



NARASIMHA REDDY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad

Accredited by NAAC with A Grade, Accredited by NBA

QUESTION BANK

Course Title : Engineering Chemistry

Course Code : 23CH102

Regulation : NR23

Course Objectives:

- ❖ To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- ❖ To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion and its control to protect the structures.
- ❖ To provide fundamental knowledge on properties and applications of polymers & to learn about polymers in a particular application area.
- ❖ To impart knowledge about various types of fuels and their combustion.
- ❖ To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes (CO's)

- ❖ The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
- ❖ Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
- ❖ Classify and characterize different polymer engineering materials and apply its knowledge to select suitable materials for specific applications.
- ❖ To be able to understand various types of fuels and the advantages of alternate fuels over conventional sources.
- ❖ They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT-I

Water & It's Treatment

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	Why is the calgon method better than other internal treatment methods?	L2	1	1
2	Write the chemical reactions involved in the regeneration of exhausted resins.	L2	1	1
3	Mention the common units used for expressing hardness of water.	L2	1	1
4	Why is the presence of even a small amount of silica dangerous to the boilers?	L4	1	1
5	Why does hard water consume a lot of soap?	L4	1	1
6	What happens when temporary hard water is boiled?	L2	1	1
7	Why do we express hard water in terms of calcium carbonate equivalents?	L2	1	1
8	Why is calgon conditioning better than phosphate conditioning?	L3	1	1
9	Differentiate between scale and sludge.	L2	1	1
10	Why should water from natural sources not be fed to boilers?	L2	1	1

11	a)	Write a short note on caustic embrittlement.	L1	1	1
	b)	Justify why the ion-exchange process is also called deionisation process.	L3	1	1
12	a)	Summarize the specifications for safe drinking water given by WHO. How does municipal water treatment meet the given specifications?	L3	1	1
	b)	Identify the hardness causing salts and calculate the total, temporary and permanent hardness: H ₂ SO ₄ - 24.09 mg/L NaHCO ₃ - 124.56 mg/L Ca(HCO ₃) ₂ - 102.69 mg/L MgNO ₃ - 109.07 mg/L MgSO ₄ - 124.34 mg/L CaCl ₂ - 208.08 mg/L K ₂ SO ₄ - 275.67 mg/L CaSO ₄ - 206.89 mg/L Mg(HCO ₃) ₂ - 189.11 mg/L NaCl - 231.09 mg/L	L2	1	1
13	a)	Reverse osmosis is the finest filtration known. Justify	L3	1	1
	b)	How can you determine if you are past breakpoint chlorination?	L2	1	1
14	a)	What are the causes and problems due to scales and sludges? Discuss the methods for treatment of scales and sludges	L2	1	1
	b)	Explain different internal treatment methods used for boiler feedwater	L1	1	1
15	a)	What is the principle of the EDTA method? Describe the estimation of hardness of water by EDTA method	L1	1	1
	b)	What is carbonate and noncarbonate hardness of water? List out various disadvantages of using hard water.	L1	1	1

UNIT-II

Battery Chemistry & Corrosion

1.	How does fuel cell differ from battery.	L2	2	1
2	Differentiate between primary battery and secondary battery.	L2	2	1
3	What are the four components of a lithium ion battery?	L2	2	1
4	Formation of which types of metal oxide film causes rapid and continuous corrosion.	L2	2	1
5	What is galvanic corrosion?	L1	2	1
6	What are the basic requirements for commercial batteries?	L2	2	1
7	What is the effect of pH on corrosion?	L2	2	1
8	Corrosion of water filled steel tanks occurs below the waterline . Give a reason.	L2	2	1
9	What are the applications of lithium ion batteries to electric vehicles?	L2	2	1
10	Write a short note on solar cells.	L1	2	1
11	What is the pilling bedworth rule?	L1	2	1

1	a).	Lithium ion batteries are the future of energy storage. Justify	L3	2	1
	b).	What is a battery? Explain the construction and working of zinc air batteries.	L1	2	1
2	a)	Describe how iron or steel can be made corrosion resistant by cathodic protection methods	L2	2	1
	b)	Explain the working principle of hydrogen- oxygen fuel cells with reactions.	L1	2	1
3	a)	Explain the construction and working of solidoxide fuel cells. Mention its advantages	L2	2	1
	b)	.Explain various factors affecting the rate of corrosion. Define	L1	2	1
4	a)	Define corrosion of metals. What are different types of corrosion? Explain the electrochemical theory of wet corrosion, giving its mechanism.	L1	2	1
	b)	Microbial fuel cells are considered as a source of sustainable energy. Explain?	L3	2	1
5	a)	Define corrosion. Explain oxidation corrosion and its mechanism. Discuss the role of nature of metal oxide formed in oxidation corrosion.	L1	2	1
	b)	How is steel protected cathodically? Discuss with impressed current cathodic protection method.	L2	2	1

