

Internal Assessment Test - II

Sub:	Non Conventional Energy Sources						Code:	10ME754	
Date:	04 / 11 / 2016	Duration:	90 mins	Max Marks:	50	Sem:	VII	Branch:	MECH
Answer Any FIVE FULL Questions									
Question No	Questions						Marks	OBE	
								CO	RBT
1)	With a neat sketch explain the working of wave power conversion device.						[10]	CO1	L4
2)	Explain the working principle of a tidal power plant (Double basin arrangement).						[10]	CO1	L4
3)	Describe the closed cycle OTEC system with its advantages over open cycle system.						[10]	CO3	L2
4)	What is meant by anaerobic digestion? What are the factors, which affect biodigestion? Explain briefly.						[10]	CO1	L1,L4
5)	Discuss the constructional detail and working of KVIC digester						[10]	CO1	L4
6)	Summarises the working of a binary cycle system for liquid dominated system.						[10]	CO1	L2
7)	Classify geothermal sources. Explain any one of them.						[10]	CO2	L3,L4

Course Outcomes		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1:	Explain renewable energy sources & systems.	1											
CO2:	Summarise and classify different energy resources based on common parameters	2											
CO3:	Differentiate between the different techniques of non conventional energy sources with regard to performance	3	2										1
CO4:	Analyse and evaluate the implication of renewable energy concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems.	3	3				1	1					

Cognitive level	KEYWORDS
L1	List, define, tell, describe, identify, show, label, collect, examine, tabulate, quote, name, who, when, where, etc.
L2	summarize, describe, interpret, contrast, predict, associate, distinguish, estimate, differentiate, discuss, extend
L3	Apply, demonstrate, calculate, complete, illustrate, show, solve, examine, modify, relate, change, classify, experiment, discover.
L4	Analyze, separate, order, explain, connect, classify, arrange, divide, compare, select, explain, infer.
L5	Assess, decide, rank, grade, test, measure, recommend, convince, select, judge, explain, discriminate, support, conclude, compare, summarize.

PO1 - *Engineering knowledge*; PO2 - *Problem analysis*; PO3 - *Design/development of solutions*; PO4 - *Conduct investigations of complex problems*; PO5 - *Modern tool usage*; PO6 - *The Engineer and society*; PO7- *Environment and sustainability*; PO8 - *Ethics*; PO9 - *Individual and team work*; PO10 - *Communication*; PO11 - *Project management and finance*; PO12 - *Life-long learning*

CI

CCI

HOD

I
A.

