

**Centre for Open and Distance Learning**  
**TEZPUR UNIVERSITY**  
**DRE 104: Wind and Hydro Energy**

Assignments  
*Full Marks: 30*

1. (a) How the wind energy potential is assessed at a site according to its wind characteristics?  
(b) What are the main differences between wind electric generator and windmill?  
(c) Draw a schematic diagram of a wind electric generator and discuss its all components.  
(d) Draw a schematic diagram of a hydropower plant. Explain in brief the various components of the power plant.  
(e) Discuss the various factors which are to be considered while selecting a site for a hydroelectric plant.  
(f) What are the advantages of small hydro power plant over large hydro power plants?

**3×6=18**

2. A wind machine with rated power  $P_{er} = 1\text{MW}$  has the rated wind speed of 7 m/s. It has cut-in wind speed of 3 m/s and cut-out wind speed of 20 m/s. It is installed at two different places with Weibull parameters (i)  $k = 2.1$  and  $c = 6\text{m/s}$  and (ii)  $k = 1.8$  and  $c = 8\text{m/s}$ . At which site, the cost of energy generation will be minimum and why.

**6**

3. The available discharge and head of a proposed hydroelectric power plant are  $350\text{ m}^3/\text{s}$  and 30 m respectively. The turbine efficiency is 87%. The generator is directly coupled to the turbine. The frequency of the generator is 50 Hz and the number of poles is 24. Find the least number of machines if using (a) Francis turbines having a specific speed of 300 and (b) Kaplan turbines having a specific speed of 820.

**6**

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