Unit - IV

Ans Q4(a)! -

Five general categories of geothermal resources have been identified as:-

1) Hydrothermal convective system
   (a) Vapour dominated or dry Steam fields
   (b) Liquid dominated system
   (c) Hot water field
2) Geopressure resources
3) Petro thermal or Hot dry rocks
4) Magma resources
5) Volcanoes

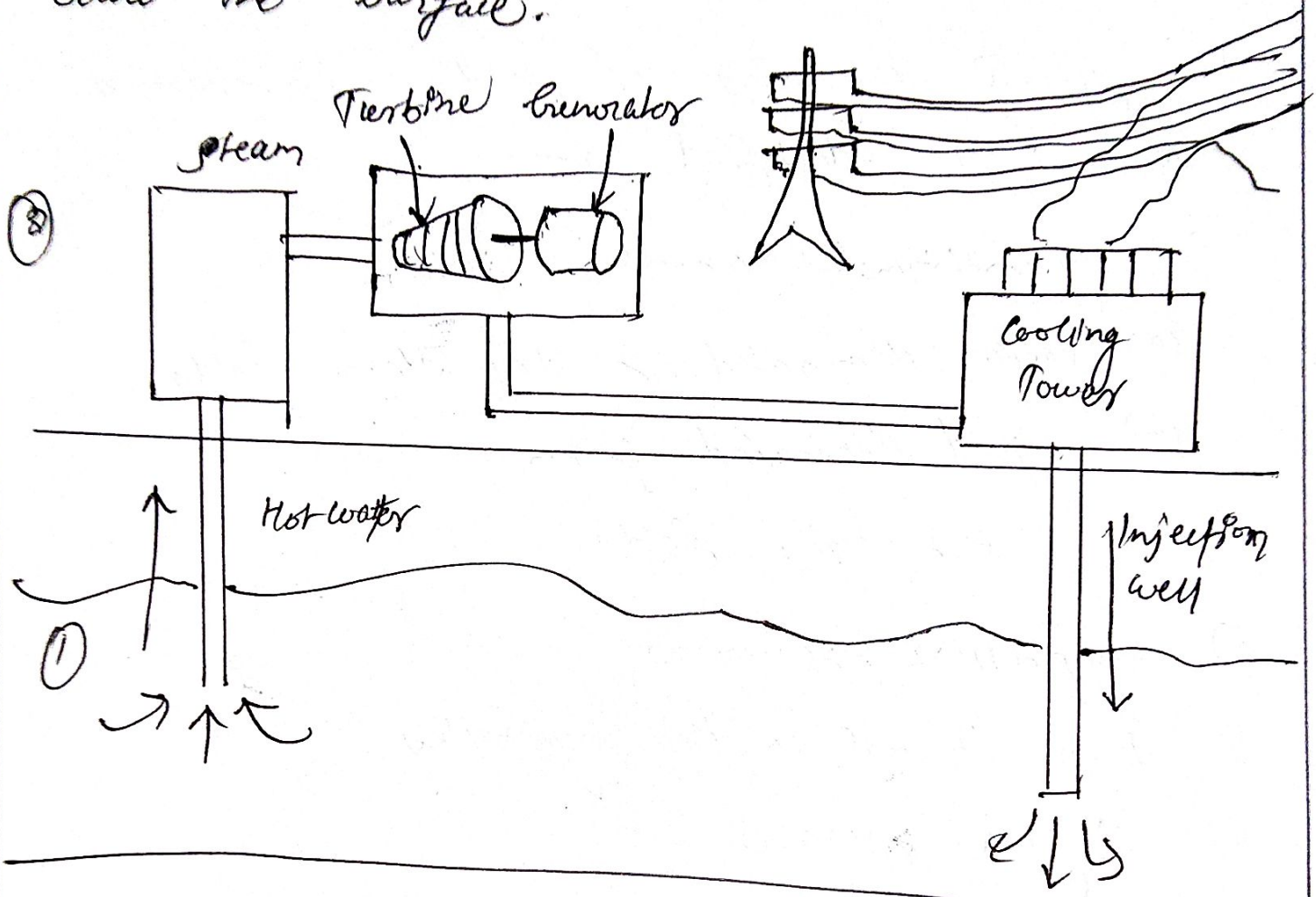
Ans Q4(b)! -

Geothermal Power plants:-

At a geothermal power plant, wells are drilled 1 or 2 miles deep into the earth to pump Steam or hot water to surface.

This type of power plant is found in an area that has a lot of hot springs, geysers, or

volcanic activity, because there are places where the earth is particularly hot just below the surface.



Schematic diagram of Geothermal power plant

Working :-

1) Hot water is pumped from deep underground through a well under high pressure.
2) When the water reaches the surface, the pressure is dropped which causes the water to turn into steam.

3) The steam spins turbine, which is connected to a generator that produces electricity.

