

SUBJECT: ME6701-POWER PLANT ENGINEERING

UNIT-I

COAL BASED THERMAL POWER PLANTS

PART-A

1. What are the processes of rankine cycle?
2. Draw the layout of coal based thermal power plant.
3. What are the types of boilers?
4. Why thermal power plants are not suitable for supplying fluctuating loads.
5. What is the function boiler and turbine?
6. What is called superheated steam?
7. What are the super critical boilers?
8. Define the merits of pulverized fuel firing system.
9. Define FBC.
10. What is the necessity of feed pump in thermal power plant
11. Mention the various modern ash handling systems.
12. What are the methods used for handling of coal?
13. What is the function of cooling tower?
14. What are the requirements of a modern surface condenser?
15. What are the processes of Binary cycle?
16. What is pulverization?
17. What are the factors affecting cooling of water in cooling tower?
18. Draw the P-V, H-S and T-S diagram for rankine cycle.
19. Draw a neat sketch of basic principle of FBC.
20. What is mean by Cogeneration systems?

PART-B

1. Draw the general layout of thermal power plant and explain the working of different circuits.
2. Explain the principle involved in preparation of coal and what are the methods of preparation?
3. How ash is handled in the power plant? Explain the ash handling system.
4. Explain the various draught systems with a neat sketch.
5. What are the different types of cooling towers? Explain with a neat sketch.
6. Explain the construction and working of any one High pressure boiler with a layout.
7. Explain the reheat system and regeneration system of a thermal power plant.
8. Explain the water tube boiler and fire tube boiler with neat sketch.
9. Draw an explanatory line diagram of an ash handling system employed in steam power plants and also explain the difficulties encountered in the handling of ash in a thermal power station.
10. (a) Draw a chart showing operations and devices used in coal handling plant. (8)
(b) Describe different types of coal conveyors. (8)

UNIT-2

DIESEL, GAS TURBINE AND COMBINED CYCLE POWER PLANTS

PART-A

1. What are the applications of diesel engine power plant?
2. Draw the layout of Diesel power plant.
3. What is the purpose of air intake system in a diesel engine power plant?
4. What are the various types of cooling system used in diesel power plant?
5. What is the commonly used fuel injection system in a diesel power station?
6. What are the processes of Otto cycle?
7. What are the processes of diesel cycle?
8. What are the processes of dual cycle?
9. What are the processes of Brayton cycle?
10. What are the Components of Diesel Power plants?
11. What are the different types of Engines used in diesel power plants?
12. Mention any two drawbacks of a stationary gas turbine power plant for generation of electricity.
13. What are the Components of Gas Turbine Power plants?

14. How the gas turbine blades are cooled?
15. Discuss the effect of inter cooling in a gas turbine plant.
16. Mention the advantages and disadvantages of a diesel power plant.
17. What is the process in combined cycle power plant?
18. What are the advantages of combined cycle power plants?
19. What is the process in Integrated Gasifier based combined cycle power plant?
20. What are the advantages of Integrated Gasifier based combined cycle power plants?

PART-B

1. Explain in detail about Otto cycle and processes with p-V and T-s diagrams.
2. (a) Explain in detail about diesel cycle.(8)
(b) Explain in detail about dual cycle. (8)
3. (a) Explain in detail about Brayton cycle.(8)
(b) Why is the Brayton cycle most suitable for gas turbine power? (8)
4. Draw and explain the layout of a modern diesel power plant showing the following systems.
 - a. Air Intake system
 - b. Cooling system
 - c. Fuel supply system
 - d. Lubrication system and
 - e. Exhaust system.
5. (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. (8)
6. Explain the Gas turbine power plant with neat sketch. Discuss the advantages of gas turbine power plant.
7. With p-v & t-s diagram explain the effect of intercooling, reheating& regeneration in a gas turbine plant
8. (a) Give the classification of gas turbine power plants. (8)
(b) Give the advantages and disadvantages of open cycle gas turbine power plant. (8)
9. Draw and explain the layout of a Combined Cycle Power Plant.
10. Draw and explain the layout of an Integrated Gasifier based Combined Cycle Power Plant.

UNIT-3

NUCLEAR POWER PLANTS

PART-A

1. What are the advantages of nuclear power plant?
2. What are the three moderators used in nuclear power plants
3. Explain the function of nuclear reactor.
4. What is nuclear fusion?
5. What is nuclear fission?
6. State the fuels used in nuclear power plants.
7. What are the conditions satisfied to sustain nuclear fission process?
8. List down the basic factors those are to be considered for the design of a nuclear power reactor.
9. State the advantages of fast breeder reactors.
10. What is a 'CANDU' reactor?
11. What are the requirements of fission process?
12. What is "half life" of nuclear fuels?
13. Explain the functions of moderators.
14. Distinguish between PHWR and LMFBR
15. Define the term "Breeding".
16. What are the components of pressurized water reactor nuclear power plant?
17. How the nuclear reactors are classified?
18. What are the essential components of a nuclear reactor?
19. Mention the various types of fast breeders.
20. What are the components of supercritical water reactor nuclear power plant?

