

## CHAPTER - 01

### \* Source of energy :

① The sun.

② " wind.

③ water.

④ fuel.

⑤ Nuclear energy.

① The sun :- The sun is the primary source of energy. The heat energy radiated by the sun can be absorbed over a small area by means of machinery. This heat can be used to raise steam and electrical energy can be produced with the help of turbine-alternator combination.

② Water : when water is stored at a suitable place it possesses potential energy because of the height created. This water energy can be converted into mechanical energy with the help of water turbines. The water turbine drives the alternator in mechanical into electrical energy.

Fuels:

(iv) The main sources of energy are fuels. Solid fuel as coal, liquid fuel as oil and gas fuel as natural gas.

(v) nuclear energy: Towards the end of second world war, it was discovered that large amount of heat energy is liberated by the fission of uranium and fissionable materials.

(vi) The wind: This method can be used where <sup>the</sup> wind blows for a considerable length of time. The wind energy is used to run the wind mill which drives a small generator. ✓

\* Advantages of solid fuels over liquid fuels.

(1) In case of liquid fuels, there is a danger of explosion.

(2) Liquid fuels are costlier as compared to solid fuels.

(3) Sometimes liquid fuels give unpleasant odours during burning.

(11) Liquids : which require special type of burners for burning.

Adv of Liquid fuel over solid fuel.

(1) The handling of liquid fuel is easier and they require less <sup>storage</sup> space.

(2) The combustion of liquid fuel is uniform.

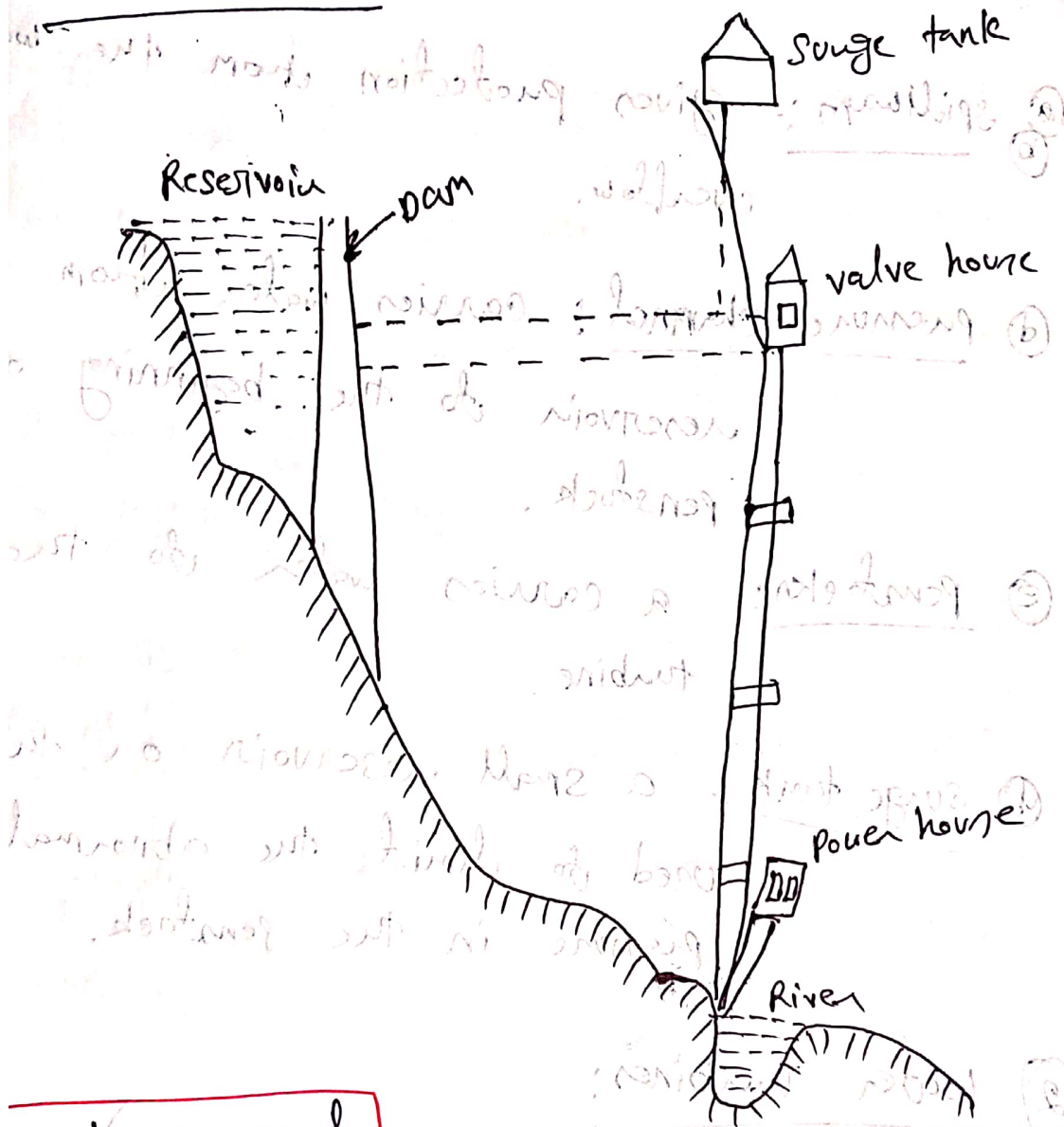
(3) The waste product of solid fuel is a large quantity of ash and its disposal become problem.

