

# **SRM VALLIAMMAI ENGINEERING COLLEGE**

SRM Nagar, Kattankulathur – 603 203

## **DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING**

### **QUESTION BANK**



### **VII SEMESTER**

**1907801 – Thermal Power Plant Instrumentation**

**Regulation – 2019**

**Academic Year 2025 – 2026 (Even semester)**

*Prepared by*

**Mr.P.Tamilmani,**

**Assistant Professor (Sel.G)/EIE**



# SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203.



## DEPARTMENT OF ELECTRONICS AND INSTRUMENTATION ENGINEERING QUESTION BANK

**SUBJECT : 1907801 – THERMAL POWER PLANT INSTRUMENTATION**  
**SEM / YEAR: VII / IV**

<b>UNIT I - POWER GENERATION METHODS</b>				
Brief survey of methods of power generation: hydro, thermal, nuclear, solar and wind power – importance of instrumentation in power generation – thermal power plants: building blocks, details of boiler processes P&I diagram of boiler – cogeneration.				
<b>PART A</b>				
<b>Q.No</b>	<b>Question</b>	<b>CO's</b>	<b>BT Level</b>	<b>Competence</b>
1.	Differentiate between Renewable and Non-Renewable energy sources.	CO1	BTL 2	Understand
2.	Why we can't completely depend on solar and wind power plant?	CO1	BTL 2	Understand
3.	Classify the methods of power generation.	CO1	BTL 2	Understand
4.	Identify the two important use of surge tank.	CO1	BTL 1	Remember
5.	Give any two role of air preheater.	CO1	BTL 2	Understand
6.	Name the four commonly used moderators in nuclear power plants.	CO1	BTL 1	Remember
7.	Mention the functions of two important components of Nuclear power plant.	CO1	BTL 2	Understand
8.	Mention about enriched uranium.	CO1	BTL 2	Understand
9.	Define Chain Reaction.	CO1	BTL 1	Remember
10.	Give the disadvantages of Nuclear Power Plant.	CO1	BTL 2	Remember
11.	Discuss about how to control nuclear reactor in nuclear power plant.	CO1	BTL 2	Understand
12.	Point out the two important working principle of Solar Photo Voltaic Cell.	CO1	BTL 2	Understand
13.	Classify the types of wind power plant.	CO1	BTL 2	Understand
14.	Point out the four significant need of instrumentation in power generation.	CO1	BTL 2	Understand
15.	State the two major importance of instrumentation in power generation	CO1	BTL 2	Understand
16.	Name the three basic cycle of Thermal Power Plant.	CO1	BTL 1	Remember
17.	Define the role of Economiser in thermal power plant.	CO1	BTL 2	Understand
18.	Examine the basic factors to be considered for thermal power plant.	CO1	BTL 1	Remember
19.	Define the term Cogeneration.	CO1	BTL 1	Remember
20.	Draw the instrument line symbol for pneumatic signal.	CO1	BTL 2	Understand
21.	What is the advantage of Hydro power plant?	CO1	BTL 1	Remember
22.	What is the non-renewable source of energy?	CO1	BTL 1	Remember
23.	Give major building block of thermal power plant?	CO1	BTL 1	Remember
24.	What are varies method of power generation?	CO1	BTL 1	Remember

