**ASSIGNMENT No.1**

1. Explain the importance of solar energy in day today life.
2. Comment on the oil crisis of 1973.
3. Define solar irradiance, solar constant, extraterrestrial and terrestrial radiations.
4. What is the standard value of solar constant?
5. Tabulate the differences between flat plate collectors and concentrating collectors.
6. Explain the principle of solar cell and the importance of solar thermal systems over photovoltaic cell.
7. Why usually the actual output power from a PV module is less than its rated power? Define tracking error of a solar.
8. Explain the I-V
9. Calculate the number of daylight hours at Delhi on December 21 and June 21 in a leap year. ($∅$=28o35’)
10. An inclined surface, facing due south, tilted at 60o with the horizontal, is location at Aligarh (latitude 27o54’ N, Longitude 78o 05’ E) on 22 March at 1 p.m. (IST). The reflection coefficient ρ of the ground is 0.2. calculate the total radiation received at the surface. Also, calculate the values of Rb, Rr, Rd and R’.

**ASSIGNMENT No.2**

1. What are the basic components of wind energy conversion systems (WECS)? Explain them with neat block diagrams.
2. Derive speed power relation for a Wind Energy Conversion System.
3. Define mode and mean speed for WECS.
4. Sketch the diagrams of a HAWT and VAWT and explain the functions of its main components.
5. Comment on the environmental impacts of wind energy.
6. Enumerate essential elements of hydro-electric power plant. Explain them with a neat block diagram.
7. How hydro power energy is a better choice over other conventional energy sources.
8. Give some advantages and limitations of small scale hydroelectric power plant.
9. Explain the working principle of Induction Generators.

**ASSIGNMENT No.3**

1. What is the origin of biomass energy? What is the average efficiency of photosynthetic conversion of solar energy into biomass?
2. What are different biomass energy resources and what is the energy yield from each of them?
3. Explain the benefits and limitations of hydrogen as a fuel.
4. What is biogas? Explain the production process of biogas.
5. Explain the term in brief
6. Super trees
7. Energy forest
8. Pyrolysis
9. Incineration.
10. What is OTEC system? How do we harness the energy from the ocean tidal waves also explain any wave energy conversion system machine with the help of diagram.
11. Explain the method of energy conversion from a wave energy machine.
12. What is the function of a fuel cell? Explain any two types of fuel cell. Also give the limitations of fuel cell.
13. What are different sources of geothermal energy? Also explain the advantages and disadvantages of geothermal energy.

**ASSIGNMENT No.4**

1. Explain the term
2. LVRT
3. Ramp Rate
4. Islanding.
5. Write a short note on voltage flicker and power quality issues. Also explain the roll of non-conventional energy system in smart grid.
6. What are various power quality issues? Discuss in detail.

1. Write a short note on supply of ancillary services for frequency and voltage control.
2. Explain the role of non-conventional energy system in smart grid.