PART-B

1. Explain the construction and working of Nuclear power plant with a layout.
2. Explain the working of a typical fast breeder nuclear reactor power plant, with neat diagram.
3. What are the difference between a pressurized water reactor nuclear power plant and boiling water reactor nuclear power plant?
4. Explain the following terms:
 - (i) Fission of nuclear fuel
 - (ii) Distribution of fission energy
 - (iii) The chain reaction.

5. (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)
6. With the help of a sketch show all the important part of nuclear reactor. Describe briefly the functions of each part.
7. Explain the difference between controlled and uncontrolled nuclear chain reaction.
8. (a) Explain the importance of nuclear waste management. (8)
(b) What are the Safety measures for Nuclear Power plants? (8)
9. (a) Explain the Gas Cooled and Liquid Metal Cooled Reactors.(8)
(b) Explain the CANada Deuterium- Uranium reactor (CANDU). (8)
10. Write detailed notes on following:
 - (i) Boiling water reactor
 - (ii) Gas cooled reactor.

UNIT-4

POWER FROM RENEWABLE ENERGY

PART-A

1. On what a factor does the selection of a water turbine for hydel plants depends upon?
2. What is known as binding energy?
3. Enumerate the advantages and disadvantages of hydropower plants.
4. What is surge tank?
5. Mention the merits of hydro electric power plants.
6. Classify the hydro electric turbines with respect to high medium and low head.
7. What are the three main factors of power output of hydroelectric plant?
8. What are the main parts of pelton wheel?
9. What is the function of spear & nozzle?
10. What do you understand by water hammer?
11. Discuss the essential factor which should be considered while selecting a site for a hydro electric power plant.
12. What is the basis of classification of turbines?
13. What is a solar cell?
14. What are the advantages and limitations of tidal power plant?
15. What are the components of Tidal power plants?
16. What is a fuel cell?
17. What is geothermal energy?

18. What are the applications of geothermal energy?
19. What are the important criteria while selecting the geothermal energy?
20. What are the different types of geothermal fluid and give its temperature range.

PART-B

1. With a neat sketch explain in detail the construction and working principle of hydro electric power plant.
2. (a) Compare Kaplan turbine and Francis turbine. (8)
(b) Explain pumped storage power plant with its merits & demerits. (8)
3. Explain the working of the cyclone burner.
4. Explain in detail about surge tank used in hydro electric power plant. Also explain about the classification and selection of dams.
5. (a) What are the factors to be considered while selecting the site of a hydro power plant? (8)
(b) Explain the selection factors of a hydraulic turbine .What are the function of a hydraulic turbine? (8)
6. How are the turbines classified? Explain anyone with a suitable sketch.
7. Explain the construction and working of Geo thermal power plant.
8. (a) What are the different types of Tidal power plants? (8)
(b) Explain the Solar thermal central receiver system. (8)
9. What are the different types of ocean thermal energy conversion system?
10. (a) Explain with a neat diagram of wind electric generating power plant.(10)
(b) Explain in detail about the various types of Wind energy system. (6)

UNIT-5

ENERGY, ECONOMIC AND ENVIRONMENTAL ISSUES OF POWER PLANTS

PART-A

1. Define demand factor.
2. Define load factor.
3. What is load curve?
4. Draw the load duration curve.
5. What is tariff?
6. How can we calculate the cost of electricity?
7. What is two part tariff?
8. How to improve the power factor?
9. What is the capital cost of power plant?

10. What is financing cost?
11. What is operating cost?
12. What is meant by depreciation?
13. What are the various operating cost of coal fired steam power plant?
14. What is meant by depreciation?
15. What are the waste disposal options for Coal Power Plant?
16. List the components of fixed cost.
17. What is the significance of two part tariff and three part tariff?
18. What are the criteria for site selection of power plant?
19. What are the merits and demerits site selection of power plant.
20. What are the waste disposal options for Nuclear Power Plant?

PART-B

1. What do you understand by power plant economics? Explain the fixed costs and operating costs of a power station.
2. What are the elements which contribute to the cost of the electricity? And how can the cost power generation be reduced?
3. What is cost of electrical generation? What are the various types of cost associated with power generation?
4. What is a tariff? Discuss and compare various tariff used in practice.
5. (a) Explain the term depreciation and discuss various methods of calculating the depreciation of an electrical plant. (8)
(b) What are load curves and load duration curves? Discuss their utility in the economics of generation. (8)
6. A generating stations as a maximum demand (MD) of 15 MW and the daily load curve on the station is as follows, 10pm to 05 am 2500 KW 01pm to 04pm 10000KW 05am to 07 am 3000KW 04pm to 06pm 12000KW ,07pm to 11am 9000KW 06 pm to 08pm 15000KW 11am to 01pm 6000KW 08pm to 10pm 5000KW Determine the size and the number of generator units, plant load factor, plant capacity factor, use factor and reserve capacity of plant.
7. Explain the pollution control technologies including waste disposal options for coal power plant.
8. Explain in detail Capital & Operating Cost of different power plants.
9. Explain the pollution control technologies including waste disposal options for nuclear power plant.
10. (a) Write short notes on site selection criteria.(8)
(b) Explain its merits and demerits. (8)