

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

Term-End Examination

00495 December, 2014

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) Give a brief comparison between a nuclear and a conventional thermal power station in respect of 7
- (i) Capital cost
 - (ii) Fuel cost, and
 - (iii) Operating and Overhead cost.
- (b) A city requires 1500 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 day's operation. Assume that energy released per fission of U^{235} nuclide = 200 MeV. 7

2. (a) What are the principal parts of a nuclear reactor ? Explain each part in brief. 7
- (b) "The source of future power generation will be only nuclear fuel." Give your comments. 7
3. (a) With the help of neat sketches, explain the construction and working of an air preheater. 7
- (b) A nuclear reactor consumes 10 kg of U^{235} per day. Calculate its power output if the average energy released per U^{235} fission is 200 MeV. 7
4. (a) Explain the following terms with reference to a nuclear reactor : 7
- (i) Moderator
 - (ii) Biological shield
 - (iii) Inelastic scattering
 - (iv) Atomic mass unit
 - (v) Radioactivity.
 - (vi) Condenser
 - (vii) Nuclear fusion
- (b) List down some safety measures for Nuclear Power Plants. 7
5. (a) What do you mean by "Economics of Nuclear Power Plants" ? Explain in brief. 7
- (b) What is a "Liquid Metal Cooled Reactor" ? Explain briefly a typical liquid metal reactor. 7

6. (a) Describe with the help of a neat sketch the construction and working of a Pressurised Water Reactor (PWR). What are its advantages and disadvantages? 7
- (b) What are the various methods of storage or disposal of radioactive waste materials? 7
7. (a) Explain the principle of gas disposal system with a neat sketch. 7
- (b) Briefly explain Electrostatic Precipitator with the help of a neat sketch. 7
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