : 21BSS11 - ENGINEERING CHEMISTRY

Year/Sem/Sec :

Unit-I: WATER TECHNOLOGY

Part-A (2 Marks)

1. Why is water softened before using in boiler?
2. Write any two disadvantage of hard water in boilers. (Apr 2015, Dec 2015, Dec 2016)
3. What are boiler compounds? (Apr 2015)
4. What are the disadvantages of Scale formation?
5. State importance of carbonate conditioning. (June 2017)
6. Distinguish between internal and external conditioning of water. (Nov 2014)
7. Define softening of water. How it is carried out?
8. What is meant by priming and foaming? How can they be prevented? (Nov 2014)
9. What is Blow down operation?
10. What is meant by caustic embrittlement? How is it prevented? (May 2014. Dec 2015)
11. What are the advantages of ion-exchange process?
12. How is water demineralised is an ion-exchanger?
13. Give a brief note on choice of phosphate salt in phosphate conditioning. (Dec 2016)
14. Name the gases dissolved in water that cause corrosion.
15. What is the role of phosphates in the internal treatment of water?
16. What is calgon conditioning? How is it better than phosphate conditioning? (May 2014, June 2016)
17. Soft water is not Demineralised water whereas Demineralised is a soft water. Justify.
18. What are boiler compounds?
19. List out the requirements of boiler feed water. (June 2016, June 2017)
20. Define Reverse Osmosis.(Jan 2019)

Part-B (16 Marks)

1. (i) What are Scales and Sludge's? Describe the disadvantages of Scale and Sludge formation.(Apr 2015) (16)

   (ii) Discuss the causes and prevention of Priming and Foaming.(Dec 2015)

2. (i) What are boiler troubles? Suggest steps to minimize the boiler troubles. (16)
   (ii) How will you protect boiler form corrosion? (June 2017)

3. (i) Describe de-mineralization process of water softening. (8) (May 2014, Dec 2015, June 2016, Dec 2016, June 2017) (8)

   (ii) 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)

4. (i) How is internal treatment of boiler water carried out using Colloidal, Phosphate, Calgon & Carbonate. (8) (June 2016, June 2017) (8)

   (ii) Define the term desalination. With a neat diagram, describe desalination by reverse osmosis method. (8) (Dec 2016, June 2017, Jan 2019 (8)

5. (i) Explain breakpoint chlorination. (8) (Dec 2016) (8)

   (ii) Describe Ozonation, UV treatment and chlorination disinfection methods. (8) (8)

Unit-II : CORROSION AND CORROSION CONTROL

Part-A (2 Marks)

1. Distinguish between Dry corrosion and Wet corrosion (May 2014, Dec 2015)
2. What is corrosion and mention its types? (Apr 2015, Jan 2019)
3. What is Rust? What is meant by rusting of iron?
4. What is Pitting corrosion?
5. What is acid pickling?
6. What are the characteristics of stable oxide layers?
7. What is Pilling-Bedworth rule?
8. What is galvanic corrosion? How can it be prevented? (Nov 2014)
9. Write the effect of pH of the conducting medium on corrosion of metals.
10. What is an electrochemical series? (Nov 2014)
11. Define Pigment Volume Concentration (PVC) of paint.
12. What are the factors affecting rate of corrosion?
13. What is corrosion inhibitor? Give an example.
14. Distinguish between electro and electroless plating methods. (June 2017)
15. Define paint and write important constituent of paints. (June 2016)
16. Write function of extender in a paint. (Dec 2016)
17. Explain advantage of electroless plating over the electroplating. (Dec 2016)
18. Write about the possibilities for differential aeration corrosion. (June 2017)
19. Mentioned the concept of electroless plating of nickel. (June 2017)
20. Differentiate paints and lacquers. (Jan 2019)

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)
2. (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)
3. (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)
4. (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)
5. (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)
6. (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)

Unit-III : POLYMER CHEMISTRY

Part-A (2 Marks)

1. Define Polymer. Give an example. (Jan 2019)
2. Define Monomer. Give an example.
3. What is meant by Polymerization?
4. What is meant by Degree of Polymerization? (Jan 2014)
5. Give the difference between Oligomer and High polymer.
6. What is functionality of polymers? (Jun 2014, June 2017)
7. What is natural and synthetic polymer? Give examples.
8. What are Plastics? List out its advantages.
9. In what way is copolymerization different from homo polymerization? (Dec 2016)
10. Thermosetting plastics cannot be remolded. Why?
11. Differentiate thermoplastics and thermosetting plastics (Dec 2014).
12. Give two examples for initiators.
13. Define tacticity. Mention its types with example.
14. Mention any two uses of SBR rubbers. (Jan 2014)
15. What is the repeating unit of Nylon 6,6? (Jun 2014, June 2016, Dec 2016, June 2017)
16. Define Glass Transition Temperature.
17. What is meant by Number – Average molecular mass?
18. What is Step-wise polymerization?

