

Total No. of Pages: 1

7<sup>th</sup> Semester

Supplementary Examination

Paper Code: ~~EE-359~~ EE-359

Time : 3:00 Hrs.

Roll No.....

B. Tech. (EE...)

Feb.- 2019

Subject: Non conventional energy systems

Max. Marks: 70

Note: Attempt any five questions. Each question carries equal marks.

Assume suitable missing data if any.

1. Discuss the viable energy options to meet the growing energy demand of India, keeping the socio-economic-environmental consideration in mind.
2. a. Draw the block diagram of a typical solar photovoltaic system and discuss the working of its each component.  
b. Calculate the maximum efficiency and 'fill factor' of solar cell having intensity of  $1 \text{ kW/m}^2$ . Measurements show open-circuit voltage of 10 V, short-circuit current of 2 A, and the maximum current is 50% of short-circuit current. Assume the 17% efficiency of solar cell.
3. a. Differentiate between battery and fuel-cell. Give the complete description of the working and constructional features of hydrogen-oxygen fuel-cell.  
b. Discuss the different technologies to produce biogas. Also discuss the factors affecting the production of biogas.
4. a. Discuss the aerodynamic operation of wind turbine using drag and lift forces. Why the wind output power is cubic function of wind velocity and maximum theoretical efficiency is only 59.3%.  
b. Discuss the working and control of variable speed wind turbine incorporating maximum power point tracking (MPPT) with the help of any standard MPPT technique.
5. a. Explain the working principle of tidal as well as OTEC power plant with the help of their schematic diagrams.  
b. A simple single-basin type power plant has a basin area of  $22 \text{ km}^2$ . The tide has range of 10 m. The turbine stops its operation when the head on it falls below 3 m. Calculate the average power generated during one filling/emptying process in MW if the turbine-generator efficiency is 74%. Take the sea water density as  $1025 \text{ kg/m}^3$ .
6. Write short note on any two
  - a. MHD Power plant
  - b. Geothermal energy
  - c. Role of power electronics in harvesting renewable energy.