1. Discuss neutron sources, slowdown, reactivity pile, and interaction:

Neutron sources start and maintain nuclear reactions. They come from special materials like Americium or deuterons.

Slowing down neutrons (called "moderation") makes them more effective in splitting atoms. This is done using materials like water or graphite.

The "reactivity pile" is the reactor core, where fuel, like uranium, interacts with neutrons to create a chain reaction.

2. Discuss nuclear fission, fusion, and power reactors:

Fission: A heavy atom (like uranium) splits into smaller parts, releasing energy. This powers most nuclear reactors.

Fusion: Light atoms (like hydrogen) combine to form heavier ones, releasing even more energy. This happens in the sun but is hard to control on Earth.

Power reactors use controlled fission reactions to produce energy safely.

3. Discuss radiation monitoring and safety measures:

Radiation levels are checked with devices like Geiger counters to ensure safety.

Safety steps include using shields (like lead or concrete), storing radioactive materials safely, and wearing protective gear.

4.Discuss applications of nuclear physics in the following:

Medicine: Used in X-rays, cancer treatment, and scans like PET or CT. Radioactive materials help diagnose and treat diseases.

Agriculture: Radiation improves crops, kills pests, and helps with soil research.

Industry: Radiation is used to check materials for cracks, sterilize medical tools, and preserve food.