<b>PART B</b>						
1.	i)	Illustrate with a neat sketch, the process of electric power generation using Wind Energy.	(7)	CO1	BTL 3	Apply
	ii)	Explain with a neat sketch, the process of electric power generation using Solar Energy.	(6)	CO1	BTL 3	Apply
2.		Discuss in detail with a schematic diagram the hydro power plant generation.	(13)	CO1	BTL 3	Apply
3.		Describe the various process take place in thermal power plant with neat diagram.	(13)	CO1	BTL 3	Apply
4.	i)	Describe briefly the importance of instrumentation in nuclear power plant.	(6)	CO1	BTL 3	Apply
	ii)	Describe the working Principle of solar cells with neat diagram.	(7)	CO1	BTL 3	Apply
5.		With a block diagram explain the operation of nuclear power plant and also mention the important parameters to be monitored in each block.	(13)	CO1	BTL 4	Analyze
6.	i)	Describe the various operations involved in thermal power plant.	(9)	CO1	BTL 3	Apply
	ii)	Describe the importance of instrumentation in power generation.	(4)	CO1	BTL 3	Apply
7.	i)	Compare and evaluate the performance characteristics of thermal and nuclear power plants based on each component.	(5)	CO1	BTL 3	Apply
	ii)	Illustrate the schematic diagram and explain the operations of Pressurized water nuclear reactor & Boiling water nuclear reactor.	(8)	CO1	BTL 3	Apply
8.		Discuss the various role of instrumentation system in thermal power plant. Also list the desirable qualities of measurement requirements.	(13)	CO1	BTL 3	Apply
9.		Draw the Piping and Instrumentation diagram of a Boiler system in a thermal power plant with the functions of each unit.	(13)	CO1	BTL 3	Apply
10.		Explain the applications of cogeneration in power plant with neat sketch.	(13)	CO1	BTL 4	Analyze
11.		What is meant by cogeneration? Also explain the topping cycle and bottoming cycle operation of cogeneration system.	(13)	CO1	BTL 4	Analyze
12.	i)	Assess the need of combine cycle power generation?	(3)	CO1	BTL 4	Analyze
	ii)	Explain any two types of combined cycle power generation unit with neat sketch and working.	(10)	CO1	BTL 4	Analyze
13.		Distinguish the different methods of power generation.	(13)	CO1	BTL 3	Apply
14.		Elaborate the Boiler Process with neat diagram.	(13)	CO1	BTL 4	Analyze

15.	Explain the importance of instrumentation in nuclear power plant and Survey of methods of power generation.	(13)	CO1	BTL 4	Analyze
16.	Discuss in detail with a schematic diagram the hydro power plant generation.	(13)	CO1	BTL 4	Analyze
17.	Explain in detail a Combined Heat and Power System. Also mention their applications	(13)	CO1	BTL 4	Analyze
<b>PART C</b>					
1.	Compare the various methods of power generation and present the summary in table from various factors.	(15)	CO1	BTL 4	Analyze
2.	Asses the utilization of boilers under various classifications in detail.	(15)	CO1	BTL 4	Analyze
3.	Compile the process used for converting thermal energy into electrical energy	(15)	CO1	BTL 4	Analyze
4.	Discuss the operation of combined cycle system including Gas turbine and steam turbine in power plant with neat sketch and also discuss the merits and demerits in combined cycle applications.	(15)	CO1	BTL 4	Analyze
5.	Draw the Piping and Instrumentation diagram of a Boiler system in a thermal power plant with the functions of each unit.	(15)	CO1	BTL 4	Analyze
<b>UNIT II MEASUREMENTS IN POWER PLANTS</b>					
Electrical measurements: current, voltage, power, frequency, power factor – non electrical parameters: flow of feed water, fuel, air, steam pressure and steam temperature – smoke density measurement – Flue gas oxygen analyzer – pollution monitoring instruments.					
<b>PART A</b>					
Q.No	Question	CO's	BT Level	Competence	
1.	Classify the types of orifice.	CO2	BTL 2	Understand	
2.	Write the two types of feed water heaters in a steam power plant.	CO2	BTL 2	Understand	
3.	List various methods of feed water flow measurement in power plant.	CO2	BTL 1	Remember	
4.	Define the suitability of float type in boiler drum level measurement.	CO2	BTL 2	Understand	
5.	Compare two element and three element drum level control.	CO2	BTL 2	Understand	
6.	Analyze the importance of drum level measurement. How is it taken care of?	CO2	BTL 2	Understand	
7.	Name any two sensors used for temperature measurement in steam turbines.	CO2	BTL 1	Remember	
8.	What is the need of correction factor in temperature measurement of Steam in High Pressure Boiler.	CO2	BTL 2	Understand	
9.	Give the two scales used for temperature measurements in power plants.	CO2	BTL 2	Understand	
10.	List the sensors for measurement of steam pressure and steam temperature.	CO2	BTL 1	Remember	