19. What are elastomers? Give an example.
20. What us the role of sulphur in the vulcanization process?

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)
2. (i) Explain the types of polymerization with an example. (June 2016, June 2017) (8)
   (ii) Classify the polymers with example. (June 2017) (8)
3. (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)
4. (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)
5. (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)
6. (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)

Unit-IV : NON CONVENTIONAL ENERGY SOURCES AND STORAGE DEVICES

Part-A (2 Marks)

1. Given any two differences between nuclear fission and fusion. (Nov 2014, June 2016)
2. What is nuclear chain reaction? Write nuclear fission reaction of $_{92}U^{235}$. (Dec 2015)
3. What is super critical mass and sub-critical mass of U235?
4. Give any one nuclear fission reaction; mention the factors that impede the chain reaction. (Apr 2015)
5. What are fissile nuclides and fertile nuclides?
6. What are the draw backs of nuclear reactor? (May 2014)
7. What are non-conventional energy sources? Give two examples.
8. Write how wind energy is generated. (Dec 2015)
9. EMF of battery vary with size? Give reason for your answer? (May 2014)
10. How are the nuclear wastes disposed?
11. What are batteries? How do they differ from a cell? (Nov 2014)
12. What are fuel cells? Write application of H_2-O_2 fuel cell? (Apr 2015, Dec2016)
13. Why solar energy is considered important in the present situation? (June 2017)
14. What is a primary battery? Give an example. (June 2016)
15. Write the overall equation for the reaction taking place in an alkaline battery.
16. Write the charging and discharging reaction of lead accumulator.
17. How are anodic and cathodic electro active materials made in Ni-Cd battery.
18. What are the limitations of the lead acid battery? (June 2017)

19. Write the cell representation of Lead-acid and NICAD batteries. (Dec2016)

20. What are the applications of lithium batteries?

Part-B (16 Marks)

1. What is nuclear reactor? Describe the components of nuclear power plant with a suitable block diagram. (Dec 2016, Jan 2019) (16)

2. (i) Describe the breeder reactor. (Dec 2016) (8)

   (ii) Explain nuclear fusion reaction with an example.(Dec 2015) (8)

3. (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)

4. (i) Justify why wind energy is considered green energy.(June 2017) (8)

   (ii) Write a note on Alkaline Battery. (8)

5. (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)

6. (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 H_2- O_2 fuel cell. (8)

Unit-V : ENGINEERING MATERIALS

Part-A (2 Marks)

1. Mention the characteristics (or) requisites of a good refractory.

2. Define refractoriness of a refractory? (Apr 2015, June 2016, Dec 2016)

3. What is meant Pyrometric Cone Equivalent (PCE) of a refractory?

4. What are the industrial applications of refractories? (June 2017)

5. Name the stages in the manufacture of refractory.

6. What is RUL? How is RUL test carried out?

7. What do you understand by dimensional stability of a refractory material? (May 2014)

8. What are abrasives? Give two examples for natural abrasives? (Nov 2014, Dec 2015)

9. What is carborundum? How is it prepared?

10. How are silicon carbide used conventionally? (June 2017)

11. Give few examples for natural and synthetic Abrasives. (June 2016)

12. How the thermal conductivity of a refectory related to its porosity?

13. What is glass? Mention its composition and two uses. (Nov 2014)

14. What are the general properties of glass?

15. What are the compositions of boro-silicate glass? (Apr 2015)

16. Give an example for non-siliceous and siliceous abrasives. (Dec 2016)

17. What are the differences between acidic and basic refractories?

18. What are the various classification of refractories? (Jan 2019)

19. Give any four application of abrasives? (Jan 2019)

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.
2. (i) Explain the properties refractories in detail. (Dec 2015, June 2016)
   (ii) What are the different types of abrasives? Describe the applications of abrasives.
3. (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)

Course Faculty **HoD**