

PaperCode: BS104	Paper: Engineering Chemistry - II	L	T/ P	C								
PaperID: 99104		3	-	3								
Marking Scheme: 1. Teachers Continuous Evaluation: 25 marks 2. Term end Theory Examinations: 75 marks												
Instruction for paper setter: 1. There should be 9 questions in the term-end examinations question paper. 2. The first unit will be compulsory and cover the entire syllabus. This question will have Five sub-parts, and the students will be required to answer any THREE parts of 5 marks each. This unit will have a total weightage of 15 marks. 3. Apart from unit 1 which is compulsory, the rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may contain up to 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15. 4. The questions are to be framed keeping in view the learning outcomes of the course/paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook. 5. The requirement of (scientific) calculators / log-tables / data - tables may be specified if required.												
Course Objectives: 1: To understand methods to make pure water and use fuels. 2: To understand the use of techniques used to characterize engineering materials. 3: To understand the properties and industrial applications of polymers. 4: To understand the basics of nano-technology and bio chemistry												
Course Outcomes (CO): CO1: Ability to make pure water and use fuels and perform energy conversion calculations CO2: Ability to use techniques used to characterize engineering materials. CO3: Understand the properties and industrial applications of polymers. CO4: Understand the basics of nano-technology and bio chemistry												
Course Outcomes (CO to Programme Outcomes (PO) Mapping (scale 1: low, 2: Medium, 3: High)												
CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	2	2	3	3	2	-	-	-	1	1	-	1
CO2	2	2	3	3	2	-	-	-	1	1	-	1
CO3	2	2	3	3	2	-	-	-	1	1	-	1
CO4	2	2	3	3	2	-	-	-	1	1	-	1

Unit I

Water treatment: Introduction, Hardness of water, Disadvantages of hard water, Water-softening-Lime-Soda process, Ion-exchanger polished water, Boiled-feed water, boiler problems-scale, sludge priming and foaming, caustic embrittlement and corrosion.

Fuels: Classification of fuels, Calorific values, Comparison between solid, liquid and gaseous fuels, Bomb calorimeter, Calorific value of gaseous fuel, Theoretical calculation of calorific value of a fuel, Wood, Coal, Analysis of coal, Natural Gas, Producer gas, water gas, Non-Conventional sources of energy. [10Hrs]

Unit II

Spectroscopic Techniques: Basic principles of spectroscopic methods. The use of various spectroscopic techniques for the determination of structure of simple compounds. XRD, SEM and TEM. [10Hrs]

Unit III

Polymers: Basic concepts & Terminology, such as monomers, Polymers, functionality, Thermoplastics, Thermosets, Linear, Branched, cross linked polymers etc. Different definitions of molecular weight's viz. Mw, Mn, Mv and then determinations, Industrial applications of polymers. General methods of synthesis of organics and their applications. [10Hrs]

Unit IV

Nano Technology: Introduction, Properties, Synthesis and characterization of Nanomaterials, Material self-assembly, Nanoscale materials and their applications.

Biochemistry: Molecular basis of life, study of macro molecules: Carbohydrates, Proteins, Lipids, Nucleic acid. Metabolism, basic concepts and design, Glycolysis citric acid cycle oxidative phosphorylation pentose phosphate pathway.. [10Hrs]

Textbooks/References:

1. Engineering Chemistry (16th Edition) by Jain, Jain, Dhanpat Rai Publishing Company, 2013.
2. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley, 2017.
3. Engineering Chemistry by E.R. Nagarajan and S. Ramalingam, Wiley, 2017.

4. *Biochemistry* by Lubert Stryer, Jeremy Berg, John Tymoczko, Gregory Gatto 9th Edition 2019. W H Freeman & Co.