11.	What is the need of connecting thermocouples in series and parallel during temperature measurement.		CO2	BTL 2	Understand
12.	Quote the digital methods of measuring speed.		CO2	BTL 1	Remember
13.	Classify the types of turbine speed measurement.		CO2	BTL 2	Understand
14.	Name the five sensors used in measuring vibration.		CO2	BTL 1	Remember
15.	Give the need of vibration monitoring in turbine.		CO2	BTL 2	Understand
16.	Summarize the working principle of Orsat flue gas analyzer.		CO2	BTL 2	Understand
17.	Describe about flue gas and list any two flue gases.		CO2	BTL 2	Understand
18.	State the purpose of Flue gas analyser.		CO2	BTL 2	Understand
19.	Quote the objective of Fuel Analysis.		CO2	BTL 1	Remember
20.	Mention the principle of bomb calorimeter.		CO2	BTL 2	Understand
21.	What are the disadvantages of pitot tube?		CO2	BTL 2	Understand
22.	What are the different types of positive displacement meters?		CO2	BTL 2	Understand
23.	How is the power factor of an electrical circuit calculated, and why is it important?		CO2	BTL 2	Understand
24.	Name two types of instruments used to measure electrical power and explain their applications briefly.		CO2	BTL 1	Remember
<b>PART B</b>					
1.	Describe in detail about coal flow measurement methods with neat diagram. (13)		CO2	BTL 3	Apply
2.	i)	Describe a primary and secondary element each in the measurement of feed water flow. (7)	CO2	BTL 3	Apply
	ii)	Discuss the principle behind vortex flow meter. (6)	CO2	BTL 3	Apply
3.	i)	With suitable diagram, explain the principle of Electromagnetic type flow meters. (10)	CO2	BTL 4	Analyze
	ii)	Mention the advantages and limitations of Electromagnetic type flow meters. (3)	CO2	BTL 4	Analyze
4.	i)	Specify the need of drum level measurement. (3)	CO2	BTL 3	Apply
	ii)	Explain the method of measuring drum level using differential pressure method. (10)	CO2	BTL 3	Apply
5.	How do you measure the speed of the turbine and what is the control mechanisms required for maintaining the optimum speed of the turbine? (13)		CO2	BTL 3	Apply
6.	State the importance of vibration analysis in turbine. What are the various techniques used for vibration measurement? Explain anyone vibration measurement technique in detail. (13)		CO2	BTL 3	Apply
7.	i)	Explain with a neat diagram to measure the steam temperature. (7)	CO2	BTL 4	Analyze
	ii)	Explain with a neat diagram to measure the steam pressure. (6)	CO2	BTL 4	Analyze
8.	With a neat sketch illustrate the working of flue gas oxygen analyser. (13)		CO2	BTL 3	Apply
9.	Explain the method of measuring smoke, density (13)		CO2	BTL 4	Analyze

	in thermal power plant with a conceptual diagram.					
10.	i)	How do you evaluate the proximate analysis of fuel and explain it.	(8)	CO2	BTL 3	Apply
	ii)	Describe about the flow control measurements required in power plants.	(5)	CO2	BTL 3	Apply
11.	Mention the different methods of analysis of fuel and illustrate the analysis of fuel by bomb calorimeter in detail.		(13)	CO2	BTL 3	Apply
12.	Describe the need of Fuel Analysis in Thermal Power plant. Also explain the Fuel Analysis method in detail.		(13)	CO2	BTL 3	Apply
13.	List the parameters to be measured in Flue gas of Boiler.		(13)	CO2	BTL 3	Apply
14.	i)	Explain the method of measurement of speed.	(7)	CO2	BTL 3	Apply
	ii)	What are the basic impurities in feed water and how do you analyze them.	(6)	CO2	BTL 4	Analyze
15.	Explain about (a) Dissolved oxygen analyzer (b) Flue gas Oxygen analyzer		(13)	CO2	BTL 4	Analyze
16.	Discuss the temperature measurements in power plants in detail.		(13)	CO2	BTL 4	Analyze
17.	Write short notes on: a) Drum level measurement b) Temperature compensation techniques		(13)	CO2	BTL 3	Apply
<b>PART C</b>						
1.	Classify the transducers based on Low, Medium and High temperature applications. Also list the major temperature measurement points and suggest suitable sensors in Thermal power plant.		(15)	CO2	BTL 4	Analyze
2.	Classify the different methods for measuring flow. Suggest suitable instruments to measure coal flow in power plant.		(15)	CO2	BTL 4	Analyze
3.	Discuss, how to analysis fuel using ultimate and proximate analysis.		(15)	CO2	BTL 4	Analyze
4.	Why conventional float type drum level measurement is not suitable for Drum level measurement in high Pressure boiler? Also explain anyone method to measure boiler drum level in thermal power plant. U4		(15)	CO2	BTL 4	Analyze
5.	Explain the various methods of measurement of flow of coal.		(15)	CO2	BTL 4	Analyze
<b>UNIT III FURNACE CONTROL</b>						
Coal handling: Pulverizers - Furnace Draught: natural draught, forced draught, induced draught, power requirements for draught systems - Combustion control: Fuel/Air ratio, combustion efficiency, excess air, parallel and cross limited combustion control- soot-blowing operation.						
<b>PART A</b>						
<b>Q.No</b>	<b>Question</b>			<b>CO's</b>	<b>BT Level</b>	<b>Competence</b>