IAT - II

inlet
check valve

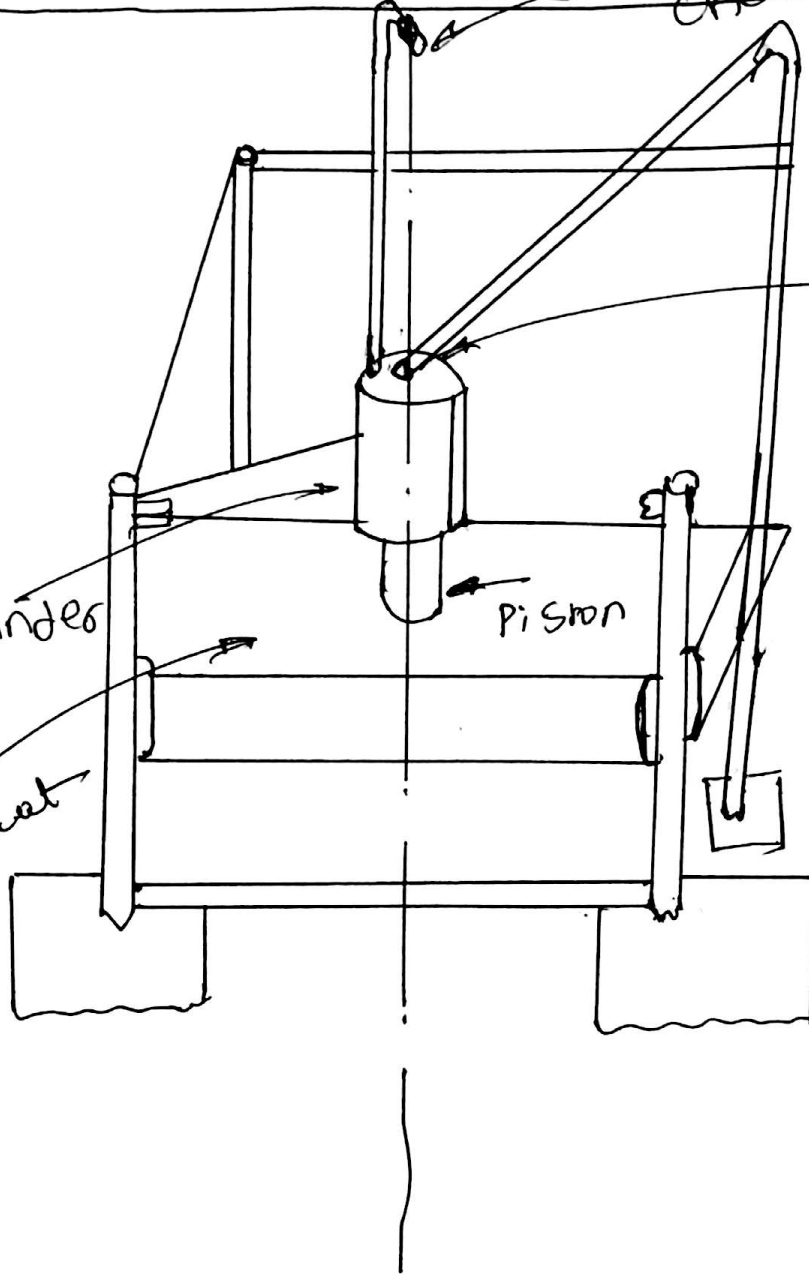
outlet
check valve

Cylinder

Piston

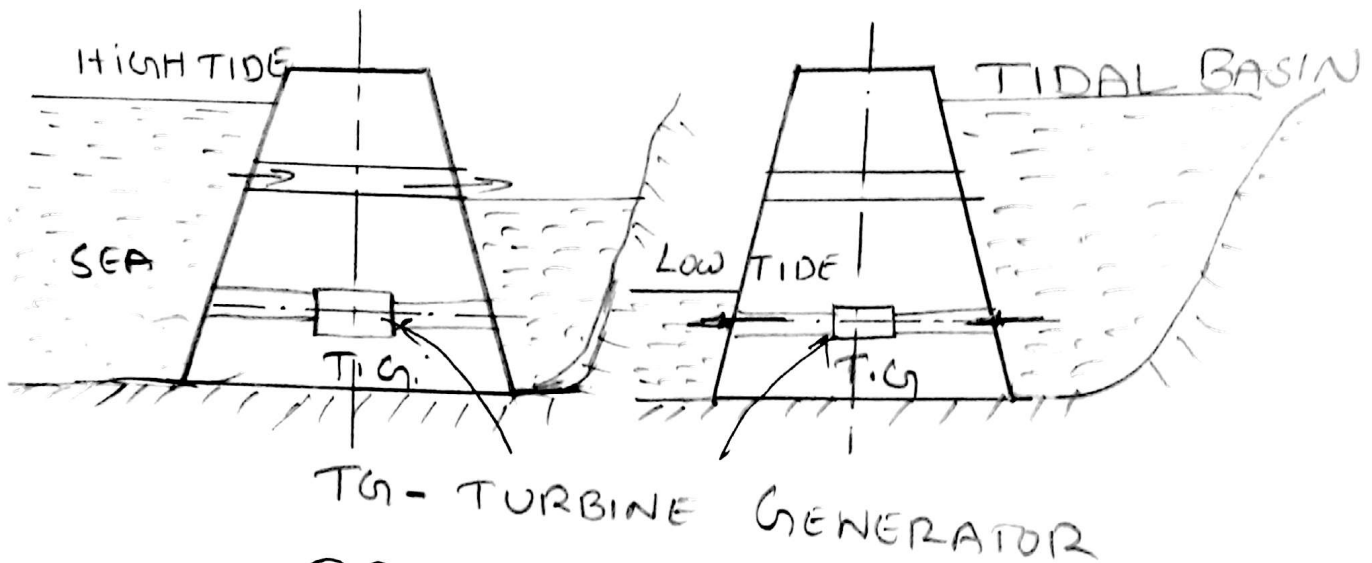
Float

Air
Storage
Tonic



ENERGY FROM TIDES

2

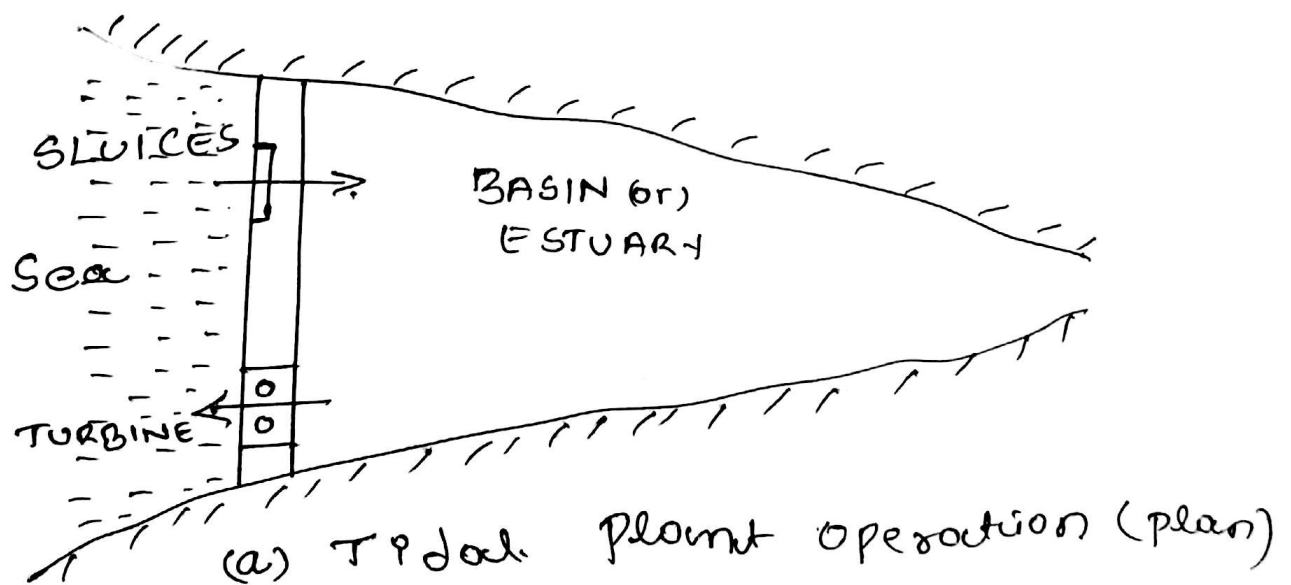


T.G. - TURBINE GENERATOR
PRINCIPLE OF TIDAL POWER GENERATION

