

ENERGY ENGINEERING

Subject Code	: 10ME53	IA Marks	: 25
Hours/Week	: 04	Exam Hours	: 03
Total Hours	: 52	Exam Marks	: 100

PART – A

UNIT - 1

Steam Power Plant: Different Types of Fuels used for steam generation, Equipment for burning coal in lump form, stokers, different types, Oil burners, Advantages and Disadvantages of using pulverized fuel, Equipment for preparation and burning of pulverized coal, unit system and bin system. Pulverized fuel furnaces, cyclone furnace, Coal and ash handling, Generation of steam using forced circulation, high and supercritical pressures.

07 Hours

UNIT - 2

A Brief Account Of Benson, Velox Schmidt Steam Generators. Chimneys: Natural, forced, induced and balanced draft, Calculations and numericals involving height of chimney to produce a given draft. Cooling towers and Ponds. Accessories for the Steam generators such as Superheaters, De-superheater, control of superheaters, Economizers, Air pre-heaters and re-heaters.

07 Hours

UNIT - 3

Diesel Engine Power Plant: Applications of Diesel Engines in Power field. Method of starting Diesel engines. Auxiliaries like cooling and lubrication system, filters, centrifuges, Oil heaters, intake and exhaust system, Layout of diesel power plant.

06 Hours

UNIT - 4

Hydro-Electric Plants: Hydrographs, flow duration and mass curves, unit hydrograph and numericals. Storage and pondage, pumped storage plants,

low, medium and high head plants, Penstock, water hammer, surge tanks, gates and valves. General layout of hydel power plants.

06 Hours

PART – B

UNIT - 5

Nuclear Power Plant: Principles of release of nuclear energy; Fusion and fission reactions. Nuclear fuels used in the reactors. Multiplication and thermal utilization factors. Elements of the nuclear reactor; moderator, control rod, fuel rods, coolants. Brief description of reactors of the following types-Pressurized water reactor, Boiling water reactor, Sodium graphite reactor, Fast Breeder reactor, Homogeneous graphite reactor and gas cooled reactor, Radiation hazards, Shieldings, Radio active waste disposal.

06 Hours

UNIT - 6

Solar Energy: Solar Extra terrestrial radiation and radiation at the earth surface, radiation-measuring instruments, working principles of solar flat plate collectors, solar pond and photovoltaic conversion (Numerical Examples).

Wind Energy: Properties of wind, availability of wind energy in India, wind velocity and power from wind; major problems associated with wind power, wind machines; Types of wind machines and their characteristics, horizontal and vertical axis wind mills, coefficient of performance of a wind mill rotor (Numerical Examples).

08 Hours

UNIT - 7

Tidal Power: Tides and waves as energy suppliers and their mechanics; fundamental characteristics of tidal power, harnessing tidal energy, limitations.

Ocean Thermal Energy Conversion: Principle of working, Rankine cycle, problems associated with OTEC.

Geothermal Energy Conversion: Principle of working, types of geothermal station with schematic diagram, problems associated with geothermal conversion, scope of geothermal energy.

06 Hours

UNIT - 8

Energy From Bio Mass: Photosynthesis, photosynthetic oxygen production, energy plantation.

Bio Chemical Route: Biogas production from organic wastes by anaerobic fermentation, classification of bio gas plants, factors affecting bio gas generation.

Thermo Chemical Route: Thermo chemical conversion on bio mass, types of gasifiers.

06 Hours

TEXT BOOKS:

1. **Power Plant Engineering**, P. K. Nag Tata McGraw Hill 2nd edn 2001.
2. **Power Plant Engineering**, Domakundawar, Dhanpath Rai sons. 2003

REFERENCE BOOKS:

1. **Power Plant Engineering**, R. K. Rajput, Laxmi publication, New Delhi.
2. **Principles of Energy conversion**, A. W. Culp Jr., McGraw Hill. 1996
3. **Non conventional Energy sources**, G D Rai Khanna Publishers.
4. **Non conventional resources**, B H Khan TMH - 2007

DYNAMICS OF MACHINES

Subject Code	: 10ME54	IA Marks	: 25
Hours/Week	: 04	Exam Hours	: 03
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PART – A

UNIT - 1

Static Force Analysis: Introduction: Static equilibrium. Equilibrium of two and three force members. Members with two forces and torque. Free body diagrams. Principle of virtual work. Static force analysis of four bar mechanism and slider-crank mechanism with and without friction.

06 Hours