(4) The burning of liquid fuel can be easily controlled.





## (\*) Schematic Arrangement of Hydro-electric power station / plant.



### main component

#### ① Hydraulic structures

② Dams or Barriers:- barrier which store water and creates water head. 50-100m dams are created by earth but high head dams created by Rcc.

⑥ Reservoir: stores water if the water availability is uneven.

⑦ Spillways: gives protection from the water overflow.

⑧ Pressure Channel: carries water from reservoir to the beginning of penstock.

⑨ Penstock: carries water to the turbine.

⑩ Surge tank: a small reservoir or tank used to limit the abnormal pressure in the penstock.

## ② Water Turbines:

① Impulse Turbines: (Pelton turbine)

\* used for high heads.

\* the entire pressure of water is converted into kinetic energy in



a nozzle and the velocity of the jet drives the wheel.

### ⑥ Reaction Turbine: (Francis and Kaplan turbine)

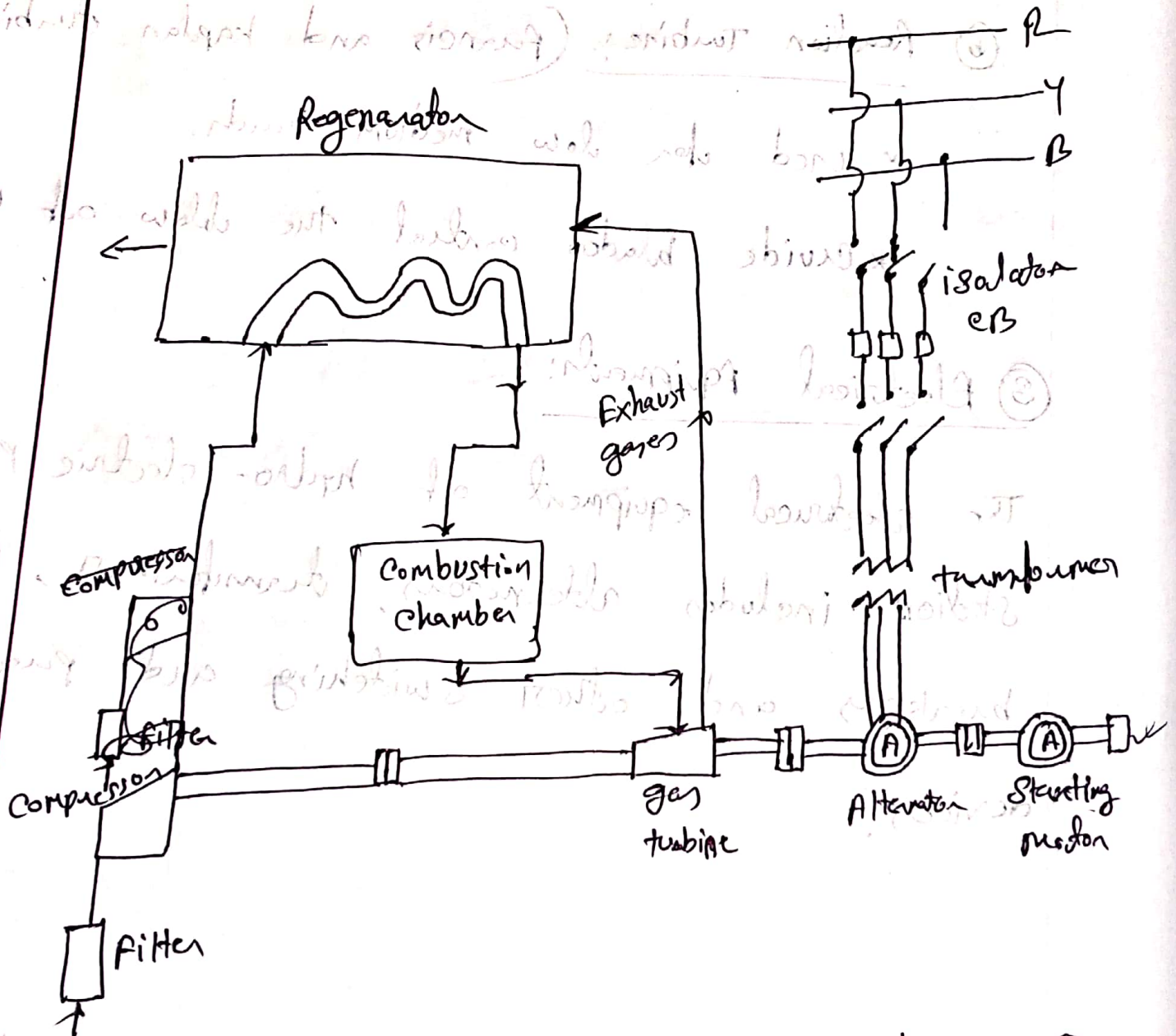
- \* used for low medium head.

