



Date: 19-11-2024

Dept. No. 

Max. : 100 Marks

Time: 01:00 pm-04:00 pm

**SECTION A****Answer ANY FOUR of the following****4 x 10 = 40 marks**

1. What is known as binding energy of a nucleus?
2. Explain thermal utilization.
3. When is a reactor said to be prompt critical and subcritical?
4. Derive an expression to find the critical value of a nuclear reaction.
5. Explain the process of neutron moderation. How is energy lost in elastic collisions during neutron moderation?
6. State and explain reciprocity theorem.
7. Explain Fermi's theory of a bare thermal reactor and derive the critical equation for an infinite reactor.
8. Explain the kinetics of an infinite reactor with delayed neutrons and the concept of the stable period in reactor operation.

**SECTION B****Answer ANY THREE of the following****3 x 20 = 60 Marks**

9. Explain the concept of space-dependent slowing down of neutrons in nuclear reactors. How does Fermi's age theory help in understanding neutron behaviour in a moderating medium?
10. Explain how the shape of a nuclear reactor influences its criticality and efficiency. Discuss the concept of the optimum reactor shape in relation to thermal reactors.
11. Discuss the role of control rods in nuclear reactors.
12. Analyse the importance of radiation shielding in nuclear reactors.
13. Discuss the fuel burnup, reactor power and consumption rate of nuclear reactor.
14. Explain the moderation of neutron in hydrogen.

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