

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 140655

Roll No.

B.TECH.

Theory Examination (Semester-VI) 2015-16

**NON CONVENTIONAL ENERGY
RESOURCES AND UTILIZATION**

Time : 3 Hours

Max. Marks : 100

Section-A

1. Attempt all questions. (2×10=20)

- (a) List the applications of hydrogen energy devices.
- (b) Name at least three green house gases responsible for global warming.
- (c) Define PV effect.
- (d) What is meant by pitch angle?
- (e) Differentiate tide and wave.
- (f) What are the constituents of biogas?

- (g) What is specific power?
- (h) Draw the equivalent circuit of a battery.
- (i) Classify the geothermal sources.
- (j) Discuss some basic reasons of developing non conventional energy resources..

Section-B

2. Attempt any five parts of the following. (10×5=50)

- (a) Discuss the availability and applications of OTEC. Explain the principle of Closed Cycle OTEC system with the help of diagram
- (b) What is meant by wet fermentation and dry fermentation? Also, explain the constructional detail and working of KVIC digester.
- (c) Briefly describe the properties of thermoelectric material. Explain the working of thermoelectric generator.
- (d) A thermoelectric generator operates between 250°C and 550 °C. The average value of seeback coefficient is 400×10^{-6} V/K, the generator resistance is 0.004Ω

and the thermal conductance is 0.035 W/k-m. Find the open circuit voltage, the maximum power output, and the thermal efficiency for maximum power output.

- (e) Write the merits and demerits of the following type of non-conventional energy sources.
- (i) Tidal energy
 - (ii) MHD
- (f) What is polarization? list different types of polarizations that occur in fuel cells. Show how the electrode structure helps in reducing polarization.
- (g) What is fuel cell? Describe the principle of working of an $H_2 - O_2$ cell. Give also limitations
- (h) Discuss briefly the types of Biogas plants. Draw schematic diagram of any one type of Biogas plant.

Section-C

Note: Attempt any two parts of the following. (15×2=30)

3. Prove in case of Horizontal axis wind turbine maximum power can be obtained when $P_{\max} = 8/27 (\rho AV^3)$

4. An MHD generator has following parameters: plate area = 0.20 m^2 , Distance between plates: 0.4 m , flux density = 2 Wb/m^2 , average gas velocity = 1000 m/s , conductivity of the gas = 10 mho/m , calculate the open circuit voltage and maximum power output.

5. What do you understand by the nature of wind? Describe with the help of a neat sketch the construction and working of a Wind Energy Conversion System (WECS).

