

5(a). with the help of schematic. explain pressurized water reactor(PWR).

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Ans=

A pressurized water reactor (PWR) is a type of nuclear reactor used for generating electricity. It is the most common type of commercial nuclear reactor in operation worldwide. Here is a description of a PWR:

1. Reactor Core: The heart of the PWR is the reactor core, where nuclear fission takes place. It consists of fuel assemblies, typically containing ceramic pellets of enriched uranium dioxide or mixed oxide (MOX) fuel. These fuel assemblies are arranged in a grid pattern within the reactor vessel.

2. Moderator and Coolant: The PWR uses ordinary water as both the moderator and coolant. The moderator slows down the neutrons released during fission, making them more likely to cause subsequent fission reactions. The coolant carries away the heat generated by the fission reactions, preventing the fuel from overheating.

3. Pressurizer: The pressurizer is a component that maintains the water in the primary coolant loop under high pressure. It ensures that the coolant remains in a liquid state at higher temperatures, allowing it to absorb more heat from the reactor core without boiling.

4. Primary Coolant Loop: The primary coolant loop circulates water through the reactor core and other key components. It consists of pipes, pumps,

and heat exchangers. The water absorbs heat from the reactor core and transfers it to a secondary coolant loop without mixing with it.

5. Steam Generator: The primary coolant transfers its heat to a secondary coolant loop through a heat exchanger called a steam generator. In the steam generator, the heat from the primary coolant is used to convert the secondary coolant, usually water, into steam.

6. Secondary Coolant Loop: The secondary coolant loop carries the heat from the steam generator to a turbine. The steam drives the turbine, which is connected to a generator, producing electricity.

7. Condenser: After passing through the turbine, the steam is condensed back into water in a condenser, utilizing cold water from another source, such as a river or a cooling tower.

8. Cooling Water: The cooling water, used in the condenser, is then pumped back to the environment or through a cooling tower to lower its temperature before being reused.

It's important to note that the primary coolant loop, where the nuclear reactions occur, is separate from the secondary coolant loop, which drives the turbine and generates electricity. This design prevents any direct contact between the nuclear fuel and the electricity-generating components.