Soln.

OTEC

Principle of OTEC :- → The principle of OTEC system is that there is a Temperature difference b/w water at the bottom and Top of the sea.

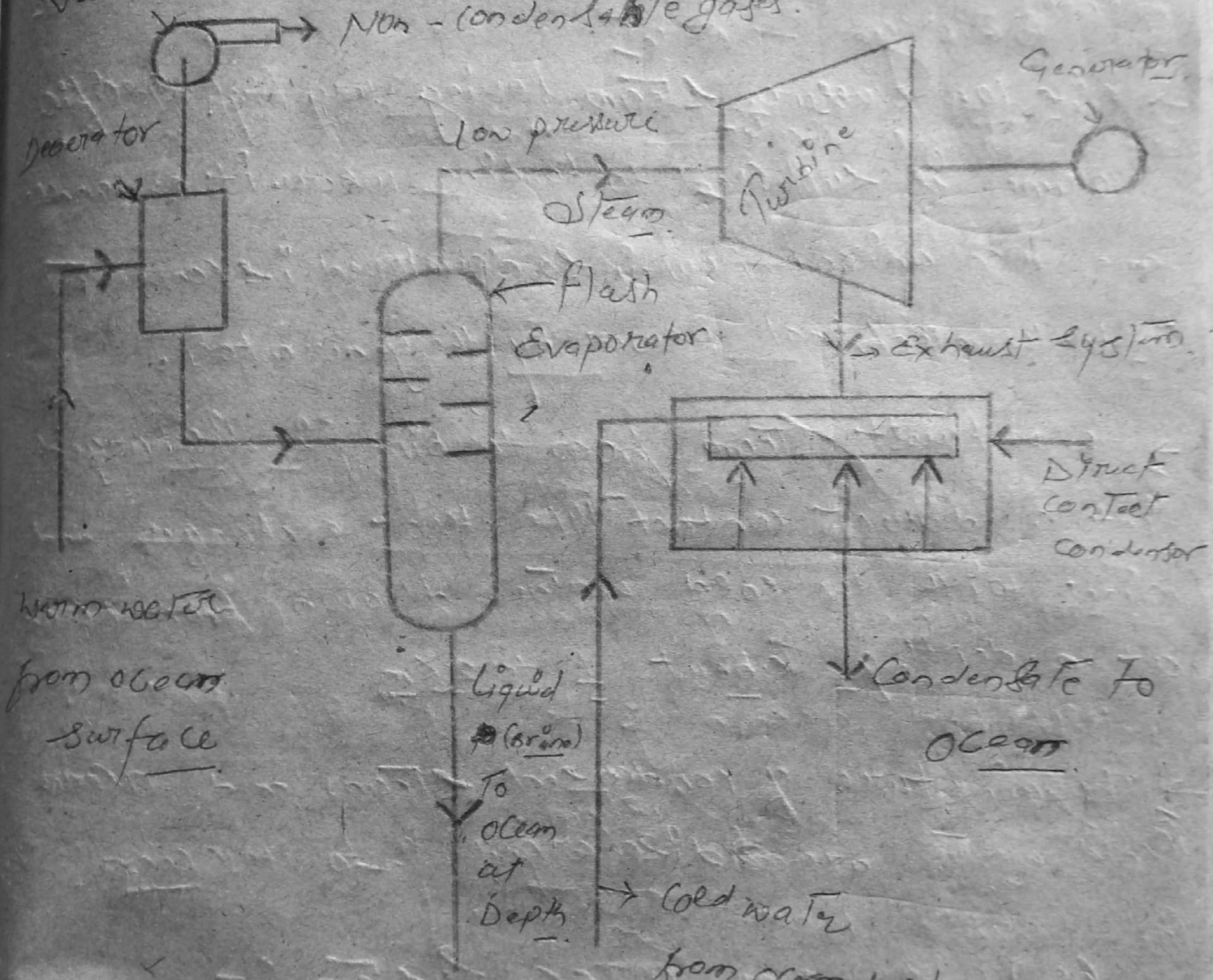
→ this Temperature can be used to operate a heat engine and most of Radiation is being absorbed at the surface layer of water.

Types of OTEC System :-

There are two Types of OTEC System -

1. Closed cycle system OR Anderson cycle system.
2. open cycle system OR Claude cycle System.
3. Hybrid cycle.

Open cycle systems or Claude cycle systems :-



→ In this system, the warm water from ocean surface is admitted through the deaerator to the flash evaporator which is maintained under high vacuum.

→ As a result, a low pressure steam is generated due to throttling effect and the remainder liquid is discharged back to the ocean at huge depth.

→ This low pressure steam having very high specific volume is supplied to turbine where it expands and mechanical power so developed is converted into the electrical power by the generator.

→ The exhaust steam from turbine is discharged into a direct contact type heat exchanger and mixes with the cold water drawn from ocean at a depth of about 1 to 2 km.

→ The mixture of condensed steam and ocean cold water are discharged into the ocean.

* Limitations of OTEC System :-

following are the limitations of OTEC system :-

(1) Low thermal efficiency (2-3%) because of low temperature difference of water available.

(2) Large size pump is required to handle large volume of water.

(3) the capital cost is more.

(4) plant should be capable of withstanding severe ocean storms and seasons.

(5) plant size above 100mW is omitted because it requires large size components (Requires 30m diameter pipe of 1 km long).