

**B.Tech. – VIEP – MECHANICAL ENGINEERING
(BTMEVI)**

Term-End Examination

00882

December, 2017

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) Describe a nuclear power plant with the help of a block diagram. 7
- (b) Draw a neat diagram and describe the working of a Pressurised Water Reactor (PWR) plant. 7
2. (a) What do you understand by natural radioactivity ? Describe the various types of radioactive emissions. 7
- (b) What is a Liquid Metal Cooled Reactor ? Explain briefly, a typical liquid metal reactor. 7

3. (a) Briefly explain the CANDU reactor with its merits and demerits. 7
- (b) Explain clearly the difference between Fast neutrons and Thermal neutrons. Explain clearly why thermal neutrons can cause a fission of ${}_{92}\text{U}^{235}$ but not of ${}_{92}\text{U}^{238}$. 7
4. (a) What do you understand by Breeding ? Discuss the factors responsible for controlling breeding. 7
- (b) A city requires 3000 MWh of electric energy per day. It is to be supplied by a reactor which converts nuclear energy into electric energy with an efficiency of 20 percent. If the reactor uses nuclear fuel of U^{235} , calculate the mass of U^{235} needed for one days operation. 7
5. (a) What are the factors considered in selecting a site for a nuclear power plant based on economic considerations ? 7
- (b) Explain the working of an electrostatic precipitator with a neat sketch. 7
6. (a) What are the factors that must be considered while selecting the materials for various reactor components ? 7
- (b) Explain how you would control the nuclear reactions in a reactor. What are the materials generally used to make control rods ? 7

7. Write short notes and explain any *two* of the following : 2×7=14

- (a) Reflector
 - (b) Biological Shield
 - (c) Effect of Delayed Neutrons
 - (d) Electromagnetic Pump
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