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BIMEE-017

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

Term-End Examination

December, 2015

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) What are the principal parts of a nuclear reactor ? Explain each part in brief.

(b) Why are nuclear power stations not so popular and successful in this country ? 7+7

2. (a) How are nuclear power plants classified ? Explain how fission reaction takes place and how is the chain reaction controlled.

(b) Discuss briefly about boiling water reactor plant. 7+7

3. (a) How are nuclear reactors classified ? Explain with neat sketch the working of a pressurised water reactor.

(b) Discuss the various factors to be considered while selecting the site for nuclear power plants. 7+7

4. (a) Give the layout of a fast breeder reactor power plant and explain its salient features.

(b) Discuss the problem of waste disposal from the nuclear plants and methods used for disposal. 7+7

5. (a) What is "nuclear fusion" ? How does it differ from "nuclear fission" ?

(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 on an average 200 MeV is released per fission. 7+7

6. (a) Give the construction and working of a "Gas cooled reactor". What are its advantages and disadvantages ?

(b) A nuclear reactor consumes 10 kg of U^{235} per day. Calculate the power output, if the average energy released per U^{235} fission is 200 MeV. 7+7