Applied Chemistry – I

F.E. Sem. I

EVALUATION SYSTEM

	Time	Marks
Theory Exam	2 Hrs.	60
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. **Module 1 : Water**
   - Impurities in water, Hardness of water, Determination of Hardness of water by EDTA method and problems. Softening of water by Hot cold lime soda method and problems. Zeolite process and problems. Ion Exchange process and problems.
   - **Drinking water or Municipal water,** Treatments removal of microorganisms, by adding Bleaching powder, Chlorination (no breakpoint chlorination), Disinfection by Ozone, Electrodialysis and Reverse osmosis, ultra filtration.
   - **BOD, COD (**def, & significance), sewage treatments activated sludge process, numerical problems related to COD.

2. **Module 2 : Polymers**
   - Introduction to polymers, Thermoplastic and Thermosetting plastic.
   - Ingredients of the plastic (Compounding of plastic.)
   - Fabrication of plastic by Compression, Injection, Transfer, Extrusion molding. Preparation, properties and uses of Phenolformaldehyde, PMMA, Kevlar.
   - Effect of heat on the polymers (Glass transition temperatures) Polymers in medicine and surgery.
   - Conducting polymers, Industrial polymers.
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   Rubbers:
   - Natural rubber (latex), Drawbacks of natural rubber, Compounding of rubber (vulcanization of rubber), Preparation, properties and uses of Buna-S, Silicone and Polyurethane rubber.

3. **Module 3 : Lubricants**
   - Introduction, Definition, Mechanism of Lubrication, Classification of lubricants, Solid lubricants (graphite & Molybdenum disulphide), Semisolid lubricants (greases Na base, Li base, Ca base, Axle greases), Liquid lubricants (blended oils).
   - Important properties of lubricants, definition and significance, viscosity, viscosity index, flash and fire points, cloud and pour points, oiliness, Emulsification, Acid value and problems, Saponification value and problems.

4. **Module 4 : Phase Rule**
   - Gibb's Phase Rule, Explanation, One Component System (Water), Reduced Phase Rule, Two Component System (Pb-Ag), Limitations of Phase Rule.

5. **Module 5 : Important Engineering Materials**
   - **Cement-** Manufacture of Portland Cement, Chemical Composition and Constitution of Portland Cement , Setting and Hardening of Portland Cement, Concrete RCC and Decay. **Refractories** Preparation, properties and uses of Silica bricks, Dolomite bricks, Silicon Carbide (SiC).
   - **Nanomaterials** , preparation (Laser and CVD method), properties and uses of CNTS

Mumbai University Question Paper Format

1) Question paper will comprise of total 6 questions, each of 15 marks.
2) Total four questions need to be solved.
3) Question no. 1 will be compulsory and based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
4) Remaining questions will be mixed in nature (for example suppose Q.2 has part (a) from module 3 then part (b) will be form any module other than module 3).
5) In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Reference Books :

1) Engineering Chemistry (*Jain & Jain*), Dhanpat Rai.
2) Engineering Chemistry (*Dara & Dara*), S Chand.
3) Engineering Chemistry (*Wiley India*) (ISBN-9788126519880).
4) A Text Book of Engineering Chemistry (*Shashi Chawla*) (Dhanpat Rai).

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