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**Internal Assessment Test 2 – May 2025**

Sub:	RENEWABLE ENERGY POWER PLANT					Sub Code:	BME654 B	Branch:	All branches		
Date:	27/05/2025	Duration:	90 min's	Max Marks:	50	Sem / Sec:	VI			OBE	
<u>Answer <b>any 5</b> Questions</u>								MARKS	CO	RBT	
1	With the help of a neat sketch, explain the construction and working of a Vapour-dominated geothermal power plant.						[10]	CO3	L2		
2	Explain the basic characteristics of tidal energy and describe the methods used for its harnessing.						[10]	CO3	L1		
3	Explain the limitations of tidal energy and describe some technological improvements that can address these issues.						[10]	CO4	L2		
4	Using a T-S diagram and schematic layout, explain the operating principle of an Open Cycle OTEC system.						[10]	CO4	L4		

PTO

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5	Write a short note on OTEC power stations currently operating in the world and explain the common issues faced in their deployment.
6	Discuss the different hydrogen production methods, and illustrate the working of any one method with a labeled diagram.
7	How are biogas plants classified? Illustrate the construction and working of a KVIC biogas digester with the help of a neat sketch.

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**C.I**

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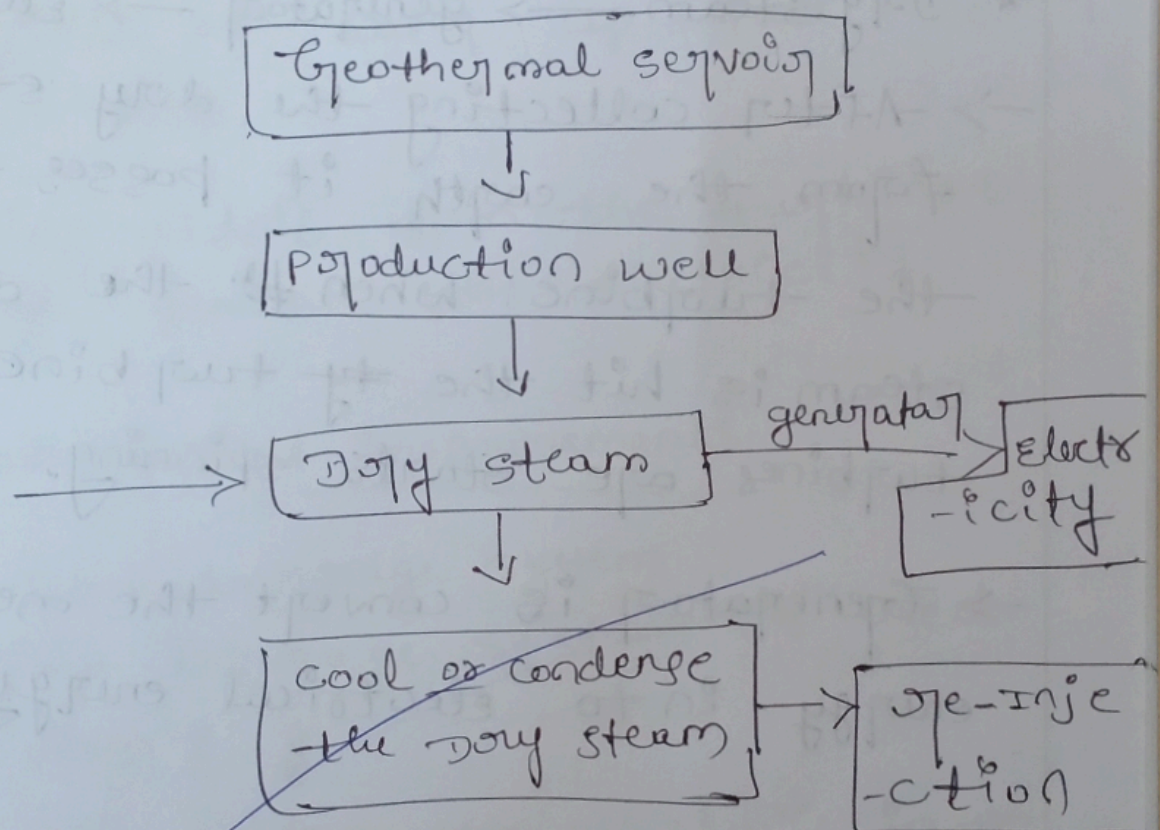
**C.I**

**C.C.I**

**HOD**

1. Vapour-dominated geothermal power plant  
 → geothermal energy is ~~genera~~ generated by high steam from underground of the earth.

### Architecture



\* Geothermal energy generated by dry steam.

\* Production well  $\rightarrow$  production  
or collect the dry steam from underground of the earth

\* Dry steam  $\rightarrow$  generator  $\rightarrow$  electricity

$\rightarrow$  After collecting the dry steam from the earth it passes through the turbine. When ~~the~~ the dry steam is hit the ~~ty~~ turbine turbines are starts spinning.

$\rightarrow$  Generator is convert the mechanical energy into electrical energy

\* condense & cool the water

$\rightarrow$  After generate the electricity cool the dry steam into water

### \* Re-Injection

→ Again the cool water is use to cool the dry steam.

## 3. Tidal energy

\* Tidal energy is generated through the oceans water ~~up & fall~~ through process of water up & fall is generate the Tidal.

\* using Tidal spin the turbines and generate the electricity.