4) The steam cools off in a cooling tower and condenses back to water.

5) The cooled water is pumped back into the earth to begin the process again.

Types of Geothermal Power plant :-

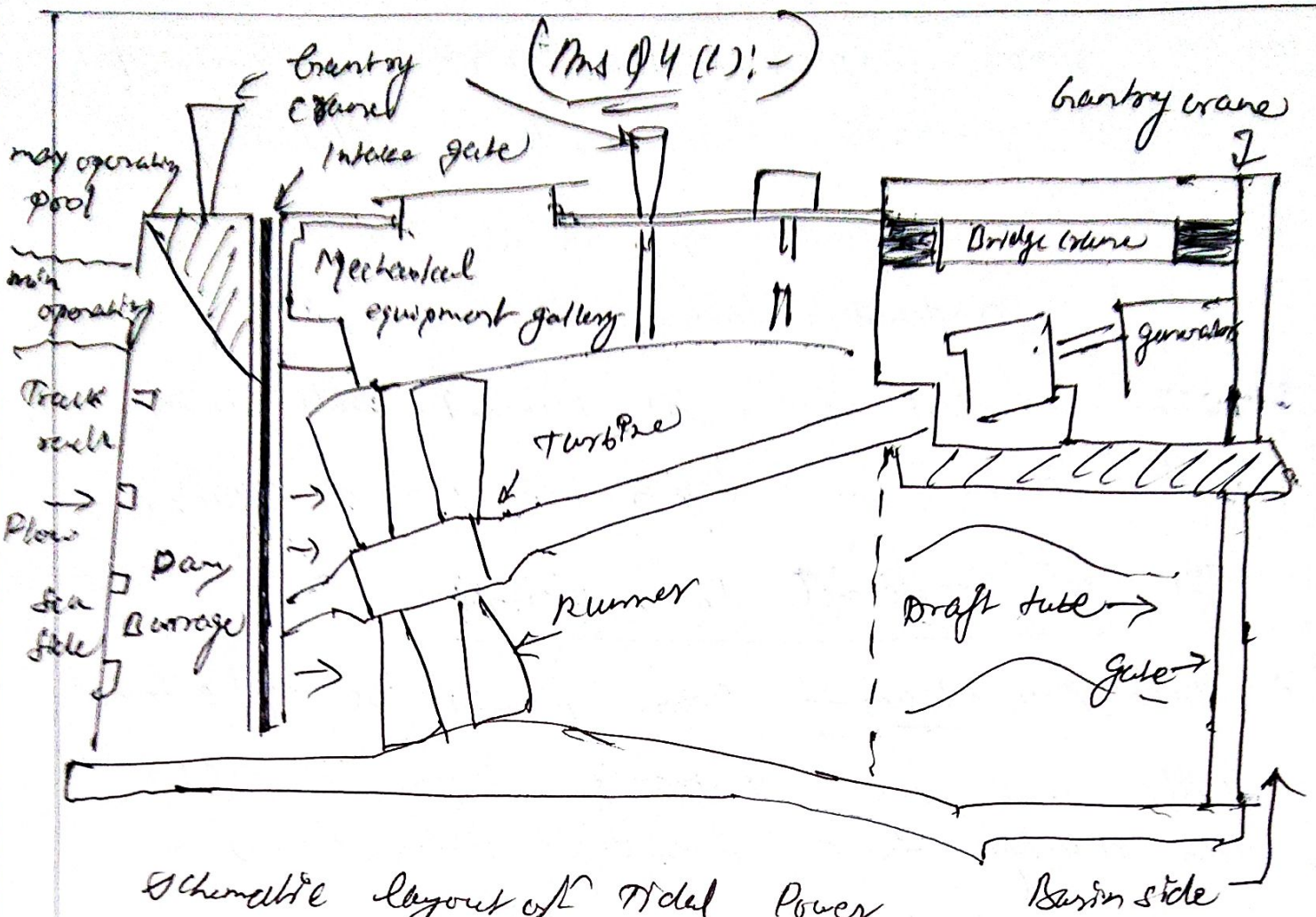
1) Direct Dry Steam — Steam plants use hydrothermal fluids that are primarily steam. The steam goes directly to a turbine, which drives a generator that produces electricity.

2) Flash and double flash cycle :- Hydrothermal fluids above 360°F can be used in flash plants to make electricity.

3) Binary cycle :- Most geothermal areas contains moderate temperature water (below 400°F). Energy is extracted from these fluids in binary cycle power plants.

Most geothermal power plant in future will be binary cycle power plant.

(Ans Q4 (1):-



Schematic layout of Tidal Power plant:-

The main components of a tidal power plant is shown in above figure:-

1) Barrage (Dam of low head) - The function of dam is to form a barrier between sea and basin.

2) Sluice ways for filling:- These are gate controlled devices. They are used to fill basin during the high tide or empty the basin during low tide.

