



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad-500043

ELECTRICAL AND ELECTRONICS ENGINEERING

TUTORIAL QUESTION BANK

Course Title	ELECTRICAL POWER GENERATION SYSTEMS				
Course Code	AEEB14				
Programme	B.Tech				
Semester	IV				
Course Type	Core				
Regulation	IARE - R18				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	3	1	4	-	-
Chief Coordinator	Dr.V.Chandra Jagan Mohan, Associate Professor, EEE				
Course Faculty	Dr.V.Chandra Jagan Mohan, Associate Professor, EEE Ms. T. Saritha Kumari, Assistant Professor, EEE				

COURSE OBJECTIVES:

The course should enable the students to:	
I	Demonstrate various conventional power generation systems including major subsystems.
II	Understand hydroelectric power generation systems along with pumped storage plants and hydraulic turbines.
III	Apply knowledge of solar and wind power generation systems in design and implementation to obtain clean energy.
IV	Illustrate the economic aspects of power generation and power tariff methods.

COURSE OUTCOMES (COs):

CO 1	Discuss the principles and operation of thermal and nuclear power plants.
CO 2	Demonstration of working of hydro power plant and its importance in the power system.
CO 3	Describe the principle, operation of photovoltaic effect and layout of solar power plant.
CO 4	Discuss the construction and working principle of wind energy systems.
CO 5	Explain about economic aspects of power generation.

COURSE LEARNING OUTCOMES (CLOs):

AEEB14.01	Demonstrate the layout and working principle of thermal power plant.
AEEB14.02	Analyze the principle and operation of different energy conversion systems.
AEEB14.03	Discuss the principles and operations of nuclear power plant.
AEEB14.04	Discuss about different types of turbines.
AEEB14.05	Explain about various hydro power plants.
AEEB14.06	Explain the working of hydro power plant and its importance in the power system.
AEEB14.07	Discuss the principles and operations of photovoltaic effect.
AEEB14.08	Describe the layout and working of solar power plant in electrical systems.
AEEB14.09	Build the flow chart of maximum power point tracking system.
AEEB14.10	Demonstrate the importance of wind energy system and types of turbines.
AEEB14.11	Demonstrate the construction and working principle of wind energy systems.
AEEB14.12	Discuss the principle and operation of induction generator in wind energy system.
AEEB14.13	Discuss about different loads and their importance.
AEEB14.14	Explain about different factors which are affecting cost of generation.
AEEB14.15	Demonstrate different tariffs in power systems.

TUTORIAL QUESTION BANK

MODULE- I				
CONVENTIONAL POWER GENERATION SYSTEMS				
Part – A (Short Answer Questions)				
S No	QUESTIONS	Blooms Taxonomy Level	Course Outcomes	Course Learning Outcomes (CLOs)
1	Why pulverized fuel is preferred?	Understand	CO 1	AEEB14.01
2	What are advantages and disadvantage of a thermal power plant?	Understand	CO 1	AEEB14.01
3	Compare the performance of different types of boilers used in Thermal station?	Understand	CO 1	AEEB14.01
4	What are the functions of Economizer Super Heater?	Understand	CO 1	AEEB14.01
5	What is the impact of thermal power plant on environment? System?	Remember	CO 1	AEEB14.01
6	What is the function of Super Heater in thermal plant?	Understand	CO 1	AEEB14.02
7	What are the applications of thermal power plant?	Understand	CO 1	AEEB14.02
8	What are the different types steam turbines used in thermal power plant?	Understand	CO 1	AEEB14.02
9	Compare a nuclear power plant with thermal power plant?	Understand	CO 1	AEEB14.02
10	What are the important thermal power plants in India?	Understand	CO 1	AEEB14.02
11	What are the different merits and demerits of nuclear power plant?	Understand	CO 1	AEEB14.03
12	Compare a nuclear power plant with thermal power plant?	Remember	CO 1	AEEB14.03
13	Discuss about nuclear fission process?	Understand	CO 1	AEEB14.03
14	What is the impact of nuclear power plant on environment?	Remember	CO 1	AEEB14.03
15	What are the applications of nuclear power plant?	Understand	CO 1	AEEB14.03
16	What is the function of Moderator in nuclear plant?	Understand	CO 1	AEEB14.03
17	What is the function of control rods in nuclear plant?	Understand	CO 1	AEEB14.03
18	What are the advantages of a nuclear power plant?	Understand	CO 1	AEEB14.03
19	What are the important nuclear power plants In India?	Understand	CO 1	AEEB14.03
20	What is the importance of nuclear power plants in India?	Understand	CO 1	AEEB14.03

