

CHE 486 : ENERGY ENGINEERING

L – T – P

3 – 1 – 2

Time :3 Hrs.

Theory : 100 marks.

Sessional : 50 marks.

Practical : 50 marks.

1. **INTRODUCTION:** Energy crisis, present position in India and the world. Remedial measures. energy resources, Survey, classification and scope of utilization

2. **SOLID FUELS:** Types of solid fuels, classification of coal, origin of coal, Coal composition : Proximate & Ultimate analysis of coal., calorific value of solid fuel : Gross and net calorific value and their determination by Bomb calorimeter, processing of coal, cleaning of coal, coal carbonization, recovery of by-products from coal carbonization, pulverized coal, coal Gasification & Liquefaction.

3. **LIQUID FUELS:** Types of Liquid Fuels- Basic Introduction, Petroleum, Coal tar fuel, liquid fuel from coal, (F-T process and Bergius process), Alcohols, Shale oil etc.

4. **GASEOUS FUELS :** Types of gaseous fuels, manufacture of producer gas, water gas, coal gas, carbureted water gas from coal, LPG, SNG, CNG etc., oil gasification. Gross and net calorific value of gaseous fuel and their experimental determination, Junker's gas calorimeter, Boy's gas calorimeter.

5. INTRODUCTION TO VARIOUS COMBUSTION EQUIPMENTS

6. **ALTERNATIVE ENERGY RESOURCES:** Overview of various renewable resources: Hydroelectricity, solar energy, Energy from Biomass, Geothermal Energy, Wind, Tidal energy.

7. **CALCULATIONS.:** for combustion of solid, liquid & gaseous fuels, for calorific value of solid, liquid & gaseous fuels.

PRACTICALS :

Proximate analysis of coal.

Determination of calorific value of solid & liquid fuel by Bomb calorimeter.

Determination of calorific value of gaseous fuel by Junker's Gas calorimeter.

Determination of flash point by Abel's apparatus.

Determination of flash point by Pensky-Marten apparatus.

Determination of flash point & fire point by Cleveland apparatus.

Analysis of flue gas by Orsat apparatus. Determination of viscosity by Redwood – I & II Viscometers.

BOOKS

Fuel & Combustion by S. Sarkar.

Combustion Engineering & Fuel Technology by A.K. Saha.

Solid, liquid & gaseous fuels by Brame & King.

Fuel Combustion energy Technology, S N Saha, Dhanpat Rai Publication

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