

## II: Hydro - Electric power plant (or) Hydel power plant :

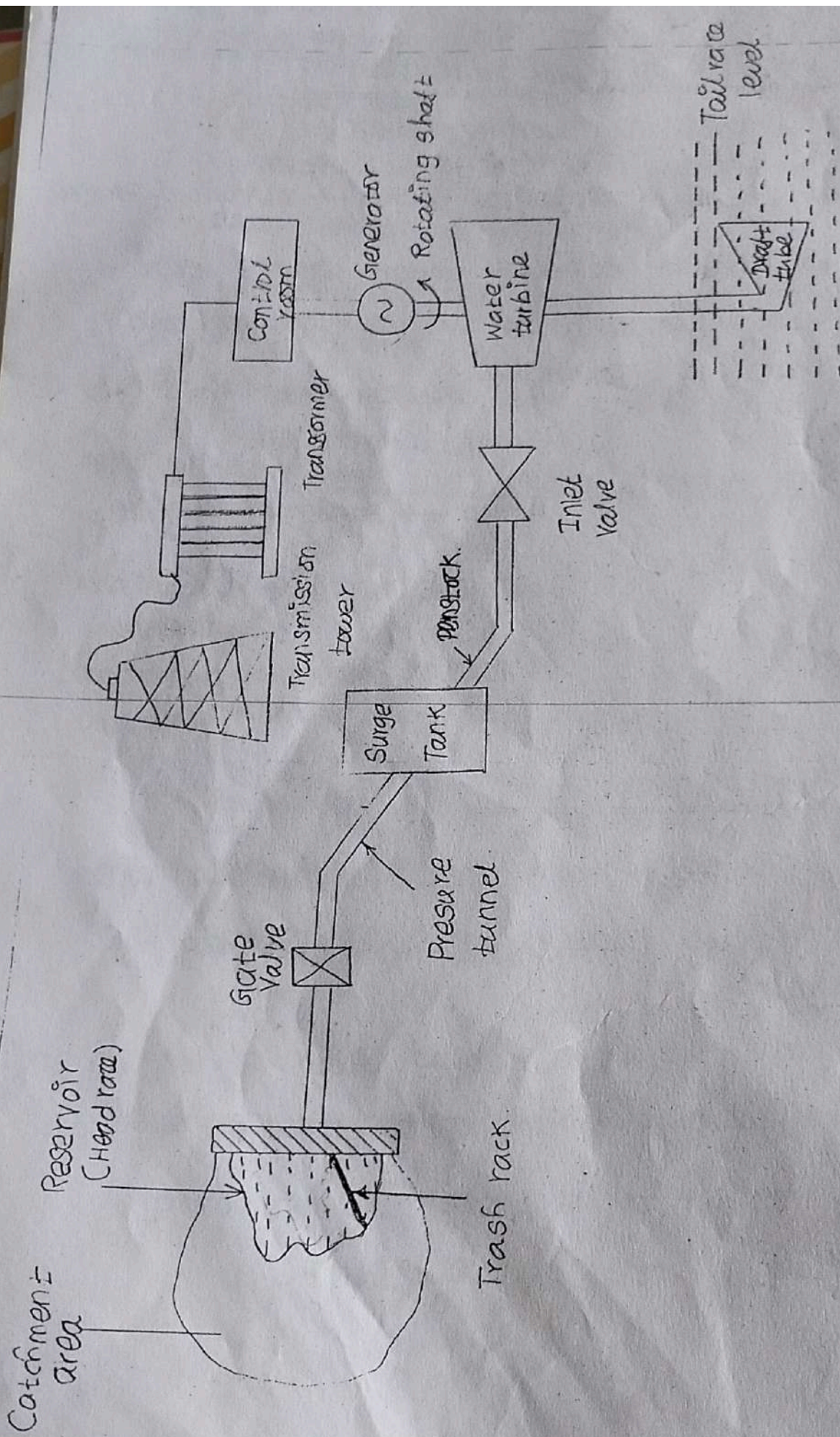
### (A): Working principle of Hydel power plant :

1. water is used as working fluid.
2. potential energy  $\rightarrow$  Mechanical energy  $\rightarrow$  Electrical energy.
3. Water is allowed to flow under pressure from the dam which is used to run the turbine and electrical power is generated.

Device	Energy Conversion
Dam	Water $\rightarrow$ potential energy.
Turbine	potential energy $\rightarrow$ Mechanical energy.
Generator	Mechanical energy $\rightarrow$ Electrical energy.

### (B) layout of Hydel power plant :

1. water is collected from the catchments area during the rainy seasons and is stored in the reservoir.
2. Dam regulates the outgoing flow of water and increases the working head of the power plant.
3. A gate <sup>Valve</sup> is used to regulate the quantity of water flowing out of the dam.



Layout of Hydro - Electric power plant

4. Pressure tunnel is a passage used to carry water from the reservoir to the surge tank.
5. Surge Tank is a small reservoir or tank in which the water level rises or falls due to sudden changes in pressure.
6. Penstock is a closed pipe made of steel or concrete used for supplying water from surge tank to the turbine.
7. Inlet Valve is provided at the inlet of the turbine to increase the velocity of water flowing to the turbine.
8. Water turbine is to convert kinetic energy of water into mechanical energy.
9. Draft tube is connected at the outlet of the water turbine. It allows the turbine to be placed over tailrace level.
10. Tail race is a passage for discharging water leaving the turbine into the river.
11. The electric generator is coupled with the turbine shaft.
12. Transformer is used to step ~~the~~ up the voltage generated at the generator terminal before transmitting the power to consumers and workstation.

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(c) Advantages of Hydel power plant :

1. Highly reliable.
2. Life of the plant is high.
3. Maintenance and operating cost is low.
4. No fuel transportation problem.
5. No ash disposal problem.

(d) Disadvantages of Hydel power plant :

1. Initial cost is high.
2. Load centers it requires long transmission lines
3. Transmission losses are high.
4. Power generation depends on quantity of water available.
5. Erection will take a long period of time.