1.	Describe the concept of excess air.	CO3	BTL 1	Remember
2.	Point out the effect of excess air in combustion.	CO3	BTL 2	Understand
3.	Define Firing rate demand.	CO3	BTL 1	Remember
4.	Give the requirements to be considered for firing due to load change.	CO3	BTL 2	Understand
5.	Describe the role of boiler control.	CO3	BTL 2	Understand
6.	State the role of Attemperator.	CO3	BTL 2	Understand
7.	Write down the necessity for Steam temperature control.	CO3	BTL 2	Understand
8.	Quote the Steam temperature control methods.	CO3	BTL 1	Remember
9.	List the two basic types of deaerator.	CO3	BTL 1	Remember
10.	What is the term swell in boiler drum level control.	CO3	BTL 2	Understand
11.	Quote the need of deaerator control.	CO3	BTL 1	Remember
12.	Give the function of a deaerator in power plant and its importance.	CO3	BTL 2	Understand
13.	Discuss about 'swelling' and 'shrinking' in boiler drum.	CO3	BTL 2	Understand
14.	List the significance of air-fuel ratio in boiler.	CO3	BTL 1	Remember
15.	Differentiate the advantage of three element control with single element control.	CO3	BTL 2	Understand
16.	Point out the function of furnace draft and how to quantify furnace draft.	CO3	BTL 2	Understand
17.	What will happen if furnace pressure is (i) too negative and (ii) too positive?	CO3	BTL 2	Understand
18.	Examine the balanced draft in Boiler.	CO3	BTL 2	Understand
19.	Infer Soot blowing.	CO3	BTL 2	Understand
20.	Examine the role of soot blowing in thermal power plant.	CO3	BTL 2	Understand
21.	What is the primary purpose of a pulverizer in a coal-handling system?	CO3	BTL 2	Understand
22.	Differentiate between natural draught and forced draught in furnace systems.	CO3	BTL 2	Understand
23.	What is the significance of maintaining an optimal fuel/air ratio in combustion systems?	CO3	BTL 2	Understand
24.	How does soot-blowing improve the efficiency of a boiler system?	CO3	BTL 2	Understand
<b>PART B</b>				
1.	List the two basic types of deaerator. Explain any one of them. (13)	CO3	BTL 3	Apply
2.	i) Describe about how deaerator is controlled in boiler system. (6)	CO3	BTL 3	Apply
	ii) Recommend the suitable method to control boiler drum level and explain it with neat sketch. (7)	CO3	BTL 3	Apply
3.	Describe fireside and waterside control mechanisms for control steam temperature in boilers. (13)	CO3	BTL 3	Apply
4.	Organize the steps involved in the operation of a three element feed water drum level control (13)	CO3	BTL 3	Apply

	system with its schematic block diagram.			
5.	Formulate the strategy to control Steam Temperature with neat diagram. (13)	CO3	BTL 3	Apply
6.	i) What is the main function of super heater? What are advantages of super heated steam? (7)	CO3	BTL 3	Apply
	ii) Name and explain briefly the different methods used for controlling super heated steam. (6)	CO3	BTL 3	Apply
7.	List the types of drafts in furnaces and also explain about the control employed for furnace draft system. (13)	CO3	BTL 3	Apply
8.	Describe how air is delivered to the furnace at the right conditions of now and temperature using air heater and different types of fans in the draught plant. (13)	CO3	BTL 3	Apply
9.	Mention the role of combustion control. What are the parameters to be monitored during combustion control? Also explain the balanced draft method to control draft in boiler furnace. (13)	CO3	BTL 3	Apply
10.	Explain the flue gas dew point control. (13)	CO3	BTL 4	Analyze
11.	i) Classify the types of draft established in boiler system, where and how? (6)	CO3	BTL 4	Analyze
	ii) Explain the method of controlling the combustion by Oxygen trim control. (7)	CO3	BTL 4	Analyze
12.	i) With the help of neat diagram explain the operation of a three element control system. U4 (9)	CO3	BTL 3	Apply
	ii) Discuss about soot blowing. (4)	CO3	BTL 3	Apply
13.	Illustrate with a SAMA diagram, explain a simple feedback control in a process. Assume a proportional plus integral control function. (13)	CO3	BTL 3	Apply
14.	Explain the working principle of coal pulverizers used in power plants. Discuss the types of pulverizers used in coal handling systems. (13)	CO3	BTL 3	Apply
15.	Explain the factors affecting the power requirements of draught systems in boilers and suggest ways to optimize energy usage in these systems. (13)	CO3	BTL 3	Apply
16.	Derive the expression for the power requirements of draught systems in boilers. (13)	CO3	BTL 4	Analyze
17.	Explain the types of soot blowers used in thermal power plants. (13)	CO3	BTL 3	Apply
<b>PART C</b>				
1.	Differentiate induced and forced draft. How are they measured and controlled? Discuss in detail with neat sketches. (15)	CO3	BTL 4	Analyze
2.	Adapt any two suitable types of steam temperature controller to control the temperature (15)	CO3	BTL 4	Analyze

