

IV B.Tech I Semester Regular Examinations, November 2007  
POWER PLANT ENGINEERING  
(Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. (a) Explain the different components used in steam power plant.  
(b) What are the basic coal ingredients and how do they affect furnace design. [8+8]
2. Describe the electrostatic precipitator dust collection in a steam power plant. [16]
3. (a) Explain with sketches any two types of super charging methods of diesel engines.  
(b) List the disadvantages of diesel power plants. [8+8]
4. (a) What do you understand by water hammer and what are its effects on the power plant?  
(b) What are the functions of a surge tank fore bay and draft tube in a hydraulic power plant? [8+8]
5. (a) Explain the working of a fuel cell.  
(b) What are the merit and demerits of fuel cell. [8+8]
6. With a neat sketch explain the working of a simple constant pressure gas turbine. Mention its advantages and disadvantages. [16]
7. (a) Explain the functions of cladding. [4]  
(b) Explain the characteristic features of Pressurized Water Reactor. [8]  
(c) Give a brief account of nuclear waste disposal. [4]
8. (a) Write short notes on  
    i. Economics in plant section. [3]  
    ii. Power plant capacity [3]  
(b) Calculate the unit cost of production of electric energy for a power station for the following data.  
Capacity = 50 MW,  
Interest and depreciation = 10 %  
Cost per kw = Rs.600  
Cost of fuel, taxation and salaries = Rs.36 × 10<sup>5</sup>  
Load factor = 40% [10]

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1. Draw a general layout of a thermal power plant and explain the working of different circuits. [16]
2. (a) How are pulverizers classified? On what factors does the performance of a Pulverizer depends?  
(b) What are the feeding systems of pulverized coal in to the furnace? What are the Two conditions to be satisfied to burn pulverized coal successfully. [8+8]
3. (a) Explain with sketches any two types of super charging methods of diesel engines.  
(b) List the disadvantages of diesel power plants. [8+8]
4. Explain rotational speed, specific speed, maximum possible efficiency, part load efficiency, head of water, type of water available. [16]
5. (a) What are the advantages of a fuel cell?  
(b) Discuss the problems associated with the operation of a fuel cell. [8+8]
6. With a neat sketch explain the working of a simple constant pressure gas turbine. Mention its advantages and disadvantages. [16]
7. (a) What are the advantages of breeder reactor? [4]  
(b) With neat sketch explain the working of a Homogeneous Reactor. [8]  
(c) Write short note on Shielding. [4]
8. (a) What are the major source of air pollution. [8]  
(b) What are the different methods used to control SO<sub>2</sub> in the flue gases. [8]

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1. (a) Draw a chart showing operations and devices used in coal handling plant.  
(b) Describe different types of coal conveyors. [8+8]
2. (a) What is a cyclone furnace? Where it is used? Mention its advantages and Disadvantages.  
(b) Why is tertiary air required in a cyclone furnace? Where is it admitted? [8+8]
3. (a) Mention the advantages and disadvantages of a diesel power plant over a gas turbine power plant.  
(b) Give a maintenance schedule for Diesel engine power plant. [8+8]
4. (a) Explain the terms catchment area, rain fall and run off.  
(b) Explain the arrangement of the components of a hydro electric power plant with a neat sketch. [8+8]
5. (a) Explain the working of a fuel cell.  
(b) What are the merit and demerits of fuel cell. [8+8]
6. (a) With neat sketches and equations explain the regeneration and reheating methods employed to improve the performance of gas turbine power plant.  
(b) What is governing of gas turbine power plant? Why it is required? [8+8]
7. (a) What is a chain reaction? How it is controlled. [5]  
(b) Describe the fast breeder reactor. [6]  
(c) What is function of shield? What are the different types of shields? [6]
8. (a) Define:  
    i. Connected load  
    ii. Maximum demand  
    iii. Demand factor [6]  
(b) The peak load on a power station is 30 MW. The loads having maximum demands of 25 MW, 10MW, 5 MW and 7 MW are connected to the power station. The capacity of the power station is 40MW and annual load factor is 50 % find.  
    i. Average load on the power station.

Code No: RR410304

**Set No. 3**

- ii. Energy supplied per year.
- iii. Demand factor.
- iv. Diversity factor.

[10]

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1. What is the importance of thermal power development in the country? Describe its development in the last 10 years. [16]
2. Explain direct and indirect dry cooling system with neat sketches. [16]
3. (a) Mention the different methods of fuel injection used in Diesel plants. Which method is mostly used? [8]  
(b) What are the advantages of Diesel power plant? [4]  
(c) List some applications of Diesel engine plants. [4]
4. (a) Explain the terms hydrograph, flow duration curve and mass curve.  
(b) Explain the construction and features of different types of types of dams. [8+8]
5. (a) What are the main advantages of using solar flat plate collectors?  
(b) Describe the working of distributed type solar thermal power generating unit.  
(c) Write short notes on solar energy collection and utilization. [4+6+6]
6. With a neat sketch explain the working of a simple constant pressure gas turbine. Mention its advantages and disadvantages. [16]
7. (a) What is a chain reaction? How it is controlled. [5]  
(b) Describe the fast breeder reactor. [6]  
(c) What is function of shield? What are the different types of shields? [6]
8. (a) What do you understand by thermal pollution ? What are the bad effects of thermal pollution ?  
(b) Explain different methods adopted to control the nuclear pollution. [8+8]

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