BHAGWAN MAHAVIR COLLEGE OF ENGINEERING & TECHNOLOGY,SURAT

MECHANICAL DEPARTMENT

Sub:Renewable Energy Engineering.

Sub Code: 2181910

ASSIGNMENT-1

Introduction

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1. Discuss points on needs of renewable energy in present life (10 points).

2. Advantages and disadvantages of renewable energy sources.

3. Discuss present scenario of conventional and non conventional energy sources in India.

ASSIGNMENT-2

Solar Radiation

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1. Define solar constant and distinguish between diffused radiation and global radiation.

2. Define the following with figure

    i. Declination angle

    ii. Hour angle

    iii. Altitude angle

    iv. Zenith angle

    v. Day Length

    vi. Sunrise/Sunset hour angle

3. What is angle of incidence? Which are the factors affecting angle of incidence?

4. Describe pyranometer and pyrheliometer with neat sketch.

5. Describe sunshine recorder and angstrom pyrheliometer with neat sketch.

ASSIGNMENT-3

Solar Energy Collector

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1. What are the main components of flat plate collectors and explain working of liquid flat plate collector.

2. Write short notes on

    i. Instantaneous collector efficiency

    ii. Collector aperature area and gross area

    iii. Stagnation temperature and its utility

3. Classify concentrating collectors and explain

    i. Mirror strips reflector

    ii. Fresnel lens collector

4. Differentiate between flat plate collector and concentrated collector.

5. Define with figure

    i. Concentration ratio

    ii. Intercept factor

    iii. Collector efficiency factor

    iv. Instantaneous collector efficiency

ASSIGNMENT-4

Solar Applications

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1. What are the basic components of an active space heating system? Describe such a system using water.

2. State the types of collector using air and discuss their operation with the help of simple sketch.

3. Define solar still. Discuss the working of a basic type solar still with the help of a neat sketch. Define efficiency of solar still.

4. What are solar greenhouses? Differentiate between the active and passive greenhouse.

5. State various types of solar cookers. Discuss the working of box type solar cooker. What are its disadvantages?

ASSIGNMENT -5

Wind Energy

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1. Derive an expression for maximum power, maximum torque and maximum axial thrust available from a wind turbine from basic principles. What is optimum velocity?

2. Write a short note on classification of wind mills.

3. Define lift and drag. Define coefficients of lift and drag. How these coefficients are affected by angle of attack? Discuss.

4. Discuss the method of site selections for locating the wind mills.

5. Wind at 1 bar and 20o C has a velocity of 12m/s calculates:

Total power density in wind stream.

Maximum power density.

A reasonable obtainable power density.

Total power produced if rotor diameter is 60 m and it runs at 50 rpm.

The torque and the axial thrust produced at maximum efficiency.

ASSIGNMENT -6

Biogas Energy

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1. Discussion the factors which affected the biogas production in details.

2. Discuss the classification of biogas plants. Differentiate between single stage and two stage continuous biogas plants and batch type plants.

3. Describe the working of a floating dome type biogas plant with the help of neat sketch.

4. Write a short note on site selection for installation of biogas plants.

ASSIGNMENT -7

Ocean Energy

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1. Describe the working of an OTEC system based on closed cycle with help of a schematic diagram.
2. Discuss the advantages and disadvantages of OTEC system.
3. Discuss the working of double basin type tidal power plant.
4. What is wave energy? How it can be used for power generation?

ASSIGNMENT – 8

Geothermal Energy

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1. Discuss the utilization of vapour dominated hydrothermal fluid for power generation with a schematic diagram.
2. What are liquid dominated hydrothermal resources? How these can be utilized in a high temperature wet steam system?
3. Write a brief note on hot dry rock system of utilization of geothermal energy.

ASSIGNMENT – 9

Magneto Hydro Dynamics

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1. State Faraday's Law? How it is used in MHD system?
2. How the MHD power plants are classified. Explain the working of any one type power plant with the help of a neat line diagram.
3. Write a short note on "Fuels and Materials" used in MHD plants.
4. Explain the working of combined MHD and steam power plant.

ASSIGNMENT – 10

Economic Analysis

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1. Define with Example.
   (a) Fixed cost
   (b) Variable cost
   (c) Break even chart.
2. Define Cash flow in Detail.
3. How simple and Compound interest charges are calculated?
4. Write Short note on
   (a) R.O.I
   (b) NPV of cash flow
   (c) Internal rate of return
   (d) Life cycle cost.