	of superheated steam produced in a boiler to pass through the high pressure turbine and demonstrate its operation with necessary sketches. U4			
3.	What is meant by the term oxygen trim control in boiler operation? How is it performed? Also explain the method of controlling the combustion by oxygen trim control. (15)	CO3	BTL 4	Analyze
4.	Discuss, why should measure and control drum level? Specify the different method of controlling feed water in boiler and explain the why three element control method suitable over two element control method. (15)	CO3	BTL 4	Analyze
5.	Discuss the combined operation of forced draught and induced draught systems, including the advantages and challenges associated with balancing these systems. (15)	CO3	BTL 4	Analyze

#### UNIT IV BOILER CONTROL

Boiler metal temperature measurement, pressure measuring devices – Boiler feed water processing and control - drum level measurement methods - steam temperature control: main steam and reheat steam temperature control, superheater control, deaerator control – distributed control system in power plants – interlocks in boiler operation.

#### PART A

Q.No	Question	CO's	BT Level	Competence
1.	Point out the functions performed by all burners.	CO4	BTL 2	Understand
2.	List the non-control problems when burning waste fuels.	CO4	BTL 1	Remember
3.	Compare liquid and solid fuel fired boilers	CO4	BTL 2	Understand
4.	Classify atomizing for different burners.	CO4	BTL 2	Understand
5.	Why atomization is required while burning of oil fuel?	CO4	BTL 1	Remember
6.	Summarize the coal burning problems that affect boiler.	CO4	BTL 2	Understand
7.	Recommend the purpose of furnace safety interlocks in a boiler.	CO4	BTL 2	Understand
8.	Mention the objective of combustion control.	CO4	BTL 1	Remember
9.	List the types of combustion control for liquid and gaseous fuel boilers.	CO4	BTL 1	Remember
10.	Classify the basic elements for unit pulverizer system.	CO4	BTL 2	Understand
11.	Interpret the burning of coal by using fluidized bed.	CO4	BTL 2	Understand
12.	What is the use of pulveriser?	CO4	BTL 1	Remember
13.	Distinguish single-point positioning control and parallel positioning control.	CO4	BTL 2	Understand
14.	Classify the coal feeders of volumetric coal feeders.	CO4	BTL 2	Understand
15.	Inspect the significance of coal pulverizer control in boilers used in thermal power plants.	CO4	BTL 2	Understand
16.	Compare gravimetric and volume tricoal feeders for excess air effect.	CO4	BTL 2	Understand
17.	List the factors affecting combustion efficiency of boiler.	CO4	BTL 1	Remember

