

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

**Term-End Examination**

**December, 2013**

**BIME-017 : POWER PLANT ENGINEERING**

*Time : 3 hours*

*Maximum Marks : 70*

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

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1. (a) Discuss different criteria for selection of site for : **2x7=14**
  - (i) hydro power plant and
  - (ii) coal based thermal power plant
- (b) Plant A of capacity 200MW uses coal at a rate 150 T/hr., where as plant B of same capacity uses oil at the rate of 40.0 T/hr. If the calorific value of coal is 10MJ/kg and that of oil is 42MJ/kg, find out the plant which is more efficient on the basis of heat rate.
  
2. (a) With the help of a neat sketch, explain the working of pressurized heavy water (PWR) nuclear power plant. What are its advantages and disadvantages over BWR (Boiling Water Reactor) ? **2x7=14**

- (b) Explain how waste disposal is carried out in a nuclear power plant.
3. (a) Discuss various means of improving the efficiency and output of a simple gas turbine cycle. **2x7=14**
- (b) A gas turbine cycle takes air at 25°C and at atmospheric pressure. The compression ratio in the cycle is 4.0. The compressor efficiency is 75%. The inlet temperature to turbine is limited to 750°C. What turbine efficiency would give overall cycle efficiency zero percent?
4. (a) Explain main distinguishing factors of fire tube boilers and water tube boilers. Discuss merits and demerits of each type. **2x7=14**
- (b) With the help of a neat sketch, describe the working of one of the following boilers.
- (i) Benson boiler
- (ii) Cochran boiler
5. (a) Describe briefly the functions of main components of Francis turbine used in a hydro power plant. **2x7=14**
- (b) What is a draft tube ? Why it is used in reaction turbines ? Describe different draft tubes with suitable sketches.

6. (a) Sketch and explain layout of a diesel engine power plant. **2x7=14**
- (b) Explain the process of combustion and expected constituents of exhaust-gases of a diesel engine.
7. Discuss various air pollutants from the following power plants and compare them. **2x7=14**
- (a) coal based thermal plant
- (b) gas turbine plant.
8. Write short notes on **any two** of the followings. **2x7=14**
- (a) power plant economics
- (b) water treatment in thermal power plant
- (c) coal handling system in thermal power plant
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