Part - B (Long Answer Questions)				
1	Explain the function of the following in thermal power plant and explain the principle of operation of each: i. Boiler ii. Turbine iii. Condenser iv. Alternator v. Economizer vi. Electrostatic precipitator vii. Super-heater viii. Cooling tower.	Understand	CO 1	AEEB14.01
2	Draw a general layout of a modern thermal power plant and explain working of different circuits?	Understand	CO 1	AEEB14.01
3	Discuss and compare the performance of different types of boilers used in thermal power plants?	Understand	CO 1	AEEB14.01
4	What are the different merits and demerits of thermal power plant?	Understand	CO 1	AEEB14.02
5	a) Discuss and compare the performance of different types of boilers used in thermal power plants in modern power system? b) Write the important considerations in the site selection of thermal power plant in modern power system?	Understand	CO 1	AEEB14.02
6	Write the important considerations in the site selection of thermal power plant in modern power system?	Understand	CO 1	AEEB14.02
7	Write the advantages, disadvantages of thermal power plant and give some important thermal power plants in India?	Understand	CO 1	AEEB14.02
8	Give the comparison of steam power plant and nuclear power plant on the basis of different factors?	Understand	CO 1	AEEB14.02
9	Explain important functioning of Economizer, Air Pre-heater and super -heater in thermal power plant.	Understand	CO 1	AEEB14.02
10	Draw a general layout of a modern thermal power plant and explain the working of different parts in the thermal power plant?	Understand	CO 1	AEEB14.02
11	Explain the important components used in nuclear power plant with neat diagram?	Understand	CO 1	AEEB14.03
12	Explain the operation of nuclear power plant with neat diagram?	Understand	CO 1	AEEB14.03
13	Explain importance of moderator, control rod and heat exchanger in nuclear power plant?	Understand	CO 1	AEEB14.03
14	What are the advantages and disadvantages of nuclear power plant?	Understand	CO 1	AEEB14.03
15	Write the important differences between renewable and non renewable source?	Remember	CO 1	AEEB14.03
16	Give the classification of nuclear reactors and explain about BWR, PWR and FBR with a neat sketch.	Understand	CO 1	AEEB14.03
17	Explain importance of moderator, control rod and Heat exchanger in nuclear power plant?	Understand	CO 1	AEEB14.03
18	Write the important difficulties between renewable and non renewable source?	Understand	CO 1	AEEB14.03
19	a) What are the different merits and demerits of nuclear power plant with respect to hydro electric power plant? b) Enumerate & explain essential components of a nuclear reactor which are used in the nuclear power station?	Understand	CO 1	AEEB14.03
20	Explain below in nuclear power plant i) Control rod iii) Moderator ii) Heat exchanger iv) Cooling systems in nuclear plant.	Understand	CO 1	AEEB14.03

MODULE-II

HYDROELECTRIC POWER STATIONS

Part – A (Short Answer Questions)

1	What is the importance of Hydro electric power plant?	Understand	CO 2	AEEB14.04
2	What are the advantages of Hydro electric power plant?	Understand	CO 2	AEEB14.04
3	What are the disadvantages of Hydro electric power plant?	Understand	CO 2	AEEB14.04
4	Explain various components used in Hydro electric power plant?	Understand	CO 2	AEEB14.04
5	Explain about importance of Penstock?	Understand	CO 2	AEEB14.05
6	Explain the functioning of Penstock?	Understand	CO 2	AEEB14.05
7	Explain about importance of Surge tank?	Understand	CO 2	AEEB14.05
8	What are the different turbines used in Hydro electric power plant?	Understand	CO 2	AEEB14.06
9	Explain about importance of Impulse turbine	Understand	CO 2	AEEB14.06
10	Explain about importance of Reaction turbine?	Understand	CO 2	AEEB14.06