### Technological improvements

i) Tidal barrage system

→ this barrage system is used in dam's

→ we can fix the turbine in go dam gates when the dam gates are open the water flows through gate and it spin the turbines

\* Generator is generate the electricity

ii) Tidal ~~steam~~ stream system  
 → it is used inside the water especially we used in oceans.  
 due to some natural collision's ~~water~~ the ocean water generate tides.

→ using that tides ~~we~~ spin the turbines inside the water and generate electricity

### Characteristics

### \* Limitations

i) ~~we can not~~ gen tides are not generated any time.

ii) we generate the ~~elec~~ more electricity when the tides are high

iii) in low tides we can ~~not~~ generate the ~~elec~~ limited energy. electricity

## 2. Basic characteristics of tidal energy

- \* Tidal energy is renewable energy resource

→ tidal energy is natural resource

- \* Tidal energy has the high density electricity

→ when compare to other renewable energy resources tidal has high density electricity.

- \* environment friendly

→ it is not harmful for nature  
it not generate any greenhouse chemicals

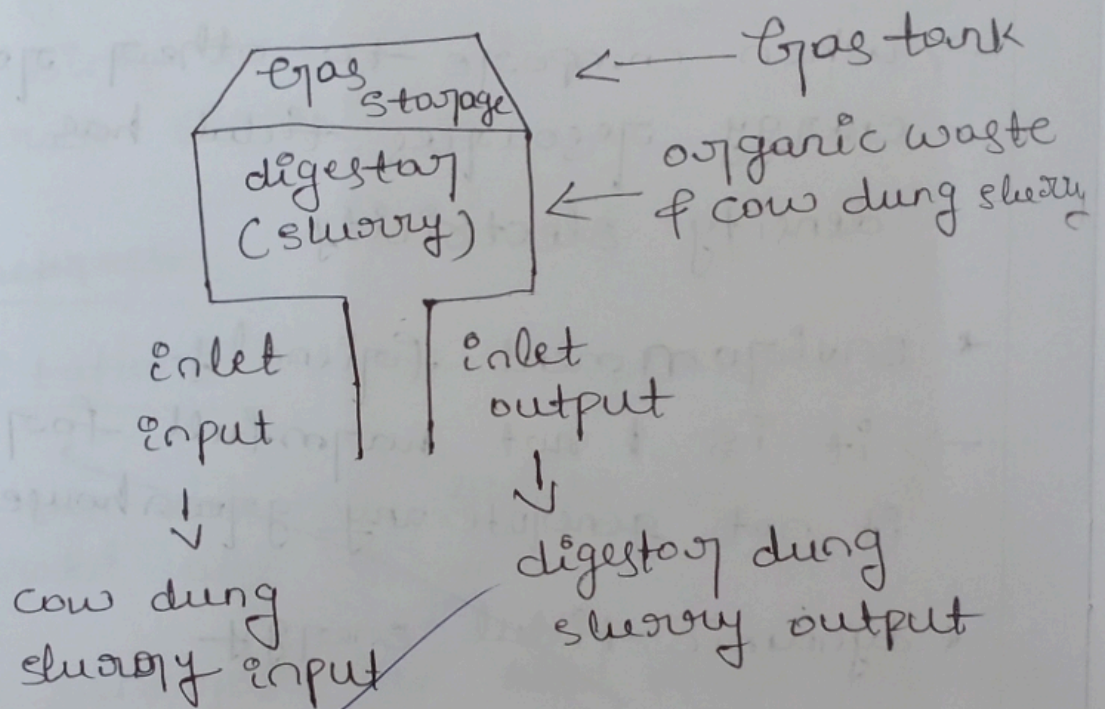
- \* dynamic tidal energy

- \* tidal energy harness

## 7. Construction and working of biogas digester.

→ Biogas energy is generated by anaerobic digestion of the organic waste, Animal dung, kitchen waste

→ it is also renewable energy resource



## Working

\* 4 steps in generate Biogas

i) Hydrolysis

ii) Acidogenesis

iii) Acetogenesis

iv) Methanogenesis.

i) Hydrolysis

→ in hydrolysis all the organic wastes, like agriculture waste, kitchen waste, Animal dung these all products are mixed with ~~said~~ soil & water it generate the Amino Acids.

ii) Acidogenesis

→ it converts all Amino Acids products into fatty Acids like hydrogen,  $\text{CO}_2$ , etc.

### iii) Acetogenesis

→ Acetogenesis convert all the fatty acids ( $\text{CO}_2, \text{H}$ ) into Acetic Acids

### iv) methanogenesis

→ methanogenesis is convert all the Acetic Acids products into methane gas, &  $\text{H}_2\text{O}$ . (water)

→ After collisons of the all digested products methane gas is generated.

### Advantages

\* renewable energy resource

\* Environmental friendly it's not generating any harmful chemicals.

\* very low cost.

6) different hydrogen production methods.

i) Steam hydrogen production

ii) chemical hydrogen production

iii) Condenses ~~or~~ ~~and~~ cooling hydrogen production.

i) Steam hydrogen production

→ use the steam through boiling of the water & upto 250 - to 350 bar, we can ~~ge~~ produce hydrogen.

ii) chemical hydrogen production.

→ using some chemical reactions & ~~we produ~~ chemical components we can ~~generate~~ produce hydrogen

iii) cooling of water

→ produce hydrogen through cooling the water up to  $250^{\circ}\text{C}$  we produce hydrogen.