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B.TECH.

THEORY EXAMINATION (SEM–VIII) 2016-17

NON CONVENTIONAL ENERGY RESOURCES

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) State Seebeck Effect and Peltier Effect.

(b) Write the chemical reaction takes place in Alkaline Fuel Cell.

(c) What is an aerobic digestion?

(d) Define solar constant. What is its standard value?

(e) Discuss the terms Energy conservation and Energy audit.

(f) What is the maximum energy conversion efficiency of a wind turbine for a given swept area?

(g) Define Fill Factor.

(h) On what factors does the collector efficiency of a solar flat plate collector depend?

(i) What is OTEC? Discuss in brief.

(j) Describe various Geothermal Energy Resources.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) Discuss the main features of various types of renewable and non-renewable energy sources. Also explain the importance of non-conventional energy sources in the context of global warming.

(b) Classify different types of solar thermal collector and show the constructional details of a flat plate collector. What are its main advantages?

(c) Explain the mechanism of photoconduction in a PV cell.

(d) Explain the process of gasification of solid biomass. What is the general composition of the gas produced and what is its heating value? What are its applications?

(e) Explain the 'Single Basin' and 'Two Basin' systems of tidal power harnessing. Discuss their advantages and limitations.

(f) Explain the essential features of a hydrogen-oxygen cell. Draw a suitable diagram of this cell and give the reactions took place at the electrodes.

(g) With the help of a schematic diagram, explain the operation of closed cycle MHD generating system.

(h) Explain the process of production of biogas from biomass. Describe Deen Bandhu Biogas plant.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3. What are the most favorable sites for installing wind turbines? Using Betz model of a wind turbine, derive the expression for power extracted from wind. Under what condition does the maximum theoretical power can be extracted from the wind turbine?

4. **Write short notes on:** i) Practical problems associated with MHD power generation. ii) Solar Cell Arrays. iii) Vertical Axis Wind Mills.

5. Describe the principle of working and constructional details of basic thermionic generator. What is the basic difference between thermoelectric and thermionic conversion systems? Also, explain the working of thermoelectric generators.

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