

Centre for Rural Development and Technology, IIT Delhi

Name and Number of Course: Rural Energy Systems (RDL-22)

Name of Exam: Minor II; Date: 27/03/2019 (05:30-06:30 PM)

Time: 1.0 h

Maximum Marks: 20

Q1. Define the following terminologies used in wind energy system: 5.0
(i) Yaw control, (ii) Isovents, (iii) Isodynes, (iv) Cut-in speed. (v) Furling speed.

Q2. Describe the following parameters of solar energy system; (i) 3.0
Solar constant and its value, (ii) Irradiance, (iii) Irradiation, (iv) Direct radiation, (v) Diffused radiation, (vi) Global solar radiation.

Q3. What is need of biogas upgradation? Describe the process of water 2.0
based biogas upgradation system.

Q4. A wind turbine is having 20 metre of its radius and is rotating at a 5.0
speed of 20 km/h. Calculate following parameters; (i) Power availability in the wind, (ii) If the electrical generation efficiency is 40%, then find the value of power developed by the turbine, (iii) If generator is developing its power at 420 V, then find the value of current on its full actual power.

Q5. A solar water heating system of capacity 1000 LPD consisting of 5.0
10 number of flat plate absorber, is being used to provide hot water supply at 75 °C. The initial temperature of water is 20 °C. Calculate following parameters; (i) Amount of sensible heat storage, (ii) If the same amount of water at same temperature condition is to be heated up using electricity, then find the value of kWh of the system, (iii) If the value of global solar radiation is 4.0 kWh/m²/day, then calculate the thermal efficiency of the system.

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