3) Basin

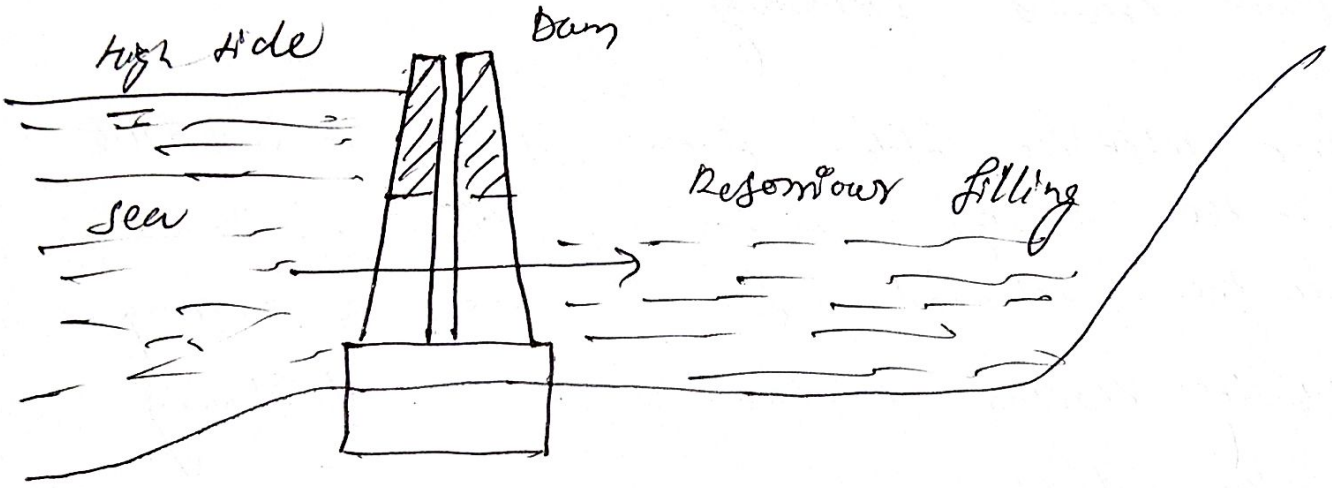
4) Duct

5) Turbine

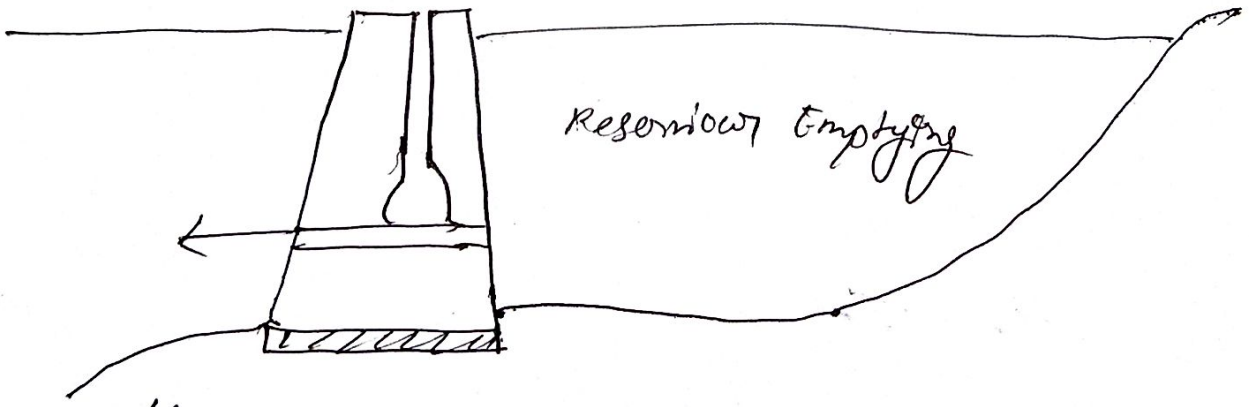
6) Generator units

Turbine and generator are main components of power house,

Operation of Plant:-



a) Sluice gates open, Turbine shut off section



b) Sluice gates shut, Turbine operation section

The barrage method of extracting tidal energy involves building a barrage across a bay or river that is subject to tidal flow,

Turbines installed in barrage walls generate power as water flow in and out of estuary basin.

When tide fills water behind the barrage in held in the estuary. The water is then released, flowing seaward turning a turbine and generator which creates electricity.

Later when the tides rises, it will be held back in the barrage in held the estuary. The water is then released, flowing back into estuary flowing through another turbine and allowing the electricity producing process to be repeated.

Unit V

Ans Q5 (a):-

Advantage of MHD generation:-

1) It is robust. without moving parts hence more reliable.
2) The conversion efficiency is high (60-65%) because of higher operating temperature.
3) Capital cost can be lower than conventional power plant.
4) Large amount of power can be generated