

ENERGY PHYSICS

UNIT - I - SUN

The Characteristics of sun – Solar constant Electromagnetic energy spectrum – Spectral distribution solar radiation on Earth;s surface – Solar angles – Types pyroheliometers – Estimation of average solar radiation.

UNIT - II - SOLAR COLLECTORS

Liquid flat plate collectors – General Characteristics – Collection efficiency – Loss coefficient – Evaluation – Temperature distribution and mean plate temperature – Focusing type solar collectors – Concentrator and receiver geometrics – General Characteristics of focusing collectors – Optic losses – Construction of reflectors.

UNIT - III - SOLAR HEATERS AND COOLERS

Solar air heaters – Application of solar water heaters – collectors and storage tanks – Characteristics and performance of collectors – storage of energy at high and low temperatures.

Solar cooling system – Vapour compression systems and heat pump – Absorption air conditioning – Open cycle cooling systems – Natural methods of air conditioning.

UNIT - IV - SOLAR GENERATORS

Solar thermal power generation – Solar still – Solar pump – Solar pond – Solar cooker – selective coating.

Conversion of light into electrical energy – Photovoltaic power generation – types of solar cells - solar energy in space.

UNIT - V - OTHER ENERGY SOURCES

Fossil fuel resources – need for alternative energy resources – Biological conversation – Biogas – Geothermal – Ocean thermal energy conversation – wind power – tidal power – Nuclear power – Fussion and fission – Basic principles of magneto hydrodynamics – solar production of hydrogen – Liquid hydrogen as a fuel in future.

Books for Study and Reference:

1. Solar Energy Utilization – G.D.Rai – Khanna Publications – Delhi – 1993.
2. Solar Energy – C.G.Agarwal.