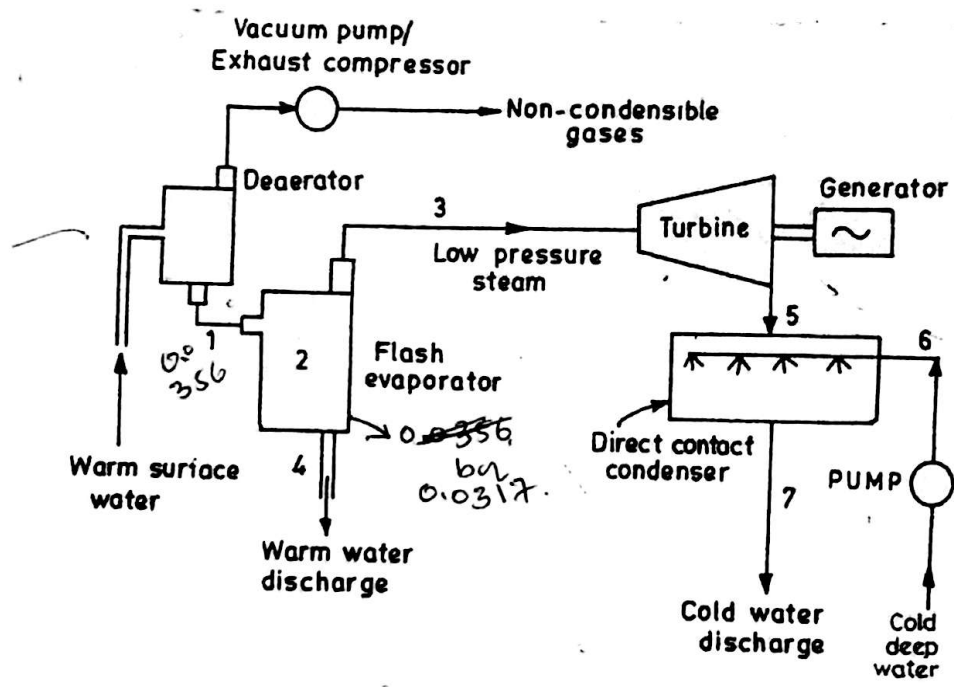
Tide is a periodic rise and fall of the water level of sea which are carried by the action of the sun & moon on the water of the earth. Tide energy can furnish a significant portion of all such energies which are renewable in nature. It has been estimated that about a billion kW of tidal power is dissipated by friction and eddies alone. This is slightly less than the economically exploitable power potential of all the rivers of the world.

The main feature of the tidal cycle is the difference in water surface elevations at the high tide and low tide. This differential head could be utilized in operations.