Part - B (Long Answer Questions)

1	With a neat diagram explain working operation of Hydro electric power plant?	Remember	CO 2	AEEB14.04
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2	(a) Write the advantages and disadvantages of Hydro electric power plant? (b) Write the factors to be considered for selection of site for hydropower plant? (c) Derive water power equation.	Understand	CO 2	AEEB14.04
3	Explain the Schematic arrangement of Hydro electric power station?	Understand	CO 2	AEEB14.04
4	Explain the various turbines used in Hydro electric power station?	Understand	CO 2	AEEB14.04
5	Explain surge tank and penstock in Hydro electric power station?	Remember	CO 2	AEEB14.05
6	Explain the Choice of site for Hydro electric power station?	Understand	CO 2	AEEB14.05
7	Explain the Impulse turbine and Reaction turbines used in Hydro electric power station?	Understand	CO 2	AEEB14.05
8	Explain about Constituents of Hydro electric power plant?	Understand	CO 2	AEEB14.06
9	Compare Hydro electric power station with thermal power plant?	Understand	CO 2	AEEB14.06
10	Compare merits and de-merits of Hydro electric power station with thermal power plant?	Understand	CO 2	AEEB14.06

MODULE -III

SOLAR ENERGY

Part - A (Short Answer Questions)

1	Define solar altitude angle?	Understand	CO 3	AEEB14.07
2	What is the drawback in solar energy conversion?	Remember	CO 3	AEEB14.07
3	Explain different types of solar cells?	Understand	CO 3	AEEB14.07
4	What are the advantages and limitations of renewable energy sources?	Understand	CO 3	AEEB14.07
5	Explain briefly the different types of solar energy measuring instruments?	Understand	CO 3	AEEB14.08
6	What is the importance of maximum power point tracking (MPPT) in solar system?	Remember	CO 3	AEEB14.08
7	Distinguish between diffuse radiation and beam radiation?	Understand	CO 3	AEEB14.08

8	What are conventional sources of energy?	Understand	CO 3	AEEB14.08
9	Explain the importance of solar energy in the present day energy crisis?	Understand	CO 3	AEEB14.09
10	Explain Photovoltaic effect?	Understand	CO 3	AEEB14.09
11	Explain briefly the different types of solar energy measuring instruments?	Remember	CO 3	AEEB14.09
12	Explain briefly the different types of solar energy measuring instruments?	Remember	CO 3	AEEB14.09

Part - B (Long Answer Questions)

1	Explain instruments for measuring solar radiation and explain important applications of solar system?	Understand	CO 3	AEEB14.07
2	Write the important differences between renewable and non renewable source.	Understand	CO 3	AEEB14.07
3	Explain and derive expression for beam and diffuse radiation?	Remember	CO 3	AEEB14.07
4	Explain the working of a Pyranometer?	Understand	CO 3	AEEB14.07
5	Explain solar grid?	Understand	CO 3	AEEB14.08
6	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Understand	CO 3	AEEB14.08
7	Explain why it is necessary to develop non-conventional method of generating Electrical energy?	Understand	CO 3	AEEB14.08

8	Write the important advantages of renewable and non renewable source.	Understand	CO 3	AEEB14.08
9	Write a short note on Photovoltaic effect, semiconducting materials, band gap theory, and photo emission of electrons in solar system?	Understand	CO 3	AEEB14.09
10	Discuss the construction and working of Liquid flat plate collector with a neat sketch. Explain the various parameters that affect the performance of collector?	Understand	CO 3	AEEB14.09
11	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Understand	CO 3	AEEB14.09
12	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Understand	CO 3	AEEB14.09