18.	Point out the predominant factor in setting of automatic controllers for optimum efficiency.	CO4	BTL 2	Understand
19.	Give the advantages of cyclone furnace.	CO4	BTL 2	Understand
20.	Predict where we are in need of air fuel ratio control?	CO4	BTL 2	Understand
21.	Why is maintaining the correct drum water level critical for safe boiler operation?	CO4	BTL 2	Understand
22.	What are the consequences of poor deaerator performance in a power plant?	CO4	BTL 2	Understand
23.	Give an example of a critical interlock used in boiler systems.	CO4	BTL 2	Understand
24.	What is the primary function of a distributed control system in power plant operations?	CO4	BTL 2	Understand
<b>PART B</b>				
1.	Describe in detail about the different modes of burning of coal in a boiler. (13)	CO4	BTL 3	Apply
2.	i) Explain in detail about burners for liquid fuels. (7)	CO4	BTL 4	Analyze
	ii) Describe about burners for solid fuels. (6)	CO4	BTL 3	Apply
3.	i) Explain air-fuel ratio control with neat sketch. (8)	CO4	BTL 4	Analyze
	ii) Explain in detail about safety interlocks in furnaces. (5)	CO4	BTL 4	Analyze
4.	Explain in detail about burners for gaseous fuel. (13)	CO4	BTL 3	Apply
5.	Describe with a schematic diagram the furnace safety interlocks. (13)	CO4	BTL 3	Apply
6.	Discuss boiler purge logic in brief with logic diagram. (13)	CO4	BTL 3	Apply
7.	i) Design combustion control scheme for liquid fuel fired boiler. (7)	CO4	BTL 4	Analyze
	ii) Design combustion control scheme for solid fuel fired boiler. (6)	CO4	BTL 4	Analyze
8.	i) Draw and explain about coal pulveriser in detail. (6)	CO4	BTL 4	Analyze
	ii) Describe coal pulveriser control with neat diagram. (7)	CO4	BTL 3	Apply
9.	Classify various combustion control of gaseous fuel and differentiate single point positioning and parallel positioning control of combustion control. Explain any one method of combustion control. (13)	CO4	BTL 3	Apply
10.	Summarize about the various combustion control system adapted in Power plant. Explain the principle and operation of "Cross-limited" combustion control system with necessary diagram. (13)	CO4	BTL 3	Apply
11.	Explain about circulating bed fluidized bed boiler with a neat diagram. (13)	CO4	BTL 4	Analyze
12.	Discuss about fluidized bed boiler with neat diagram. (13)	CO4	BTL 3	Apply

13.	i) Evaluate the function of Gravimetric coal feeders. (7)	CO4	BTL 4	Analyze
	ii) Illustrate with neat sketch on Volumetric coal feeders. (6)	CO4	BTL 3	Apply
14.	Describe in detail with a neat diagram about cyclone furnace. (13)	CO4	BTL 3	Apply
15.	Describe the working principles, construction, and applications of different types of pressure measuring devices used in boilers. (13)	CO4	BTL 3	Apply
16.	Explain the purpose and types of interlocks in boiler operation. Discuss critical interlocks, their role in ensuring safety. (13)	CO4	BTL 3	Apply
17.	Discuss the architecture and functioning of a Distributed Control System (DCS) in power plants. (13)	CO4	BTL 3	Apply

#### PART C

1.	Explain the importance of Air/Fuel ratio control in a boiler and the methods of controlling the Air/Fuel with necessary diagram. (15)	CO4	BTL 5	Analyze
2.	State the need for interlocks in boiler operation. Also, mention the various process/operation connected with interlocks in steam power plant for safety. (15)	CO4	BTL 4	Create
3.	Predict what are the parameters to be measured for trimming of combustion control and explain how to controlling it. (15)	CO4	BTL 6	Evaluate
4.	Suggest suitable combustion control method for solid, liquid and gaseous fuel and explain it. (15)	CO4	BTL 5	Analyze
5.	Describe the principles and methods of superheater steam temperature control. (15)	CO4	BTL 5	Analyze

#### UNIT V TURBINE CONTROL

Speed measurement, rotor and casing movement- vibration - shell temperature monitoring and control - steam pressure control - lubricant oil temperature - cooling system..

#### PART A

Q.No	Question	CO's	BT Level	Competence
1.	What is steam turbine?	CO5	BTL 1	Remember
2.	Classify steam turbines.	CO5	BTL 2	Understand
3.	Compare impulse turbine with reaction turbine.	CO5	BTL 2	Understand
4.	Explain velocity compounding in impulse turbine.	CO5	BTL 2	Understand
5.	List the advantages and disadvantages of velocity compounded impulse turbine.	CO5	BTL 1	Remember
6.	Compare throttle and nozzle control governing.	CO5	BTL 2	Understand
7.	Give the methods available for turbine governing system.	CO5	BTL 2	Understand
8.	Give the parameters to be measured and controlled in a turbine.	CO5	BTL 2	Understand
9.	Interpret the free governor mode operation in turbine.	CO5	BTL 2	Understand
10.	List the basic role of automatic load frequency control.	CO5	BTL 1	Remember