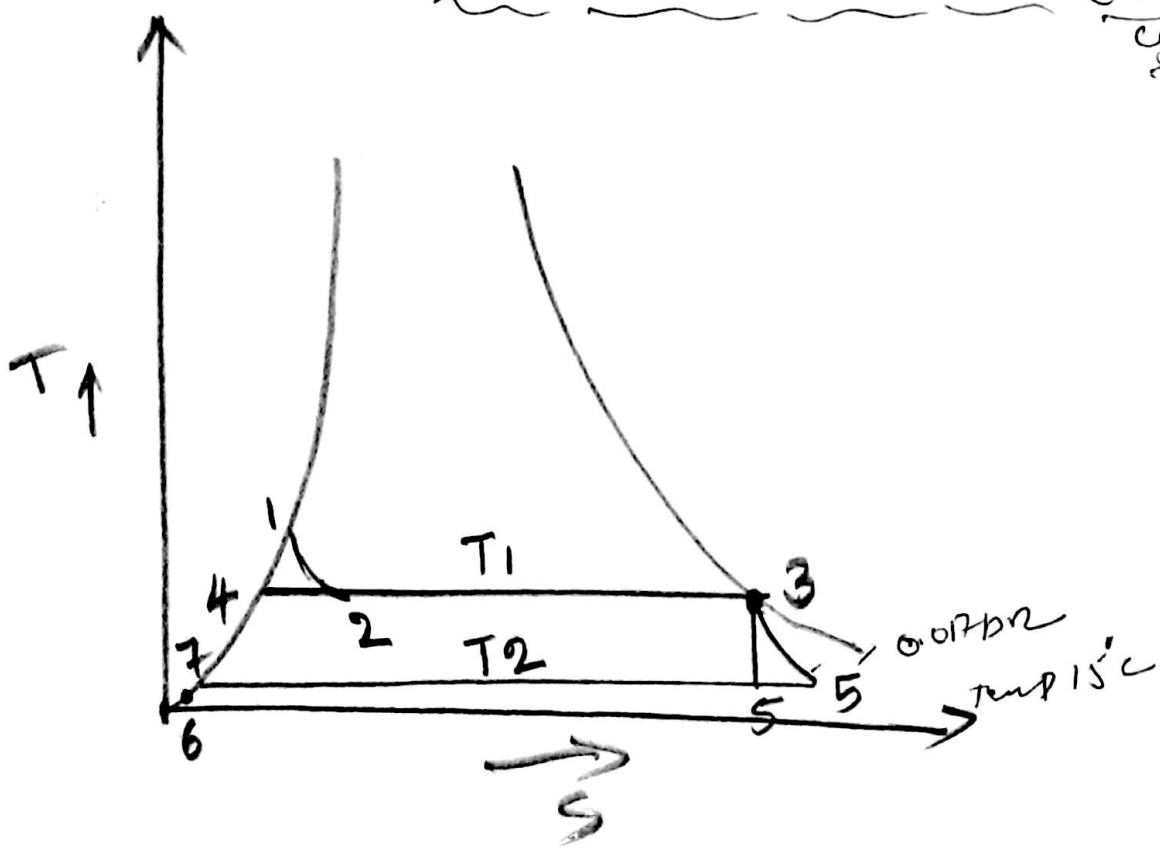
a hydraulic turbine, the tidal energy could be converted into electrical energy by means of an attached generator. In this principle, this is not very difficult as water, at the time of high tide, is at a high level and can be let into a basin to be stored at a high level there. The same water can be let back into the sea during the low tide through the turbine thus producing power. Since the basin water level is high and sea level is low, there is a differential head comparable to the tidal range, that can be utilized for the running of the turbines.



3)

