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BIMEE-017

B. Tech. -VIEP-MECHANICAL ENGINEERING

(BTMEVI)

Term-End Examination, 2019

BIMEE-017 : NUCLEAR POWER ENGINEERING

Time : 3 Hours]

[Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Use of scientific calculator is permitted.

1. (a) With the help of a neat sketch, show all the important parts of a nuclear reactor. Describe briefly the functions of each part. [10]
- (b) How do you dispose the Radioactive wastes ?[4]
2. (a) Why is shielding of a nuclear reactor necessary ? What do you understand by thermal shielding ? [7]
- (b) List down the safety measures for a nuclear power plant. [7]
3. (a) What is moderator in a nuclear reactor ? Explain the desirable properties of a good moderator. [7]

- (b) Explain clearly the difference between 'fast neutrons' and 'thermal neutrons'. Explain clearly why thermal neutrons can cause fission of ${}_{92}\text{U}^{235}$ but not of ${}_{92}\text{U}^{238}$. [7]
4. (a) Explain how control rods control the reactor. What are the materials generally used to make control rods ? [7]
- (b) What factors must be considered while selecting the materials for the various reactor components? [7]
5. (a) What do you understand by breeding ? Discuss the factors responsible for controlling the breeding. [7]
- (b) What factors are considered in selecting site for a nuclear power plant ? [7]
6. (a) What is "Boiling Water Reactor (BWR) ? How does it differ from "Pressurised Water Reactor" (PWR) ? [7]
- (b) A power of 6MW is being developed in a nuclear reactor : [7]

- (i) How many atoms of U^{235} undergo fission per second ?
- (ii) How many Kg of U^{235} would be used in 1000 hours ? Assume that on an average 200 MeV is released per fission.

7. Write short notes on **any four** of the following : [4x3.5=14]

- (a) Cooling methods
- (b) Radiation Detectors
- (c) Electromagnetic pumps
- (d) Effect of delayed neutrons
- (e) Radioactive Decay
- (f) Artificial Radioactivity

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