11.	Analyze the control objective of turbine run-up system.	CO5	BTL 2	Understand
12.	Examine the forms of cooling apparatus employed in power plants.	CO5	BTL 2	Understand
13.	Develop oil pressure drop relay in turbine.	CO5	BTL 2	Understand
14.	Define speed ratio in turbine.	CO5	BTL 1	Remember
15.	Design automatic load frequency control.	CO5	BTL 2	Understand
16.	Give the control scheme for turbine speed control.	CO5	BTL 2	Understand
17.	List the losses in steam turbine.	CO5	BTL 1	Remember
18.	Give the control scheme for turbine load control.	CO5	BTL 2	Understand
19.	Point out the significance of oil cooling system.	CO5	BTL 2	Understand
20.	List the types of cooling tower.	CO5	BTL 1	Remember
21.	What is the principle behind tachometers used for speed measurement in turbines?	CO5	BTL 2	Understand
22.	How does excessive vibration affect the performance of a turbine?	CO5	BTL 2	Understand
23.	What is the purpose of the cooling system in turbines?	CO5	BTL 2	Understand
24.	Why is monitoring casing expansion important in turbine operation?	CO5	BTL 2	Understand
<b>PART B</b>				
1.	Discuss the various control schemes for speed and load control in turbine. (13)	CO5	BTL 3	Apply
2.	Describe in detail about free governor mode operation. (13)	CO5	BTL 3	Apply
3.	Describe briefly oil cooling system in turbine. (13)	CO5	BTL 3	Apply
4.	i) Discuss in detail about the procedure employed for automatic load frequency control with neat diagram. (8)	CO5	BTL 3	Apply
	ii) Explain about oil pressure drop relay. (5)	CO5	BTL 4	Analyze
5.	Describe briefly various methods of steam turbine governing. (13)	CO5	BTL 3	Apply
6.	Write in detail the lubrication oil temperature control with a neat diagram. (13)	CO5	BTL 3	Apply
7.	i) Discuss in detail about the turbine governing system. (8)	CO5	BTL 3	Apply
	ii) Explain the control system employed for oil coolers in turbine. (5)	CO5	BTL 4	Analyze
8.	i) Illustrate with neat block diagram explain Impulse turbine. (6)	CO5	BTL 3	Apply
	ii) Illustrate with neat block diagram explain Reaction turbine. (7)	CO5	BTL 3	Apply
9.	Classify various methods of compounding steam turbine. (13)	CO5	BTL 3	Apply
10.	i) Explain about Automatic Load Frequency Control (ALFC) basic generator control loops. (7)	CO5	BTL 4	Analyze
	ii) Explain about Automatic Voltage Regulator (AVR) basic generator control loops. (6)	CO5	BTL 4	Analyze
11.	With neat block diagram explain turbine run up (13)	CO5	BTL 3	Apply

	system.			
12.	List the components in lubrication system and explain any two. (13)	CO5	BTL 3	Apply
13.	Discuss about oil coolers in turbine with neat sketch. (13)	CO5	BTL 3	Apply
14.	Explain with the control diagram the boiler-turbine coordinated firing rate control. (13)	CO5	BTL 4	Analyze
15.	Explain the causes of vibration in rotating machinery and turbines. (13)	CO5	BTL 3	Apply
16.	Describe the importance of shell temperature monitoring in turbines and boilers. (13)	CO5	BTL 3	Apply
17.	Discuss the design of lubrication systems, the role of cooling systems in temperature control. (13)	CO5	BTL 3	Apply
<b>PART C</b>				
1.	i) Distinguish the operation of impulse type and reaction type turbine with neat sketches. (7)	CO5	BTL 4	Analyze
	ii) Examine how to achieve automatic load frequency control in steam turbine. (8)	CO5	BTL 4	Analyze
2.	Discuss about the various governors used for controlling steam input to the turbine for speed control. (15)	CO5	BTL 4	Analyze
3.	Elaborate the control methodology for the control of pressure/flow, temperature and tank level in a lube oil system. (15)	CO5	BTL 4	Analyze
4.	Explain the different cooling methods for an electric generator. Why hydrogen cooling is preferred over others for large generators? (15)	CO5	BTL 4	Analyze
5.	Discuss advancements in cooling technologies for turbines and Highlight their advantages, limitations, and applications in modern power plants. (15)	CO5	BTL 4	Analyze