

IV B.Tech I Semester Regular Examinations, November 2005
POWER PLANT ENGINEERING
(Mechanical Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Discuss the relative merits of different out plant coal handling.
(b) Describe the hydraulic ash handling system. [8+8]
2. (a) Why are feed water heaters used?
(b) Explain with a sketch the working of a Barometric condenser? [8+8]
3. (a) Explain with the help of a block diagram the fuel storage and supply system of diesel power plant.
(b) Explain with the help of a block diagram the water cooling system of diesel power plant. [8+8]
4. Describe with a neat sketch the working principle of a hydro electric power plant layout and its operation. [16]
5. (a) What is the importance of the parameter gas conductivity in MHD Generation?
(b) With neat sketch explain the MHD cycle combined with thermal power cycle. [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 and disadvantages of breeder reactor? [5]
(b) What do you mean by fission of nuclear fuel? [5]
(c) Explain briefly about radiation hazards and shielding? [6]
8. (a) What are the capital cost and fixed cost to be considered for cost analysis. [6]
(b) A power station has the installed capacity of 120 MW. Calculate the cost of generation, other data pertaining to power station are given [10]
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 %

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1. Draw a net line diagram of in plant coal handling and indicate the name of equipments used at different stages? [16]
2. (a) what is a ball mill? What are its advantages?
(b) Explain the characteristic features of a ball mill? [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. What are the various factors to be considered in selecting the site for a hydro electric power plant and discuss about primary and secondary investigations. [16]
5. (a) What is the basic difference between thermo electric and thermionic conversion systems?
(b) Explain the working of thermionic system with neat sketch and explain the effects of these factors which control power generation capacity. [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) How nuclear reactors are are classified? [5]
(b) Discuss the advantages and disadvantages of Pressurized Water Reactor. [6]
(c) Give a brief account of nuclear waste disposal. [5]
8. (a) Explain economics in plant. [5]
(b) What are general arrangement for power distribution. [5]
(c) Estimate the generating cost per unit supplied from a power plant having the following data [6]
Plant capacity = 120 MW.
Capital cost = Rs.600 × 10⁶
Annual load factor = 40 %
Annual cost of fuel, taxation, oil and salaries = Rs.500000
Interest and depreciation = 12 %

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1. What will be the future planning of power in India? [16]
2. (a) Describe a cyclone separator.
 (b) Explain the carry over losses in cooling towers. [8+8]
3. Describe the following systems in brief with respect Diesel Power Plant.
 (a) Fuel storage and supply system
 (b) Exhaust system
 (c) Lubrication system [5×3=15+1]
4. (a) Explain in detail the spillways, baffle piers and drainage gallery.
 (b) Explain the various factors to be considered in the selection of a hydraulic turbine. [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) What is a chain reaction? How it is controlled? [4]
 (b) Draw a neat diagram of nuclear reactor and explain the functions of different components. [8]
 (c) What are the fuels used in nuclear power plants? [4]
8. (a) What is meant by load curve ? Explain its importance in power generation.
 (b) A power station has a maximum demand of 80×10^3 kw and daily load curve is defined as follows : [6+10]

Time (Hr)	0-6	6-8	8-12	12-14	14-18	18-22	22-24
Load (MW)	40	50	60	50	70	80	40

Determine the load factor of power station

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1. Draw a net line diagram of in plant coal handling and indicate the name of equipments used at different stages? [16]
2. (a) Describe “Zeolite water softening process” with a sketch.
(b) Explain the importance of pH value to control corrosion phenomenon. [8+8]
3. (a) Draw a neat layout of a diesel power plant and label all the components. [10]
(b) List the advantages of diesel power plants over other thermal power plants. [6]
4. What are the various factors to be considered in selecting the site for a hydro electric power plant and discuss about primary and secondary investigations. [16]
5. (a) What is the importance of the parameter gas conductivity in MHD Generation?
(b) With neat sketch explain the MHD cycle combined with thermal power cycle. [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 criteria of selecting a suitable cladding? [4]
(b) Give the construction and working of a gas cooled reactor. [8]
(c) What are the advantages and disadvantages of a gas cooled reactors? [4]
8. (a) Differentiate between fixed and running charges in the operation of a power plant. [6]
(b) Determine the generation cost Per unit of energy for power plant from the following data. [10]
Installed capacity = 100 MW
Capital cost of power plant = Rs. 3500 Per KW
Interest and depreciation = 12 %
Fuel consumption = 1 Kg / KWh
Fuel cost = Rs.50 per 1000 Kg.
Salaries wages, repairs and other operating costs per annum = Rs. 10×10^6
Peak load = 100 MW
Load factor = 60%