MODULE -IV

WIND ENERGY

Part - A (Short Answer Questions)

1	Mention two important wind turbine generator installations in India?	Understand	CO 4	AEEB14.10
2	What is the type of generator used in wind power plant?			AEEB14.10
3	How the wind mills are classified?	Remember	CO 4	AEEB14.10
4	What are the disadvantages of wind power?	Remember	CO 4	AEEB14.11

5	What is meant by pitch angle?	Understand	CO 4	AEEB14.11
6	Explain vertical wind mills with neat sketch?	Understand	CO 4	AEEB14.11
7	Constant speed constant frequency WTG unit?	Understand	CO 4	AEEB14.11
8	Explain the mechanism of production of local winds?	Understand	CO 4	AEEB14.11
9	Explain about Induction Generator?	Understand	CO 4	AEEB14.12
10	What are the advantages of wind power?	Understand	CO 4	AEEB14.12
Part – B (Long Answer Questions)				
1	Write and explain wind power equation?	Understand	CO 4	AEEB14.10
2	Explain principle operation of an induction generator which is used in wind plant?	Understand	CO 4	AEEB14.10
3	a) Describe the electrical layout of a typical wind farm by means of single line diagram. State the essential equipment? b) Discuss about power coefficients of windmills and environmental aspects of wind generating station?	Understand	CO 4	AEEB14.10
4	What is meant by pitch control and Yaw control in Wind energy plant?	Remember	CO 4	AEEB14.11
5	Explain permanent magnet generator and an induction generator?	Understand	CO 4	AEEB14.11
6	Explain different types of generating systems for wind energy.	Understand	CO 4	AEEB14.11
7	Explain how the variations of wind velocity and its directions are taken care in Wind energy systems?	Understand	CO 4	AEEB14.11
8	Explain various components used in Wind energy system also write the important Wind energy systems in India?	Understand	CO 4	AEEB14.11
9	State and briefly explain the factors that are determine the output power form wind energy system?	Understand	CO 4	AEEB14.12
10	Explain the betz criterion and also write the main applications of wind energy?	Understand	CO 4	AEEB14.12
MODULE - V				
ECONOMIC ASPECTS OF POWER GENERATION				
Part - A (Short Answer Questions)				
1	What is load curve?	Understand	CO 5	AEEB14.13
2	What is daily load curve?	Understand	CO 5	AEEB14.13
3	What is monthly load curve?	Remember	CO 5	AEEB14.13
4	What is yearly load curve?	Remember	CO 5	AEEB14.13
5	What is connected load?	Understand	CO 5	AEEB14.14
6	What is Maximum demand?	Understand	CO 5	AEEB14.14
7	What is Demand factor?	Understand	CO 5	AEEB14.14
8	What is Average demand?	Remember	CO 5	AEEB14.15
9	What is Load factor?	Remember	CO 5	AEEB14.15
10	What is Diversity factor?	Understand	CO 5	AEEB14.15
Part - B (Long Answer Questions)				
1	Which occurs almost the whole day on the power plant and explain about it in detail?	Remember	CO 5	AEEB14.13
2	Briefly discuss the importance of load factor?	Understand	CO 5	AEEB14.13
3	Explain in detail about the advantage of Sectionalizing of power plant?	Remember	CO 5	AEEB14.13
4	Give detailed comparison of initial costs of different power plants?	Remember	CO 5	AEEB14.13
5	Explain in detail about base load and peak load	Understand	CO 5	AEEB14.14
6	Discuss about diversity factor and deviation factor.	Understand	CO 5	AEEB14.14
7	Explain in detail about plant use factor.	Understand	CO 5	AEEB14.14
8	Whit neat sketch explain about different load curves.	Understand	CO 5	AEEB14.14
9	What are the different factors affecting cost of generation explain?	Understand	CO 5	AEEB14.14
10	Briefly explain about economic aspects of power generation.	Understand	CO 5	AEEB14.14