

Continuous Internal Evaluation Test - 2.

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SET-1.

Class : CSE - 'D'

Subject : UTSFE1006R - Renewable Energy Systems

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PART-A.

3) Tip-Speed Ratio (TSR):

The Tip-Speed Ratio (TSR) is an extremely important factor in wind turbine design. It refers to the ratio between the wind speed and the speed of the tips of the wind turbine blades.

4) Components of a solar water heater:

- => solar collectors
- => Heat transfer fluids.
- => Heat exchangers
- => Storage tanks
- => pumps
- => control system.

6) Anaerobic digestion is a process through which bacteria break down organic matter such as animal manure, wastewater biosolids and food wastes in the absence of oxygen. Co-digestion can increase biogas production from low-yielding or difficult to digest organic waste.

2) The solar panel efficiency is around 15% when the heating temperature of the system is 80°C and the efficiency rises to 20% when the heating temperature is 60°C.

4) Biomass is converted to energy through various processes:

a) Direct combustion to produce heat

b) Thermochemical conversion to produce solid, gaseous and liquid fuels

c) Chemical conversion to produce liquid fuels

d) Biological conversion to produce liquid & gaseous fuels

5) => How much variability is there in the wind direction

=> How windy is the site.

=> How high can you build the power.

=> What is the budget.

8) Advantage of VAWT:

- => cheaper to produce than horizontal axis turbine
- => More easily installed compared to the wind turbine type.
- => Transportable from one location to another
- => Equipped with low speed blades.

Disadvantage of VAWT:

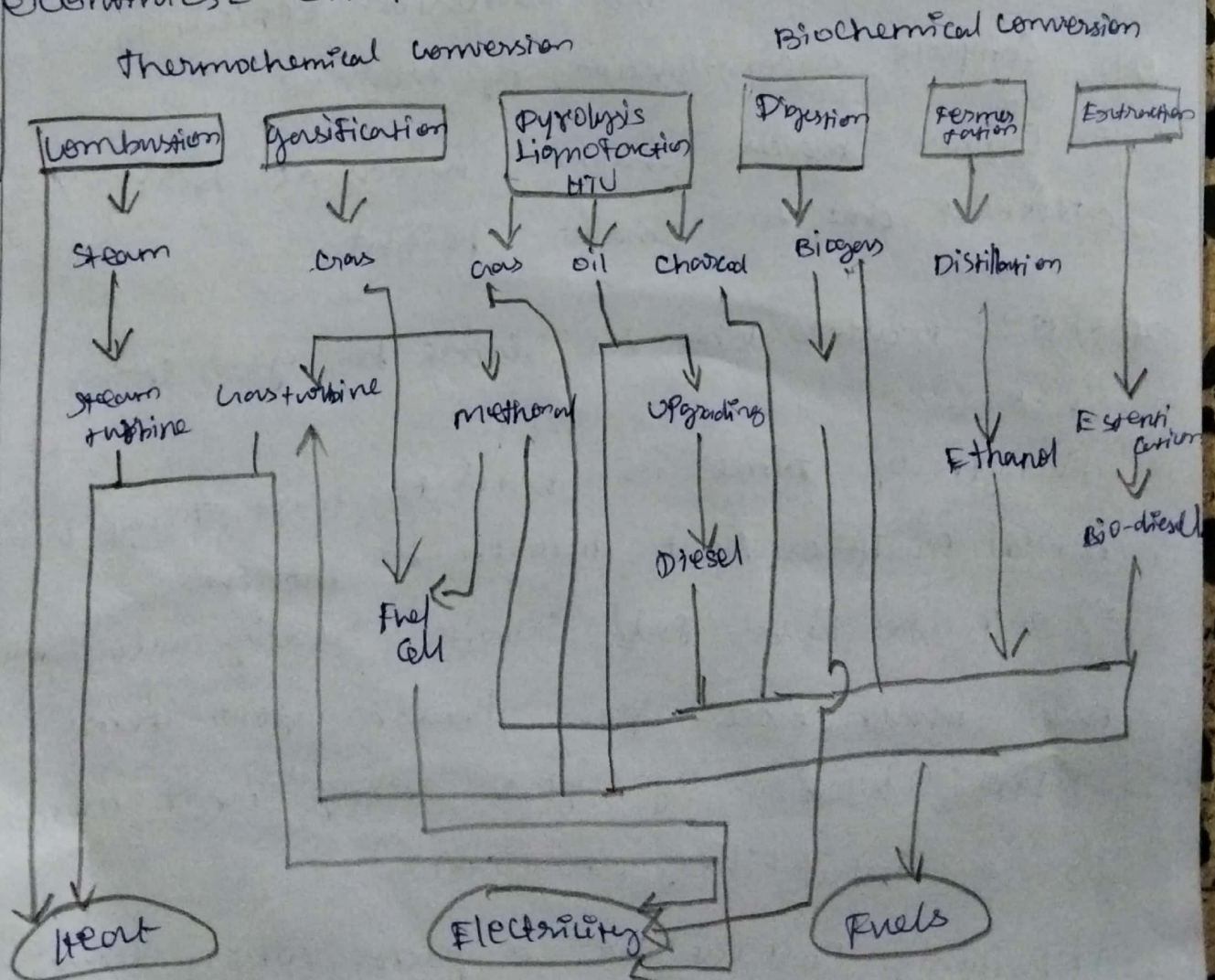
- => creates only half the amount of energy of a comparable to HAWT.
 - => lower wind energy conversion efficiency.
 - => Complete deconstruction of maintenance.
 - => Cannot makes higher winds at higher altitudes due to smaller height.
- 7) => size matters when its come to your storage unit.
- => Length of time is used to most storage unit rental facilities rent month to month.
 - => Self service vs full service really related to how much access you have to your items.
 - => The location of your storage unit matters for a availability and cost
 - => Obviously cost can be a factor when deciding on a storage solution.
 - => temperature, safety & surveillances.

