

Code No: **R42039****R10****Set No. 1****IV B.Tech II Semester Regular Examinations, April/May - 2014****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time : 3 hours****Max. Marks: 75****Answer any Five Questions****All Questions carry equal marks**

- 1 a) Explain the different components used in steam power plant. [8]
b) What are the basic coal ingredients and how do they affect furnace design. [7]
- 2 a) How are pulverizers classified? On what factors does the performance of a Pulverizer depends? [8]
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. [7]
- 3 a) What are the various factors to be considered while selecting the site for diesel engine power plant? [8]
b) Compare I.C engines with steam engines and state the advantages of I.C engines over steam engines. [7]
- 4 Describe with a neat sketch the working principle of a hydro electric power plant layout and its operation. [15]
- 5 a) With help of a block diagram explain the main components of a open cycle gas turbine power plant. [8]
b) Give the classification of gas turbine power plants. [7]
- 6 a) Explain the working of a fuel cell. [8]
b) What are the merit and demerits of fuel cell. [7]
- 7 a) What do understand by acid rains? What are the reasons of this? How are they controlled? [8]
b) Explain the pollution due to nuclear power plant. [7]
- 8 a) Explain economics in plant. [7]
b) Estimate the generating cost per unit supplied from a power plant having the following data
Plant capacity = 120 MW.
Capital cost = Rs. 600×10^6
Annual load factor = 40 %
Annual cost of fuel, taxation, oil and salaries = Rs. 500000
Interest and depreciation = 12 % [8]

Code No: **R42039****R10****Set No. 2****IV B.Tech II Semester Regular Examinations, April/May - 2014****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time : 3 hours****Max. Marks: 75****Answer any Five Questions****All Questions carry equal marks**

- 1 a) Explain the different components used in steam power plant. [8]
b) What are the basic coal ingredients and how do they affect furnace design. [7]
- 2 Describe the electrostatic precipitator dust collection in a steam power plant. [15]
- 3 a) What are harmful effects caused by using impure water in the boiler? [8]
b) What is meant by makeup water of boiler and how is the water fed into a boiler? [7]
- 4 a) Draw the arrangement of combined cycle and explain its working. [8]
b) List out the advantages of combined cycle. [7]
- 5 a) With neat sketches and equations explain the regeneration and reheating methods employed to improve the performance of gas turbine power plant. [8]
b) What is governing of gas turbine power plant? Why it is required? [7]
- 6 a) Mention the advantages and disadvantages of a diesel power plant over a gas turbine power plant. [8]
b) Give a maintenance schedule for Diesel engine power plant. [7]
- 7 a) Explain the function of a moderator. What is the criterion of its effectiveness? [8]
b) What are the different fuels used in nuclear power plants. [7]
- 8 a) Define pollution and pollutants. [7]
b) Discuss the harmful effects of CO₂, CO, compounds of sulphur and oxides of Nitrogen [8]

Code No: **R42039****R10****Set No. 3****IV B.Tech II Semester Regular Examinations, April/May - 2014****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time : 3 hours****Max. Marks: 75****Answer any Five Questions
All Questions carry equal marks**

- 1 a) What is the necessity of coal storage? [8]
b) Discuss the various methods used for coal storage at plant. [7]
- 2 a) What is a cyclone furnace? Where it is used? Mention its advantages and Disadvantages. [8]
b) Why is tertiary air required in a cyclone furnace? Where is it admitted? [7]
- 3 Draw a neat diagram of a cooling system used for diesel power plant showing all the essential components. What are the advantages of double circuit over circuit. [15]
- 4 What are the different methods used to improve the thermal efficiency of the open cycle gas turbine plant? Draw and explain with neat sketches. [15]
- 5 a) What are the advantages of a fuel cell? [7]
b) Discuss the problems associated with the operation of a fuel cell. [8]
- 6 What are the various factors to be considered in selecting the site for a hydro electric power plants. [15]
- 7 a) What factors are considered in selecting an economical site for nuclear power plant. [8]
b) List out the advantages and disadvantages of nuclear plants over conventional thermal plants. [7]
- 8 a) Explain economics in plant. [8]
b) What is general arrangement for power distribution? [7]

Code No: **R42039****R10****Set No. 4****IV B.Tech II Semester Regular Examinations, April/May - 2014****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time : 3 hours****Max. Marks: 75****Answer any Five Questions****All Questions carry equal marks**

- 1 a) Draw a chart showing operations and devices used in coal handling plant. [8]
b) Describe different types of coal conveyors. [7]
- 2 a) Explain the different components used in steam power plant. [8]
b) What are the basic coal ingredients and how do they affect furnace design. [7]
- 3 a) Mention the advantages and disadvantages of a diesel power plant over a gas turbine power plant. [8]
b) Give a maintenance schedule for Diesel engine power plant. [7]
- 4 A gas turbine plant of 800 kw capacity takes the air at 1.01 bar and 15⁰C. The pressure ratio of the cycle is 6 and maximum temperature is limited to 700⁰C. A regenerator of 75% effectiveness is added in the plant to increase the over all efficiency of the plant. The pressure drop in the combustion chamber is 0.15 bar as well as in the generator is also 0.15 bar. Assuming the isentropic efficiency of the compressor 80% and of the turbine 85%, determine the plant thermal efficiency. [15]
- 5 a) How hydro electric power plants are classified? [8]
b) Describe the advantages and disadvantages of hydroelectric power plants. [7]
- 6 a) What are the advantages of a fuel cell? [8]
b) Discuss the problems associated with the operation of a fuel cell. [7]
- 7 a) How nuclear reactors are classified?. Discuss the advantages and disadvantages of Pressurized Water Reactor. [8]
b) Give a brief account of nuclear waste disposal. [7]
- 8 a) What are the capital cost and fixed cost to be considered for cost analysis? [8]
b) A power plant has the installed capacity of 120MW. Calculate the cost of generation, if Capital cost = Rs. 120×10^6 , rate of interest and depreciation = 18% Annual cost of fuel oil, salaries and taxation = Rs. 25×10^6 , load factor = 40%. [7]