V Nuclear power plant:

(A) Working principle of Nuclear power plant:

1. Uranium is used as nuclear fuel.
2. Principle involved is nuclear fission.

(B) Component of Nuclear power plant:

1. Reactor core.
2. Control rods.
3. Moderator.
4. Coolant.
5. Thermal shielding.
6. Steam generator.
7. Turbine.
8. Condenser
9. Feed pump.

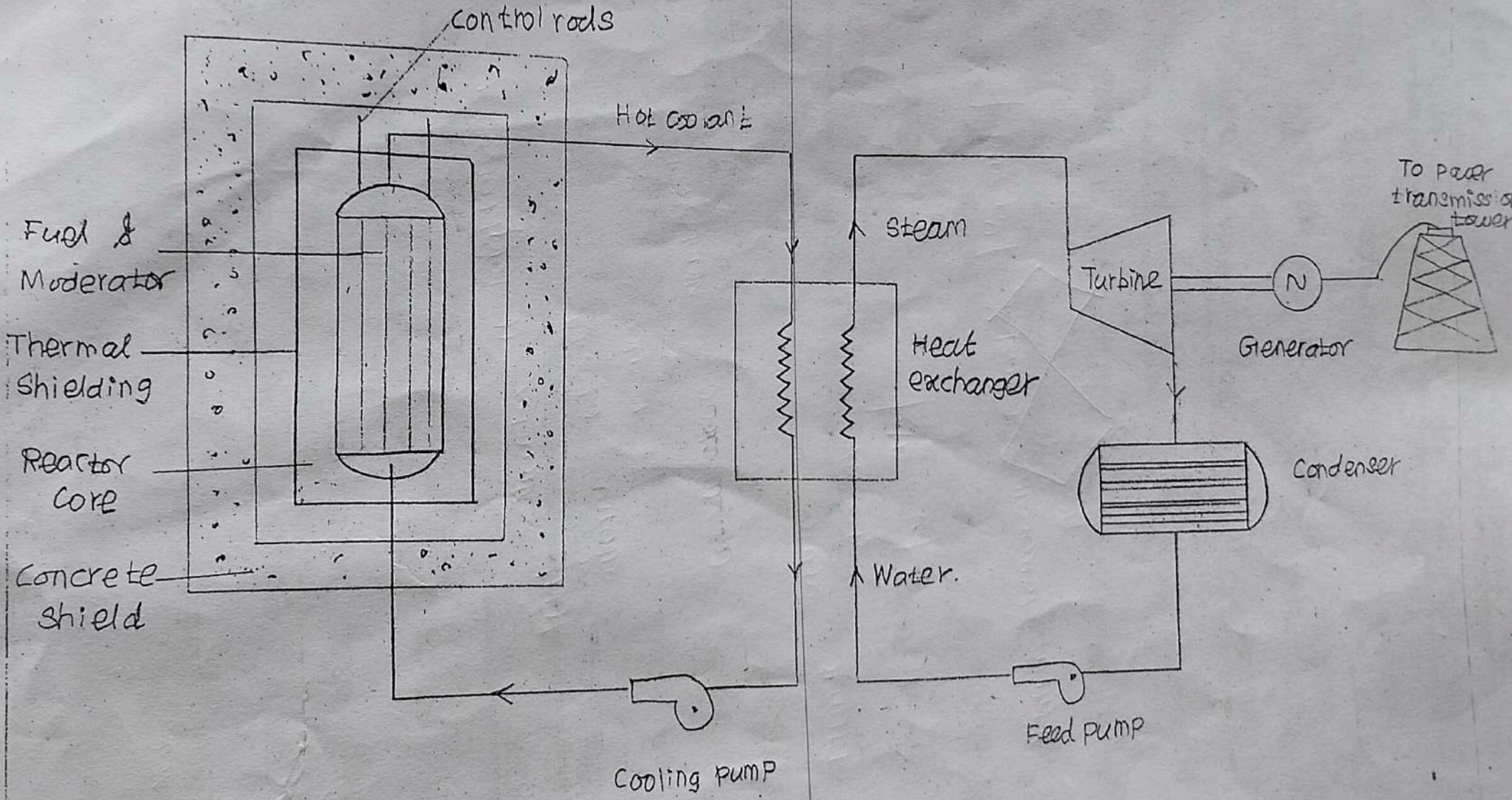
(C) layout of Nuclear power plant:

1. Reactor core:

(i) It consist of fuel elements, control rods, coolant and moderator.

(ii) Nuclear fission reaction takes place in reactor core.

Nuclear Reactor



2. Control rods :

(i) Control rods are inserted into the reactor core from the top of the reactor.

(ii) Function of control rods is to absorb the excess neutrons and to control the chain reaction.

(iii) Control rod is also used to start and stop the nuclear chain reaction.

3. Moderator :

(i) Moderator is a material which is used to slow down the fast neutrons.

(ii) Moderator materials are graphite, ~~and~~ heavy water, Carbon, and beryllium.

4. Coolant :

(i) Coolant absorb the heat generated in the core.

(ii) Commonly used coolant are water, liquid sodium.

5. Thermal shielding :

(i) It is made up of steel.

(ii) It surrounds the entire reactor core and it absorbs radiations and escaping neutrons.

6. Heat Exchanger :

(i) Heat Exchanger is used to transfer the heat carried by the coolant to water.

(ii) Water gets converted into steam while passing through the heat exchanger.

7. Turbine :

The steam is passes through a steam turbine where the thermal energy of steam is further used for generating electric power.

8. Condenser :

(i) The steam coming from the turbine is passed to the condenser.

(ii) steam is converted into water by circulating cold water around the condenser tubes.

9. Feed pump :

The feed pump pumps the condensed water from the condenser to the steam turbine.

(d) Advantages of Nuclear ~~Reactors~~ power plant :

1. No ash disposal problems.
2. Not affected by adverse weather conditions.
3. Fuel consumption is very small.
4. Suitable for large power requirements.
5. Less number of workers are needed.

(e) Disadvantages of Nuclear powerplant :

1. High Initial and maintenance cost.
2. Not suitable for varying load conditions.
3. Radioactive wastes may affect the workers health and other surroundings.
4. Disposal of radio active waste is major problem.
5. well trained personnel is required for operations.