- \* Curved blades control the flow of water

### ③ Electrical Equipment:

The electrical equipment of hydro-electric power station includes alternators, transformers, circuit breakers and other switching and protective devices.

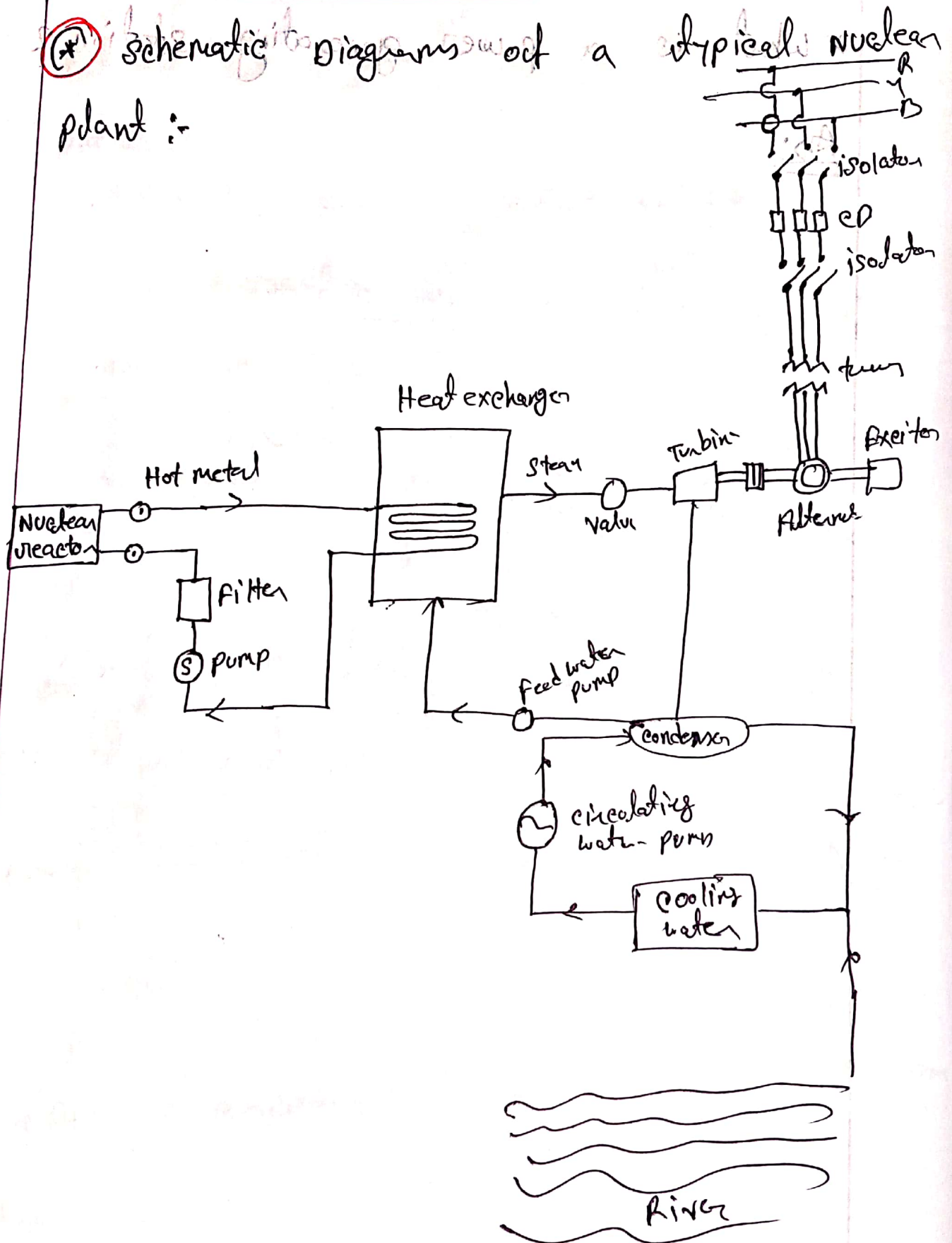
# \* Schematic diagram of gas turbine power plant.



\* Air is compressed to high pressure by a compressor



(\*) Schematic Diagrams of a typical nuclear plant :-



operation:-

Heavy elements such as Uranium (U-235) or Thorium (Th-232) are subjected to nuclear fission in a special apparatus known as a reactor. Heat energy released is utilized in raising steam at high temperature and pressure. The steam runs the steam turbine which converts steam energy into mechanical energy.

\* Last Topic  $\rightarrow$  Types of loads  $\rightarrow$  chapter-3

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