=) Accessibility & Convenience to use.

PART-C

10) Biomass energy conversion process:

b)
(i) Biomass can be converted into several useful products for energy generation and chemicals. There are some factors that influence that choice of a conversion technology to be applied on the biomass. These factors include quality & quantity of the biomass feedstock, availability, choice of end-products, process economics & environmental issues.



(10) Single stage continuous type biogas plants:

(b)
(11)

In this type of plants the entire process of conversion of biomass into biogas are carried out in the single chamber (or) digester without barrier construction of plant is simple in construction easy to operate & control. It does not need any skilled workers.

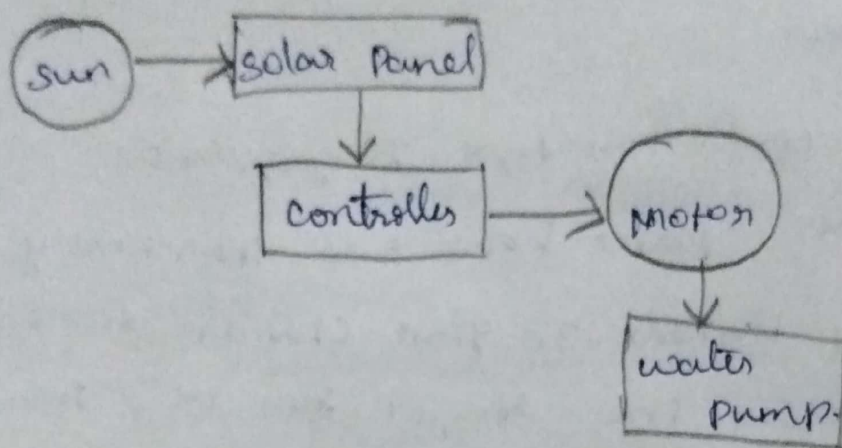
Two stage continuous type biogas plant:

These plant have two chambers for digestion of biomass. In first chamber the biomass is fed in which the stage 1 of acid formation takes place. Then the diluted acids are only fed into the second chamber where the stage 2 of methane formation is carried out. So produced is collected from the second chamber. Various factors affecting the production of biogas. Such as temperature & pressure, solid concentration and loading rate, retention period, PH value (or) Hydrogen ion concentration, nutrients concentration, Toxic substances, Digester size and shape, stirring or agitation of the content of digester.

a) Solar Pump:

b)
(i)

solar water pump is driven by the electricity produced by the PV panels or the radiant heat generated by collected sunlight. This is the opposite of a diesel (or) grid electricity water pump.



Basically, the solar is an electric pump that works on the electrical energy obtained from solar panels. These panels receive energy from the sunlight. The connected battery (or) motor controls DC/AC. The controller used of this system uses to adjust the speed and output power. The pump works on the base of the PV principle. During the working of a solar pump, PV systems absorb radiant solar energy & transform it into electricity. This produced electricity supplies to the entire system.

The inverter of the pump converts the

direct current output of the PV system into AC, which drives the Pump. These inverters also adjust the output frequency and voltage in real-time, corresponding to variations in the sunlight intensity to attain the highest power point tracking. As the intensity of the sunlight becomes weaker, the water lifting system realizes the function of switching the municipal power that works as auxiliary energy for the water lifting system.

9) Biomass Energy:

b) (n)	Advantages	Disadvantages.
	<ul style="list-style-type: none"> =) It is Renewable =) carbon neutrality =) less dependence on fossil fuels =) It is versatile =) It reduces waste =) Low cost in comparison to fossil fuels 	<ul style="list-style-type: none"> It's Not completely clean. High Costs in comparison to other Alternatives. possible deforestation It is rare It hinders development It has low efficiencies.