UNIT-III

Polymeric materials

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	What is the need for vulcanisation of raw rubber?	L3	3	1
2	Why thermosetting plastics cannot be reused and reshaped?	L3	3	1
3	Teflon is an addition polymer, but it behaves somewhat like a thermosetting polymer. Give a reason.	L2	3	1
4	List out the monomers of nylon 6:6.	L2	3	1
5	List out the applications of conducting polymers.	L2	3	1
6	List out the commonly used fibers in the following: a) GFRP b) CFRP c) AFRP	L1	3	1
7	What are biodegradable polymers used for?	L2	3	1
8	.State the monomers used in making the following: a) PVC b) Teflon	L2	3	1
9	What are dopants in conducting polymers. Give examples	L2	3	1
10	PVC is soft and flexible whereas bakelite is hard and brittle. Give reasons.	L3	3	1
Part – B (Long Answer Questions)				
11	a) .Explain the conduction mechanism of trans polyacetylene.	L1	3	1

	b)	Write a note on classification of polymers	L1	3	1
12	a)	Differentiate between addition and condensation polymerisation with suitable examples.	L2	3	1
	b)	Describe the method of preparation, properties and applications of the following a) Buna S b) Thiokol rubber	L1	3	1
13	a)	.Define the term plastic. Explain the properties and applications of the following a) PVC b)Teflon c)Bakelite	L2	3	1
	b)	What is natural rubber? Explain why natural rubber needs vulcanisation. How it is carried out	L2	3	1
14	a)	What are fiber reinforced plastics? Mention its types and applications.	L1	3	1
	b)	Poly vinyl alcohol	L1	3	1

15	a)	What is fiber? Explain the properties and engineering applications of the following a) Nylon 6:6 b) Terylene	L2	3	1
	b)	Explain free radical addition polymerisation mechanism with suitable example.	L1	3	1

UNIT-IV

Energy Sources

S.No	Questions	BT	CO	PO	
Part – A (Short Answer Questions)					
1	Gasoline containing tetraethyl lead is used in internal combustion engines. Give reasons.	L2	4	1	
2	What is meant by the calorific value of a fuel?	L2	4	1	
3	Why are gaseous fuels more advantageous than solid fuels?	L2	4	1	
4	What are the characteristics of good quality of coal?	L2	4	1	
5	What are the advantages of biodiesel?	L2	4	1	
6	What is the cracking of petroleum?	L1	4	1	
7	What are the different alternate fuels used? Why do we need alternative fuels	L2	4	1	
8	Distinguish gross and net calorific value of a fuel.	L2	4	1	
9	What is cetane value of a diesel fuel?	L2	4	1	
10	What is LPG? What are its advantages?	L1	4	1	
Part – B (Long Answer Questions)					
11	a)	.What is meant by cracking of petroleum? Explain the movingbed catalytic cracking method of obtaining gasoline.	L1	4	1
	b)	What are fuels? Give complete classification of fuels with suitable examples	L1	4	1
12	a)	Explain the proximate analysis of coal? How is it carried out? Mention its significance.	L1	4	1
	b)	What is the significance of ultimate analysis of coal? How is this analysis carried out in the laboratory?	L2	4	1
13	a)	Describe the manufacture of gasoline by Fischer-Tropsch method.	L1	4	1
	b)	What is biodiesel? Explain the production of biodiesel from the transesterification process. Mention the applications of biodiesel.	L2	4	1

14	a)	Explain the term knocking in an IC engine? How is it related tochemical constitution? Explain octane number and cetane number.	L2	4	1
	b)	What is the principle of refining petroleum? Describe the fractional distillation process for refining petroleum. What are various fractions obtained from petroleum?	L2	4	1
15	a)	Explain the advantages and applications of the following a) LPG	L1	4	1

	b) CNG			
b)	What is calorific value? What is the relationship between HCV and LCV? How calorific value can be calculated by Dulong's formula.	L2	4	1

UNIT-V

S.No	Questions	BT	CO	PO
Part – A (Short Answer Questions)				
1	Why is lubricant needed?	L2	5	1
2	State the significance of the pour point of lubricants.	L2	5	1
3	What type of lubricants are suitable for thick film lubrication?	L2	5	1
4	What should be the flash point of a good lubricant?	L2	5	1
5	Who discovered cement and why it is called portland cement.	L2	5	1
6	Define the soundness of a cement.	L2	5	1
7	What is the role of gypsum in setting and hardening?	L2	5	1
8	What are shape memory materials?	L1	5	1
9	What are the advantages of excess lime during manufacturing of cement?	L2	5	1
10	What is thermo responsive material?	L1	5	1
Part – B (Long Answer Questions)				
11	a) Discuss the important properties of lubricants and indicate the significance of these properties.	L2	5	1
	b) What is cement? Explain the composition of Portland cement.	L1	5	1
12	a) Write the chemical reactions that take place during setting and hardening of portland cement	L1	5	1
	b) Explain how lubricants work. Explain the mechanism of lubrication in detail	L2	5	1
13	a) Define the term lubricant. Write a detailed note on classification of lubricants with suitable examples.	L1	5	1
	b) Explain the term setting and hardening of cement. What are the compounds which contribute to the hardening?	L2	5	1
14	a) What are thermoresponsive materials? Discuss the applications of polyacrylamide and poly vinyl amides.	L1	5	1
	b) What are shape memory materials? What are the applications of polyurethanes?	L1	5	1

* **Blooms Taxonomy Level (BT)** (L1 – Remembering; L2 – Understanding; L3 – Applying; L4 – Analyzing; L5 – Evaluating; L6 – Creating)

Course Outcomes (CO)

Program Outcomes (PO)

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