

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

UNIT I: WATER TECHNOLOGY

(8 lectures)

Introduction and specifications of water, Hardness and its determination (EDTA method only), Alkalinity, Boiler feed water, boiler problems – scale, sludge, priming & foaming: causes & prevention, Boiler problems – caustic embrittlement & corrosion : causes & prevention, Removal of silica & dissolved gases; carbonate & phosphate conditioning, Water softening processes : Lime – soda process, Ion exchange method, colloidal conditioning & calgon treatment , Water for domestic use.

UNIT II: FUELS

(8 lectures)

Classification, calorific value of fuel, (gross and net), Determination of calorific value of fuels, bomb calorimeter, Boy's Gas calorimeter, Solid fuels - Proximate and ultimate analysis, High & Low temperature carbonisation, manufacture of coke (Otto-Hoffmann oven), Liquid Fuels – Petroleum-Chemical composition, fractional distillation, Cracking - Thermal & catalytic cracking, Octane & Cetane No. and its significance, Power Alcohol, Analysis of flue gases (Orsat's apparatus).

UNIT III: GASEOUS STATE

(5 lectures)

Gas Laws and Kinetic Theory of gases, Distribution of molecular velocities, Mean free path, Real gases-non ideal behaviour, Causes of deviation from ideal behaviour, Vander Waal's equation, liquefaction of gases.

UNIT IV: THERMOCHEMISTRY

(2 lectures)

Hess's Law, Heat of Reaction, Heat of dilution, Heat of Hydration, Heat of neutralization and Heat of Combustion, Effect of temperature on heat of reaction at constant pressure (Kirchoff's equation), Flame Temperature

UNIT V: THE PHASE RULE

(3 lectures)

Definition of various terms, Gibb's Phase rule, Application of phase rule to one component system- The water system and sulphur system, Two component system- Lead-Silver, FeCl₃- water, Na₂SO₄ – water.

UNIT VI: CATALYSIS

(4 lectures)

Effective from academic session 2007-08

Characteristics, types and theories of catalysis, concept of promoters, inhibitors and poisons, Homogenous catalysis (mechanisms of acid-base and Enzyme), catalysis by metal salts, Heterogenous catalysis (mechanism of surface reactions).

REFERENCE BOOKS:

1. Chemistry in Engineering & Technology (Vol I & II) (Latest ed.), By J.C. Kuriacose & J. Rajaram
2. Principles of Physical Chemistry, (Latest ed.), Puri B.R., Sharma L.R. and Pathania, M.S.
3. Text book of Engg. Chemistry, S. Chand & Co., (Latest ed.), S.S. Dara.

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