B. Tech.

(SEM. VIII) EXAMINATION, 2008-09
NON-CONVENTIONAL ENERGY RESOURCES & UTILIZATION

Time : 3 Hours] [Total Marks : 100

Note : (1) Attempt all questions
(2) All questions carry equal marks.
(3) Be precise in your answer.
(4) No second Answer Book will be provided.

1  Answer any two of the following : 10×2=20
(a) Discuss the primary and secondary energy sources. Also describe the future of non-conventional energy sources, in India.
(b) Define the terms:
   (i) Altitude angle
   (ii) Incident Angle
   (iii) Zenith angle
   (iv) Latitude angle
   (v) Hour angle
(c) Differentiate between beam and diffuse radiation. Describe a type of instrument to measure beam radiator with a neat sketch.
2 Answer any four of the following: \[ 5 \times 4 = 20 \]
(a) Explain the principle of conversion of solar energy into heat. Explain a flat plate solar collector.
(b) Enumerate the different types of concentrating type collector.
(c) Classify the solar energy storage system.
(d) What is meant by solar pond? Explain.
(e) Describe the working of solar power plant.
(f) Describe a continuous solar cooling system.

3 Answer any four of the following: \[ 5 \times 4 = 20 \]
(a) How bio-mass conversion takes place?
(b) Explain the process 'photosynthesis'. What are the conditions which are necessary for it?
(c) How are biogas plant classified? Explain them briefly.
(d) What are the basic principles of wind energy conversion?
(e) How are wind energy conversion system classified? Discuss in brief.
(f) Describe horizontal axis type aero-generator.

4 Answer any two of the following: \[ 10 \times 2 = 20 \]
(a) What do you understand by fuel cell? How fuel cells are classified? Describe an \( \text{H}_2-\text{O}_2 \) fuel cell with a sketch showing reactions.
(b) What do you understand by thermionic emission effect? Derive the expression for power and efficiency of a thermionic generator.
(c) Write notes on:
   (i) Limitations of Tidal Energy Conversion System
   (ii) Safety precautions of hydrogen as fuel
Answer any two of the following: \(10 \times 2 = 20\)

(a) Describe the working of a Thermo-electric generator. Derive an expression for its power output.

(b) Describe a geothermal field from which geothermal steam is obtained through hot springs. What are the prospects of geothermal energy in context to India?

(c) Describe the basic principle of ocean thermal energy conversion system. Enlist the various plants based upon it. Describe an OTEC plant.