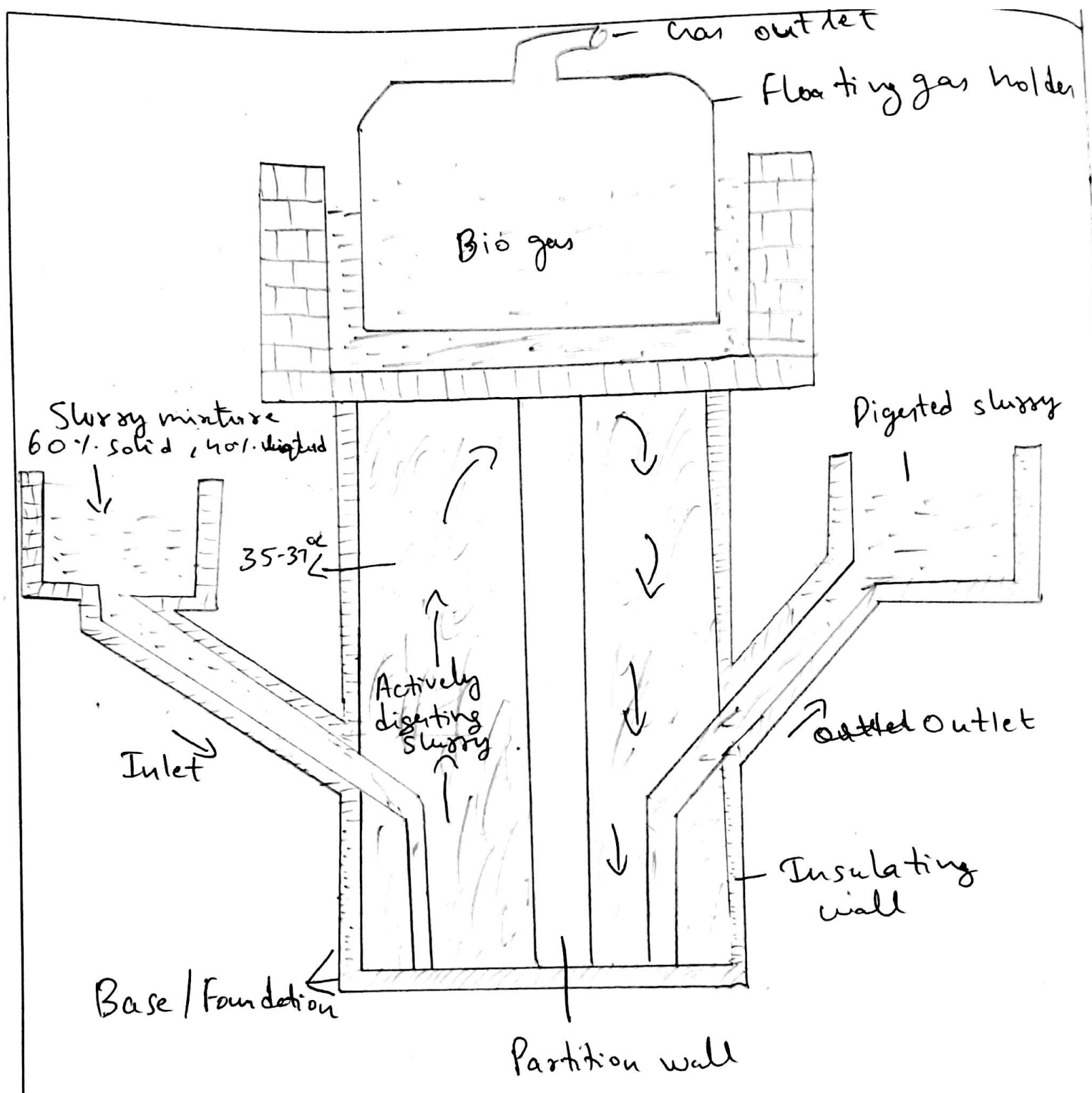


OPEN CYCLE OTEC SYSTEM (Claude cycle)



open cycle refers to the utilization of sea water as the working fluid, where in sea water is the working fluid, wherein sea water is flash evaporated under a partial vacuum. The low pressure steam is passed through a turbine, which extracts energy from it, and then the spent vapour is cooled in a condenser.

The schematic diagram of the open cycle system is shown in fig. Its corresponding T-s diagram is also shown in fig. In this cycle shown warm surface water at say 27°C is admitted into an evaporator in which the pressure is maintained at a value slightly below the saturation pressure corresponding to that water temperature. At the new pressure water which is entering the evaporator gets superheated. As shown in fig. the warm water which is at 27°C has a saturation pressure of 0.0356 bar at point (1). The evaporator has to 25°C saturation temperature. This temporarily superheated water undergoes volume building causing that water to partially flash to steam into an equilibrium two phase condition at the new pressure & temperature of 0.03213 bar & 25°C .



- It is build using refractory bricks as insulating material.
- ~~The whole setup is placed~~
- It has one chamber for inlet and one for outlet.

The fresh slurry is fed into the digester through the inlet chamber.

The slurry goes into the digester and gets digested and rises up.

The digested ~~slurry~~ slurry then moves towards the right side of partition wall where it exits the digester and fills the digested slurry chamber.

