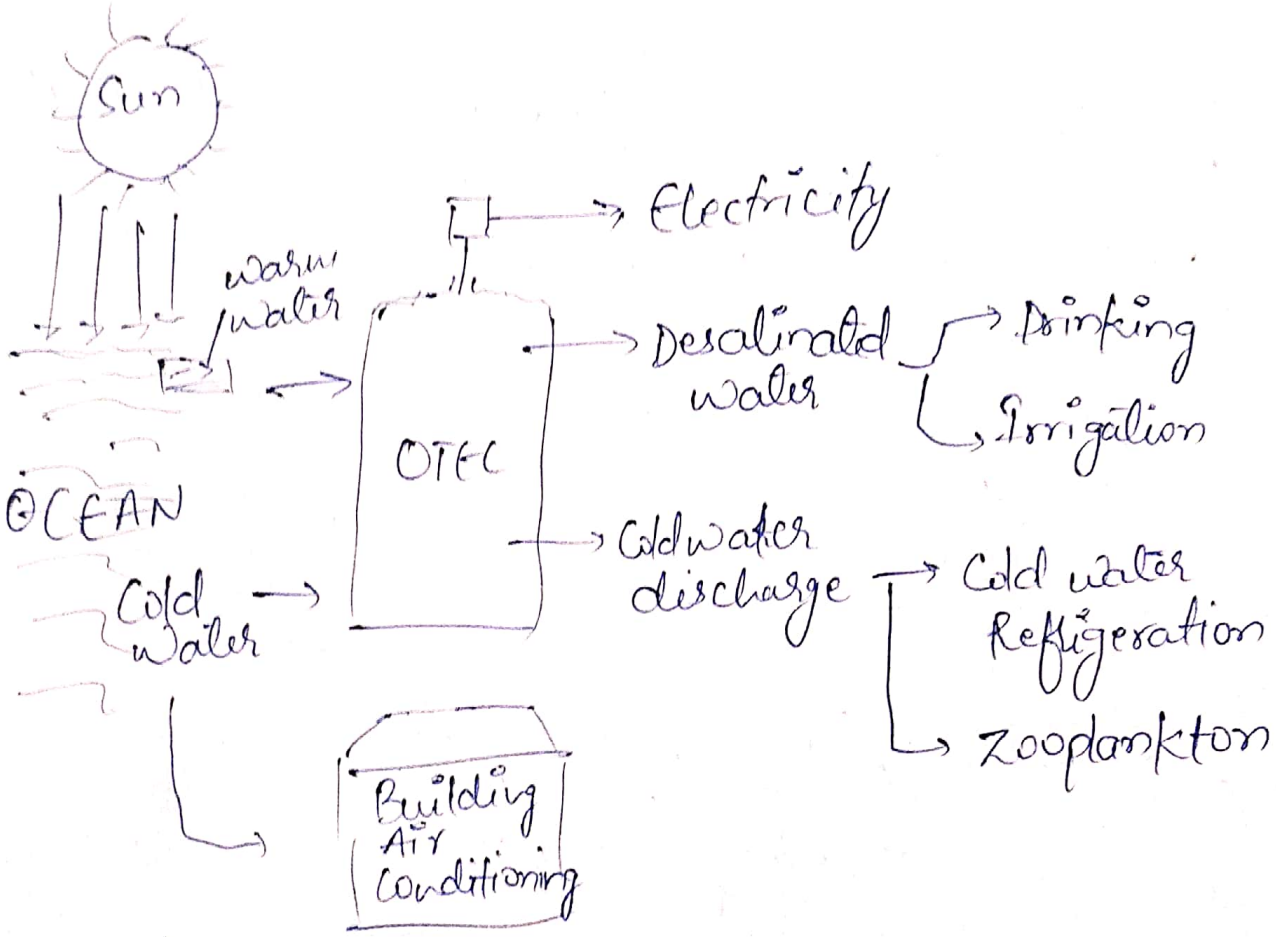
Section 4

Q1 → Principal of OTEC.

Ocean Thermal Energy Conversion uses the ocean thermal gradient b/w cooler deep and warmer shallow or surface sea waters to run a heat engine and produce useful work, usually in the form of electricity. OTEC can operate with a very high capacity factor and so can operate in base load mode



→ Open OTEC Cycle

Open cycle OTEC uses warm surface water directly to make electricity. The warm seawater is first pumped into a low-pressure container which causes it to boil.

P.T.O

Section 4

Q1 → Continue:

In some schemes, the expanding vapor drives a low-pressure turbine attached to an electrical generator. The vapor, which has left its salt and other contaminants in the low pressure container is pure fresh water. It is condensed into a liquid by exposure to cold temperatures from deep ocean water. This method produces desalinized fresh water, suitable for drinking, irrigation or aqua culture.

→ Limitation of OTEC

- Uneconomical
- Alter the nutrients of deep and shallow sea water which may cause problem to the aquatic animals.
- Technical issues (difficulties) such as
  (a) Dissolved gases → Experiments simulating conditions in the warm water intake pipe indicated about 30% of the dissolved gas evolves in the top 8.5 metres of the tube
  (b) Microbial fouling: Because raw seawater must pass through the heat exchanger, care must be taken to maintain good thermal conductivity.