MODULE 1

1. Discuss the causes of energy scarcity. Mention factors to be considered for solving energy crunch problem.
2. Briefly explain energy resources and its classifications.
3. Explain world wide renewable energy availability .
4. Define the following :

Zenith angle

Declination angle

Altitude angle

Incidence angle.

5. With the neat diagram explain Rankine cycle of electricity production.
6. For a city located at 80.50 longitudes, calculate the solar time on March 15,2011 at 10.30am IST.
7. Calculate the sunset hour angle and day length at location latitude of 35°N on May 28.
8. Discuss about Indian renewable energy resources.
9. Determine the solar local time and declination at a location latitude 230 151N, longitude 770301 E at 12.30 IST on June 19.
10. Write a short notes on Beam and Diffuse radiation, solar constant.
11. Explain any four factors affecting Energy Resources Development.
12. With neat diagram explain the layers of the sun.
13. State and explain the terms solar time and solar insolation.
14. With reference to the solar radiation geometry define declination angle ,latitude angle solar altitude angle, surface azimuth angle .
15. Define following terms with the help of diagrams-hour angle and declination angle.
16. Classify the methods of solar energy storage.
17. What are the advantages and limitations of renewable energy sources?
18. Find the solar altitude angle at 2h after local solar noon on June 1,2012 for a city, which is located at 26.750 N latitude.

19. With a neat diagram, explain the principle of solar thermoelectric converters.

MODULE -2 PART 1

1. With the schematic diagram working of Stirling engine.
2. With the neat diagram explain solar water heating system.
3. With the neat sketch explain working of flat plate collectors and concentrating collectors.
4. With a neat diagram, explain Fresnel Solar Thermal Collectors.
5. List the advantages and disadvantages of the Heliostat Solar Tower Power Plant.
6. Discuss the various material aspects of solar collectors.
7. With a neat diagram, explain Heliostat Field Solar Collectors.
8. Explain Parabolic Dish System with a neat diagram.
9. With a neat diagram, explain Typical Liquid Flat plate collector.
10. What are the main applications of solar collectors? Explain.
11. With the diagram, explain working of Heliostat electric generating plant .
12. What are the material aspects of absorber used in solar collectors.
13. With the diagram, explain working of a typical hot water system.
14. With the diagram, explain working of a typical space heating system.
15. With the diagram, explain working of Parabolic Trough Collectors.

MODULE 2 PART -2

1. With the neat sketch explain key elements of photovoltaic cell
2. Explain photovoltaic panels with appropriate equations.
3. Explain different types of water heating system.
4. List out the applications of solar water heating systems.
5. Explain active solar space cooling.
6. Explain solar dryers.
7. Explain solar space cooling.
8. Explain solar cookers.
9. Explain solar pond.

10. Explain components of solar cell system.
11. Explain solar cell materials.
12. Explain practical solar cells.
13. Explain I-V characteristics of solar cells.
14. Explain efficiency of solar cells.
15. List out the applications of solar cells systems.

MODULE -3

1. Illustrate the main considerations in selection site for wind energy generations.
2. List and explain the applications, advantages and disadvantages of hydrogen energy
3. With a neat diagram explain binary cycle based geothermal power plant. Also list the advantages of geothermal power plant.
4. . Explain five different methods of waste reduction
5. Discuss the benefits of hydrogen energy.
6. State and explain methods of hydrogen production technologies.
7. Discuss the applications, advantages, and disadvantages of hydrogen energy.
8. Mention the problems associated with the development and application of hydrogen energy.
9. Discuss the advantages and disadvantages of WEC systems.
10. Explain wind turbine site selection.
11. Describe a binary cycle geothermal power plant.
12. Explain dry steam based geothermal power plant.
13. Explain flashed steam system.
14. Explain double flash system.
15. What are the main applications of geothermal energy?
16. Briefly discuss environmental effects of geothermal energy.
17. Difference between pyrolysis and incineration..
18. Explain anaerobic digestion.
19. Explain waste recovery management scheme.
20. Explain advantages and disadvantages of waste recycling.

MODULE -4

1. Explain theory of gasification and applications of biomass gasifier
2. List and explain types of gasifiers.

3. Explain biomass gasification.
4. Explain theory of gasification.
5. Explain fluidized bed gasification.
6. Explain Updraft, Downdraft and cross draft gasifier.
7. Explain the applications of Biomass gasifier
8. Explain gasifier biomass feed characteristics.
9. Explain biomass gasification.
10. Explain theory of gasification.
11. Explain fluidized bed gasification.
12. Explain different types of gasifier
13. Explain the applications of Biomass gasifier
14. Explain gasifier biomass feed characteristics.
15. Explain chemistry of reaction process in gasification. Explain anaerobic digestion.
16. . Explain construction parts of biogas plants. Explain working of biogas plants
17. Explain the construction and working principle of fixed dome type biogas plants.
18. Explain the construction and working principle of floating type biogas plants.
19. Explain types of fixed dome biogas plants.
20. Explain benefits of biogas.
21. Explain factors affecting the selection of a biogas plant.
22. Explain biogas plant feeds and their characteristics.
23. 16. Explain singe basin system of tidal power generation.
24. Explain double basin system of tidal power generation.
25. Explain Co-operating two basin system of tidal power generation.

26. Explain different turbines used for tidal power generation.

27. Explain advantages and disadvantages of tidal power.

28. Explain problems faced in exploiting tidal energy.

MODULE -5

1. Explain motion in the sea waves.

2. Explain devices used for harnessing wave energy.

3. Explain advantages and disadvantages of wave power.

4. Explain principle of ocean thermal energy conversion.

5. Explain Ocean thermal energy conversion plants.

6. Explain basic rankine cycle and its working.

7. Explain closed cycle, open cycle and hybrid cycle OTEC.

8. Explain Carnot cycle of OTEC.

9. Explain applications of OTEC.

10. Explain advantages, disadvantages and benefits of OTEC.