



JECRC Foundation



**JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE**

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE

Year & Sem – B.Tech I year I Sem

Subject –Engg.Chemistry

Unit – IV

Presented by – Ms.Rekha Vijay

Designation - Asst.Professor

Department - Chemistry

VISION OF INSTITUTE

To become a renowned centre of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities.

MISSION OF INSTITUTE

- ❖ Focus on evaluation of learning outcomes and motivate students to inculcate research aptitude by project based learning.
- ❖ Identify, based on informed perception of Indian, regional and global needs, the areas of focus and provide platform to gain knowledge and solutions.
- ❖ Offer opportunities for interaction between academia and industry.
- ❖ Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders may emerge in a range of profession.

Engineering Chemistry: Course Outcomes

Students will be able to:

CO1: Explain the impurities of water (mainly hardness) and boiler troubles.

CO2: Describe processing technologies of fuel with numerical aspects of combustion of fuel.

CO3: Describe the engineering material (cement, glass and lubricant) with respect to their manufacturing, composition, classification & properties.

CO4: Explain corrosion with its controlling measures, organic reaction mechanism and synthesis of drugs (Aspirin & Paracetamol) with their properties and uses.

JECRC
Department of Applied Sciences
Lecture Plan (Session- 2020-2021)

Course Name: Engineering Chemistry

Year/Semester: 1st Year/ Semester- I

Course code: 1FY2-03

No. of Lecture Req. /(Avl.): /(40/44)

Semester starting: 21 Sept. 2020

Semester Ending: 24 Dec. 2020

Unit No./ Total Lect. Req.	Topics	Lect. No.	Date of Delivery	Book Referred	Pg. No.
Unit-I 10	Introduction to syllabus, Common natural impurities, hardness, Degree of hardness,	1			
	Units of hardness, Determination of hardness by complexometric (EDTA method).	2			
	Municipal water supply, Requisite of drinking water, purification of water, Sedimentation,	3			
	Filtration, disinfection, Breakpoint chlorination.	4			
	Boiler troubles: Scale and Sludge formation, Internal treatment Methods	5			
	Priming and Foaming, Boiler corrosion and caustic embrittlement	6			
	Water softening: Lime-Soda process	7			
	Water softening: Zeolite (Permutit) process, Demineralization process.	8			
	Numerical problems based on Hardness, EDTA,	9			
	Numerical problems based on Lime-Soda and Zeolite process.	10			

Unit-II

10

2.Organic Fuels: Solids fuels: Coal, Classification of Coal, Proximate analyses of coal and its significance	11			
Ultimate analyses of coal and its significance,	12			
Gross and Net Calorific value, Determination of Calorific value of coal by Bomb Calorimeter.	13			
Metallurgical coke, Carbonization processes; Otto-Hoffmann byproduct oven method.	14			
Liquid fuels : Advantages of liquid fuels, Mining, Refining and Composition of petroleum, Cracking	15			
Synthetic petrol, Reforming, Knocking, Octane number, Anti-knocking agents, Cetane number	16			
Gaseous fuels; Advantages, manufacturing, composition and Calorific value of coal gas and oil gas	17			
Determination of calorific value of gaseous fuels by Junker's calorimeter, Numerical problems based on Junkers calorimeter	18			
Numerical problems based on determination of calorific value bomb calorimeter, /Dulong's formula, proximate & ultimate Analysis.	19			
Numerical problems based on combustion of fuel.	20			

Unit-III

3

3. Corrosion and its control: Definition and significance of corrosion, Mechanism of chemical (dry) corrosion	21			
Mechanism of electrochemical (wet) corrosion, galvanic corrosion, concentration corrosion and pitting corrosion.	22			
Protection from corrosion; protective coatings-galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.	23			

Unit-IV 10

4.Engineering Materials: Portland Cement; Definition, Manufacturing by Rotary kiln.	24		
Chemistry of setting and hardening of cement. Role of Gypsum.	25		
Glass: Definition, Manufacturing by tank furnace, significance of Annealing	26		
Types and properties of soft glass, hard glass	27		
Borosilicate glass, glass wool, safety glass.	28		
Lubricants: Classification	29		Engg. Chemistry (New Age International)
Lubricants: Mechanism	30		
Properties; Viscosity and viscosity index	31		
Flash and fire point, cloud and pour point.	32		
Emulsification and steam emulsion number.	33		

Unit-V

7

5. Organic reaction mechanism and introduction of drugs: Organic reaction mechanism: Substitution; SN1, SN2.	34			
Electrophilic aromatic substitution in benzene, free radical halogenations of alkanes,	35			
Elimination: elimination in alkyl halides, dehydration of alcohols,	36			
Addition: electrophilic and free radical addition in alkenes, nucleophilic addition in aldehyde and ketones	37			
Rearrangement: Carbocation and free radical rearrangements	38			
Drugs : Introduction, Synthesis, properties and uses of Aspirin	39			
Drugs : Introduction, Synthesis, properties and uses of Paracetamol, Revision	40			

Lecture-29 (Unit-IV Engineering Materials)

Classification of lubricant

CLASSIFICATION OF LUBRICANT

SOLID
LUBRICANT

SEMISOLID
LUBRICANT

LIQUID
LUBRICANT



Classification of lubricants :

1. Liquid lubricants or lubricating oils-

- Vegetable and animal oils- : e.g. olive oil, palm oil, castor oil, hard oil, tallow oil, etc.
- Mineral oils: e.g. petroleum fractions
- Blended oils: e.g. mineral oils with various additives
- Synthetic oils: e.g. Silicon's, fluolubes, etc.



2.Semi solid lubricants(Gels)

The most important semisolid lubricants are greases and vaseline. Greases are employed in situations where :

1. Oil can not be maintained in position due to high load and low speed.
2. Spilling of the oil is undesirable eg. In paper and textile industries.

A grease is a semisolid lubricant obtained by thickening of a lubricating oil by the addition of a metallic soap.



Solid lubricant

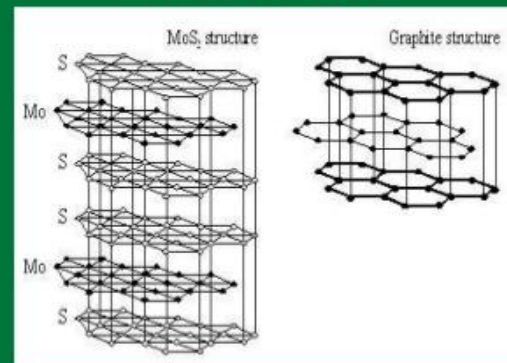
Solid film lubricants are paint-like coatings of very fine particles of lubricating pigment blended with a binder and other additives. The lubricant is applied to a substrate by spray, dip or brush methods and, once cured, creates a solid film which repels water, reduces friction and increases the wear life of the substrate to which it has been applied



SOLID LUBRICANT :-

1. GRAPHITE

2. MOLYBDENUM
DI
SULPHIDE



Suggested links from NPTEL

https://www.substech.com/dokuwiki/doku.php?id=classification_of_lubricants



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*Thank
you!*