

B.E. / B. Tech. (Full Time) DEGREE END SEMESTER EXAMINATION, APRIL/ MAY 2014

ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH

SECOND SEMESTER

ME 9153 – POWER PLANT ENGINEERING

(REGULATIONS 2008)

Time: 3 hr

Max Mark: 100

Answer ALL questions

Part A – (10 × 2 = 20 marks)

1. What do you mean by fluidized bed combustion?
2. The surge tank is an important component in a hydroelectric power plant. Why?
3. Write the different types of draft tubes used in the hydro power plant.
4. The power generation by the gas turbines is attractive nowadays. Why?
5. Why is the liquid metal preferred as a coolant in a fast reactor?
6. What is the function of a moderator and reflector in a nuclear reactor?
7. List any four factors that should be considered while selecting a site for a diesel power plant.
8. What is the effect of intercooling and reheating in a gas turbine power plant?
9. What are the suitable materials for thermo electric elements?
10. What do you mean by photovoltaic energy conversion?

Part B – (5 × 16 = 80 marks)

11. i. Explain the working of a modern steam power plant with a neat layout. (12)
ii. Discuss the factors which should be considered while selecting a site for a hydroelectric power plant. (4)
 12. a. Explain the operation of Francis turbine with a neat schematic diagram. What are its major advantages over the other hydraulic turbines? (16)
- (OR)**
- b. i. Explain the working of a pumped storage power plant with a neat sketch. (12)
ii. How are the hydro-electric power plants classified? (4)

13. a. Draw a neat diagram of a nuclear reactor and explain the functions of each component. (16)

(OR)

b. i. Explain how the fission reaction takes place and how the chain reaction is controlled. (12)

ii. Write any four differences between Boiling Water Reactor and Pressurized Water Reactor. (4)

14. a. Draw and explain the layout of a diesel engine power plant. Also list the application, advantages and disadvantages of diesel power plants. (16)

(OR)

b. In a gas turbine plant, the compressor is driven by the high pressure turbine. The exhaust from the high pressure turbine goes to a free low pressure turbine, which runs the load. The air flow rate is 20 kg/s and the minimum and maximum temperatures are 300 K and 1000 K respectively. The compression ratio is 4. Calculate the pressure ratio of the low pressure turbine and the temperature of the exhaust gases from the unit. Take $c_p = 1 \text{ kJ/kg K}$ and $\gamma = 1.4$. (16)

15. a. Explain the working of a MHD- steam power plant with a neat sketch. What are the limitations of this power plant. (16)

(OR)

b. (i) Explain the principle of thermionic power generation. (8)

(ii) With the help of a schematic diagram, explain the working of OTEC plant. (8)

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