

AL-KANIR POLYTECHNIC

Mango, Jamshedpur

Diploma in Engineering, 2020 – 21 Batch, 1st Semester

Engineering Chemistry

INTRODUCTORY CLASS

1. GENERAL INFORMATION

- (a) Wear uniform in a decent manner
- (b) Put black shoes with socks.
- (c) Shoes without socks is unacceptable.
- (d) Maintain discipline in the campus
- (e) Avoid any confrontation
- (f) Talk in civilized and polite manner
- (g) Do not use unparliamentary language in the college premises.
- (h) Write the thing being taught very clearly in the dedicated subject note book
- (i) Be comfortable to ask your doubt
- (j) Complete the portion taught on the same day

2. SYLLABUS OF ENGG. CHEM – I

- (i) **ATOMIC STRUCTURE AND CHEMICAL BONDING:** Definition of Atom, Fundamental Particles of Atom - their Mass, Charge, Location, Definition of Atomic Number, Atomic Mass Number, Isotopes & Isobars & their distinction with suitable examples, Bohr's Theory, Definition, Shape of the orbitals and distinction between Orbits & Orbitals, Hund's Rule, Aufbau's Principle. Electronic Configuration (till Atomic Number 30). Definition & types of valency (Electrovalency & Co-valency), Octet Rule, Duplet Rule, Formation of Electrovalent & Covalent Compounds e.g. NaCl, CaCl₂, MgO, AlCl₃, CO₂, H₂O, Cl₂, NH₃, C₂H₄, N₂, C₂H₂. Distinction between electrovalent & covalent compounds.
- (ii) **ELECTROCHEMISTRY:** Electrolytic dissociation, Arrhenius theory of Ionisation, Degree of Ionisation & factors affecting degree of ionisation. Significance of the terms involved in Electrolysis – such as Conductors, Insulators, Dielectrics, Electrolyte, Non Electrolyte, Electrolysis, Electrolytic Cell, Electrodes. Mechanism of Electrolysis. Concept of electrode potential such as reduction potential & oxidation potential. Electrochemical Series, Electrolysis of aqueous CuSO₄ solution using Copper (Cu) Electrode & Platinum (Pt) Electrode, Electrolysis of aqueous NaCl solution & fused NaCl using carbon (graphite) or platinum electrode, Faraday's first & second law of Electrolysis & Numerical. Electrochemical Cells & Batteries, Definition, types such as Primary & Secondary Cells & their examples. Construction, Working & Applications of Dry Cell & Lead – Acid Storage Cell, Applications of Electrolysis such as Electroplating, Electro-refining, Electrometallurgy and Electrotyping.
- (iii) **METALS AND ALLOYS:** Occurrence of Metals, Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Mechanical Properties of metals such as Hardness, Toughness, Ductility, Malleability, Tensile strength, Machinability, Weldability, Forging, Soldering, Castability. Stages of Extraction of Metals from its Ores in detail i.e. Crushing, Concentration, Reduction and Refining. Physical Properties & Applications of some commonly used metals such as Fe, Cu, Al, Cr, Ni, Sn, Pb, Zn, Co, Ag, W. Definition of Alloy, Purposes of Making alloy, Preparation Methods, Classification of Alloys such as Ferrous & Non-ferrous and their examples. Composition, Properties & Applications of Alnico, Duralumin, Dutch metal, German silver / Nickel Silver, Gun Metal, Monel metal, Wood's Metal, Babbitt metal.

(iv) **NON-METALLIC MATERIALS:**

Plastics: Definition of Plastic; Formation of Plastic by Addition & Condensation Polymerisation by giving example of Polyethylene & Bakelite plastic respectively; Types of Plastic – Thermosoftening and Thermosetting Plastic, with definition, distinction; Compounding of Plastics — Resins, Fillers, Plasticizers, Accelerators, Pigments & their examples; Engineering applications of Plastic based on their properties.

Natural Rubber: Its Processing, Drawbacks of natural rubber, Vulcanisation of rubber with chemical reaction.

Synthetic Rubber: Definition, Distinction between natural & synthetic rubber. Properties of rubber such as elasticity, abrasion resistant, stress & strain and related engineering application.

Thermal Insulating Materials: Definition and types; Characteristics of insulators; Thermal insulators; Properties & Applications of glass wool, Asbestos, Cork.

(v) **ENVIRONMENTAL EFFECTS:**

Pollution: Definition of pollution & pollutant, Causes of Pollution, Types of Pollution - Air & Water Pollution.

Air Pollution: Definition, Types of Air pollutants their Sources & Effects, Such as Gases, Particulates, Radio Active Gases, Control of Air Pollution, Air Pollution due to Internal Combustion Engine & Its Control Methods, Deforestation – their effects & control measures, Causes, Effects & control measures of Ozone Depletion & Green House Effects.

Water Pollution & Wastes: Definition, Causes & Methods of Preventing Water Pollution, Types of Waste such as Domestic Waste, Industrial Waste, their Physical & Biological Characteristics, Concept & Significance of BOD, COD, Biomedical Waste & E - Waste, their Origin, Effects & Control Measures. Preventive Environmental Management (PEM) Activities.

3. **EXAMINATION**

(a) **Internal Examination** [20 Marks]

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| (i) | Assignment -1 | [05 Marks] |
| (ii) | Assignment -2 | [05 Marks] |
| (iii) | Snap test -1 | [05 Marks] |
| (iv) | Snap test -2 | [05 Marks] |

(b) **University Examination** [80 Marks]

Pass Marks in the Subject [40 Marks]

4. **BOOKS RECOMMENDED**

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| (i) | A Text Book of Engineering Chemistry | By | Dr. Altaf Ahmad |
| (ii) | A Text Book of Engineering Chemistry | By | Shashi Chawla |
| (iii) | A Text Book of Engineering Chemistry | By | Jain and Jain |
| (iv) | A Text Book of Engineering Chemistry | By | S. S. Dara |

5. **ATTENDANCE:** 75% attendance is a must, failing which you may not be able to appear at the final examination and may be barred from many other activities. You should try to achieve 100% attendance.

6. **CONDUCT:** Your overall conduct will be considered for appearing at the Campus Placement drive.

Dr. Altaf Ahmad