

Code No: R1641034

**R16**

**Set No. 1**

IV B.Tech I Semester Regular/Supple Examinations, March - 2021

**POWER PLANT ENGINEERING**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

\*\*\*\*\*

**PART-A (14 Marks)**

1. a) What are the different sources of energy? [2]
- b) Write short notes on supercharging. [2]
- c) What is a surge tank? Why is it important in a hydro-electric power plant? [3]
- d) Write short notes on fertile and fissionable material. [2]
- e) Discuss the importance of measurement and instrumentation in a power plant. [2]
- f) Define diversity factor and explain its significance. [3]

**PART-B (4x14 = 56 Marks)**

2. a) Make a neat sketch and explain the working of multi retort stoker. [6]
- b) What is a cyclone furnace? Explain its construction. Mention its advantages and disadvantages. [8]
3. a) Discuss combined steam and gas turbine power plants. [7]
- b) Explain with the help of a neat sketch, how air intake and admission system of diesel plant works? [7]
4. a) Discuss the factors which should be considered while selecting a site for a hydro-electric power plant. [6]
- b) Explain pumped storage plant with the help of a neat sketch, discuss its advantages and disadvantages. [8]
5. a) What are the different components of a nuclear power plant? Explain the working of a nuclear power plant. [8]
- b) Write short notes on radiation shielding in nuclear power plants. [6]
6. a) Show that when two cyclic plants operate in parallel, the overall efficiency lies between the efficiency of the plants. [6]
- b) With the help of a neat sketch, explain the coordination of hydro-electric and nuclear power plants. [8]
7. a) What do you understand by connected load and average load? Explain. [6]
- b) What are the different pollutants evolved from thermal and nuclear power plants? Explain the methods to control them. [8]

Code No: R1641034

**R16**

**Set No. 2**

IV B.Tech I Semester Regular/Supple Examinations, March - 2021

**POWER PLANT ENGINEERING**

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any FOUR questions from Part-B*

\*\*\*\*\*

**PART-A (14 Marks)**

1. a) What is meant by `overfeed` and `underfeed` principles of firing coal? [2]
- b) State the applications of a diesel power plant. [2]
- c) Discuss the importance of mini and micro hydro power plant. [2]
- d) What do you understand by breeding and burn up in nuclear power plants? [3]
- e) Explain the environmental impact of a combined cycle plant. [2]
- f) Define load factor and explain its significance. [3]

**PART-B (4x14 = 56 Marks)**

2. a) Describe the various methods used to fire pulverised coal and state the advantages of pulverised fuel firing. [8]
- b) Make a neat sketch and explain the working of a chain grate stoker. [6]
3. a) Draw a simple line diagram of a simple open cycle gas turbine plant. Explain how `reheating` improves the thermal efficiency of a simple open cycle gas turbine plant? [7]
- b) Explain in detail, the fuel supply system of a diesel engine. [7]
4. a) What is a spill way? Explain why spill ways are required? Discuss the different types of spill ways. [7]
- b) What do you understand by hydrological cycle? Explain with the help of a neat sketch. [7]
5. a) Discuss the factors which go in favour of nuclear power plant as compared to other types of power plants. [6]
- b) With the help of a neat sketch, explain pressurized water reactor? [8]
6. a) With the help of a neat sketch, explain storage type hydro-electric plant in combination with steam plant. [8]
- b) Explain the working of a photo cell type smoke meter. [6]
7. a) Discuss the different methods to control SO<sub>2</sub> in the flue gases. [7]
- b) What are the various costs involved in the power plant economics? Explain them briefly. [7]



**IV B.Tech I Semester Regular/Supple Examinations, March - 2021****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B***\*\*\*\*\*****PART-A (14 Marks)**

1. a) Write a short note on the comparison of forced and induced draft system for a boiler. [2]
- b) Enlist the advantages and disadvantages of diesel engine power plant. [2]
- c) What do you understand by hydrograph? Explain. [3]
- d) Discuss the function of a pressurizer in a pressurized water reactor? [2]
- e) How can a combined cycle plant be used for cogeneration? What is its thermodynamic advantage? [2]
- f) Define demand factor and explain its significance. [3]

**PART-B (4x14 = 56 Marks)**

2. a) What do you understand by a cooling tower? Explain an indirect dry cooling tower where a direct contact spray type condenser is used? [8]
- b) Describe the various factors which determine the location of a steam power station. [6]
3. a) What is a semi-closed cycle gas turbine plant? Explain it with the help of a sketch of a plant. [7]
- b) Give the layout of a diesel engine power plant. Explain in detail. [7]
4. a) Explain the underground hydro-electric power station and over ground power stations. Discuss its advantages and disadvantages. [7]
- b) State the function of a dam. Briefly discuss a few important types of dams. [7]
5. a) Explain the properties of moderator used in a nuclear reactor? Explain the principle of a sodium-graphite reactor. [8]
- b) Write short notes on radio-active waste disposal in a nuclear power plant. [6]
6. a) With the help of a neat sketch, explain pumped storage plant in combination with nuclear power plant. [8]
- b) Explain the magnetic wind method for the measurement of O<sub>2</sub> in flue gases. [6]
7. a) Explain how NO<sub>x</sub> emissions can be reduced in the flue gases? [7]
- b) Explain load duration curve in detail. [7]

**IV B.Tech I Semester Regular/Supple Examinations, March - 2021****POWER PLANT ENGINEERING****(Mechanical Engineering)****Time: 3 hours****Max. Marks: 70***Question paper consists of Part-A and Part-B**Answer ALL sub questions from Part-A**Answer any FOUR questions from Part-B***\*\*\*\*\*****PART-A (14 Marks)**

1. a) Discuss the advantages of mechanical methods of firing coal. [3]
- b) List the major components of a gas turbine power plant and give its limitations. [3]
- c) What do you understand by storage and pondage? [2]
- d) On what factors does nuclear reaction rate depends? Explain. [2]
- e) Discuss the advantages of a combined cycle power generation. [2]
- f) Define maximum demand and average load in power plant economies. [2]

**PART-B (4x14 = 56 Marks)**

2. a) Describe the various types of burners used to burn pulverised coal. [7]
- b) Name various draught systems. Describe the operation of a balanced draught system. [7]
3. a) Bring out the differences between the closed cycle and open cycle gas turbine power plants. [6]
- b) Explain the operation of a fuel pump in a diesel engine. How is the fuel supply to the engine regulated? [8]
4. a) How are dams classified? Discuss the factors considered for the selection of the site and type of the dam? [6]
- b) Explain the different ways of classifying a hydroelectric power plant. With the help of a neat sketch, explain run off river plant. [8]
5. a) What is a homogeneous reactor? Discuss with the help of neat sketch, the homogeneous aqueous reactor. [8]
- b) Discuss the various factors to be considered while selecting the site for nuclear power station. Discuss its advantages and disadvantages. [6]
6. a) With the help of a neat sketch, explain run off river plant in combination with steam plant. [8]
- b) Discuss different types of hygrometers used in power plants. [6]
7. a) Enumerate the latest pollution laws in existence in India. [6]
- b) What is the impact on the environment and human health for the effluents released from the thermal power plants? Explain how to control them. [8]