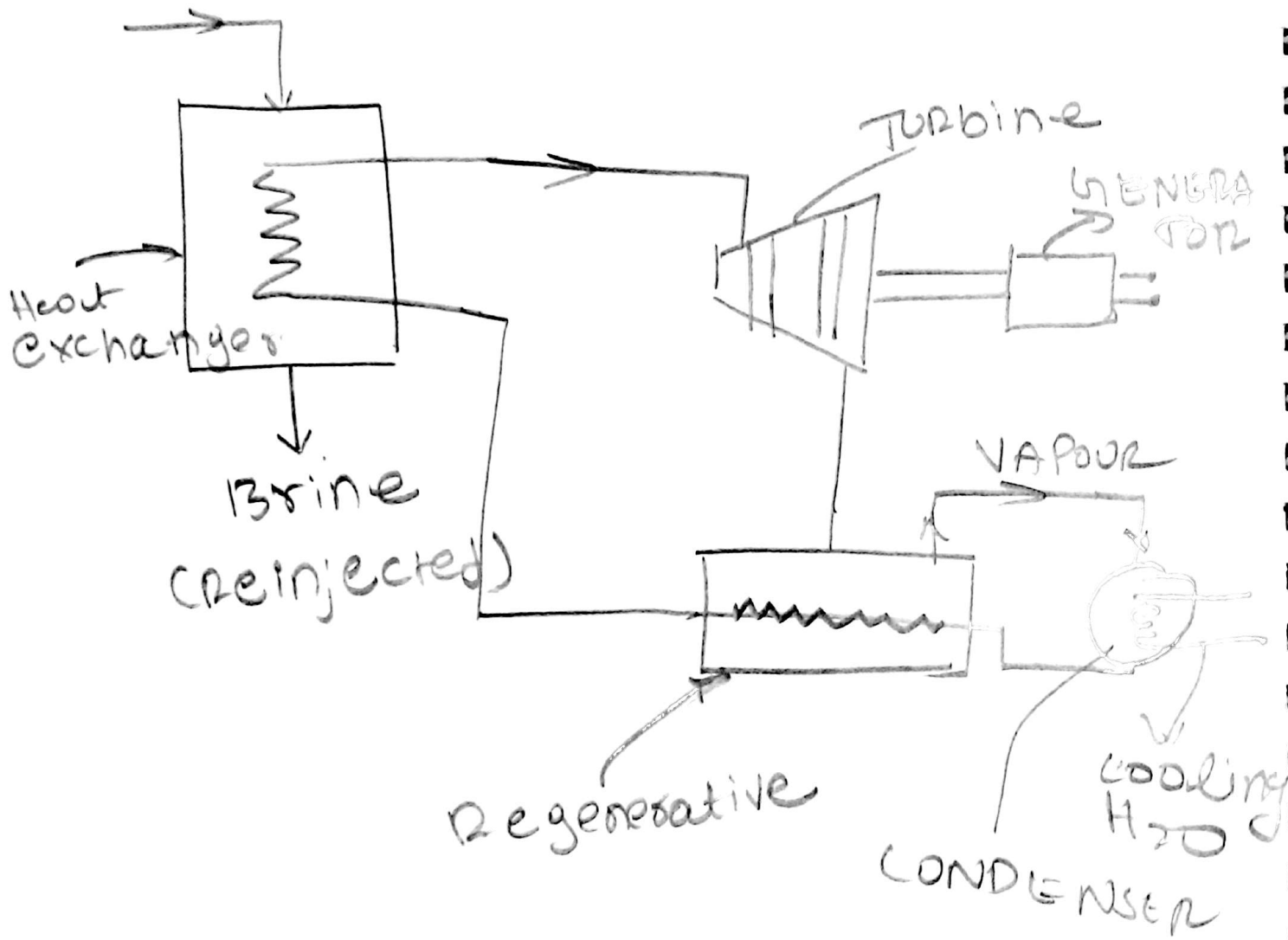
The bio gas produced ~~is~~ rises up and gets collected in a floating drum.

As the bio gas increases the drum rises up.

The bio gas can be released through the ~~gas~~ gas outlet.

The partition wall ensures that the fresh and digested slurry do not get mixed up.

6> Hot brine / steam



7)

PRESSURIZER

CONTROL VALVE

SURFACE

H₂O IN

150 MW Heat Exchanger

(280°C)

H₂O OUT

VOLCANIC ROCK

3000 M

GRANITE

200 M

depth up to 5 KM.

