

IV B.Tech I Semester Regular Examinations, November 2008
NON CONVENTIONAL SOURCES OF ENERGY
(Common to Electrical & Electronic Engineering, Mechanical Engineering,
Electronics & Control Engineering, Mechatronics, Metallurgy & Material
Technology and Production Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Derive an expression for total radiation on inclined surface.
(b) Define the following:
 - i. Solar Constant
 - ii. Incident angle
 - iii. Latitude angle. [10+6]

2. (a) Explain the following terms:
 - i. Staggering
 - ii. Tracking
 - iii. Collector efficiency(b) Describe the different methods of sun tracking. [10+6]

3. (a) Explain different methods of storing solar energy.
(b) Explain solar distillation. [8+8]

4. (a) Prove that in case of horizontal axis wind turbine maximum power can be Obtained when, exit velocity = 1/3, wind velocity $P_{max} = \frac{8}{27} \rho A V^3$. [16]
(b) Describe the main considerations in selecting a site for wind generators. [8+8]

5. (a) Briefly explain the process of fermentation.
(b) What are the various advantages of anaerobic digestion. [6+10]

6. (a) Explain the difference between geothermal plant and thermal plant
(b) Explain the various methods to extract geothermal energy. [8+8]

7. (a) Explain the power generation from double cycle system for tidal energy utilization.
(b) What are the advantages and disadvantages of ocean wave energy? [8+8]

8. (a) Explain the principle and working of MHD accelerator.
(b) Explain important factors to be considered for selecting materials for MHD generator. [10+6]

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1. (a) Explain extraterrestrial and terrestrial Radiation.
(b) Define the following :
 - i. Declination
 - ii. Altitude angle
 - iii. Solar Constant. [10+6]
2. (a) What features of Solar energy make it attractive for use in irrigation water Pump?
(b) Explain the following terms?
 - i. Flat plate
 - ii. Paraboloidal dish. [10+6]
3. (a) What are the main components of a flat plate solar collector? Explain the Working of collector.
(b) Explain the working of collector. [8+8]
4. (a) Describe with a neat sketch the working of a wind energy system with Main components.
(b) Write short notes on:
 - i. Wind energy storage
 - ii. Darrius rotor. [10+6]
5. Write short notes on the following
 - (a) aerobic digestion
 - (b) fermentation
 - (c) gasification. [16]
6. (a) Draw the diagram of geothermal field.
(b) Explain the potential of geothermal resources in India. [8+8]
7. (a) Explain the methods for the utilization of tidal energy in single basin arrangement.
(b) What are the site requirements for power generation from tides? [12+4]

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Set No. 2

8. Write short notes on the following:

- (a) Criterion for selection of material for thermo electric generators
- (b) Carnot cycle
- (c) Seebeck Effect.

[6+6+4]

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1. (a) Explain about Beam and Diffuse radiation.
(b) What is the standard value of solar constant. [10+6]
2. (a) What is the purpose of double layer of glazing in green house.
(b) What are the main merits and demerits of solar furnace. [8+8]
3. (a) Describe the classification of solar cells based on materials used.
(b) Explain different methods of storing solar energy. [8+8]
4. (a) How are WEC systems classified? Discuss in brief.
(b) Write short notes on :
 - i. Applications of wind energy.
 - ii. Wind energy storage. [10+6]
5. (a) Explain various configurations of KVIC biogas plants with neat sketches.
(b) Discuss the economic aspects of biogas. [8+8]
6. (a) Define geothermal resource.
(b) Explain the potential of geothermal resources in India.
(c) What are the prime movers used in geothermal energy conversion system. [2+8+6]
7. (a) What is the fundamental principle in energy conversion from ocean waves?
(b) Explain the fundamental principle of tidal energy generation.
(c) What is small hydel development? Classify small hydel power stations?[3+5+8]
8. (a) Derive an expression for the efficiency of thermo electric generators.
(b) Define the terms dissociation and Ionization. [12+4]

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1. (a) What are the advantages and limitations of renewable energy sources.
(b) What is solar power? Discuss briefly various possible large scale applications of solar power. [10+6]
2. (a) Write short notes on concentrating collectors and green house.
(b) Explain the following:
 - i. Flat plate collector
 - ii. Tracking
 - iii. Energy storage. [8+8]
3. (a) Explain solar waterheating system at natural circulation and forced circulation Type.
(b) List out and explain applications of solar PV System. [8+8]
4. (a) Write short notes:
 - i. Application of wind energy
 - ii. Savonius Totor
 - iii. Darrieus rotor.
(b) How is the stalled performance improved? [10+6]
5. (a) Explain the constructional features of drum and dome type plants.
(b) What are the advantages and disadvantages of fixed drum type plant. [8+8]
6. (a) Explain the potential of geothermal resources in India.
(b) Explain the principle and operation of a liquid dominated system with a neat sketch. [8+8]
7. (a) Explain the power generation from single tide system.
(b) Explain the principle and working of a high level reservoir wave machine with neat sketch. [8+8]
8. (a) Explain Ion exchange membrane fuel cell.
(b) Explain liquid metal system of MHD power generation with neat schematic. [6+10]
