



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

Department of Electrical and Electronics Engineering

TUTORIAL QUESTION BANK

Course Name	:	POWER GENERATION SYSTEMS
Course Code	:	AEE003
Class	:	B.Tech III Semester
Branch	:	Electrical and Electronics Engineering
Year	:	2018 – 2019
Course Coordinator	:	Mr. Mahesh Thati, Assistant Professor, EEE
Course Faculty	:	Mr. Mahesh Thati, Assistant Professor, EEE

COURSE OBJECTIVES:

The course should enable the students to:

I	Demonstrate principle of operation and various parts of thermal power generation system
II	Illustrate hydroelectric power generation systems along with pumped storage plants
III	Understand the basic working principle of nuclear power generation systems.
IV	Apply concept of solar and wind power generation systems in design and implementation for clean energy.

COURSE LEARNING OUTCOMES:

Students, who complete the course, will have demonstrated the ability to do the following:

CAEE003.01	Demonstrate the layout and working principle of thermal power plant.
CAEE003.02	Analyze the principle and operation of different energy conversion systems.
CAEE003.03	Classify the various types of renewable energy sources.
CAEE003.04	Compare the various hybrid energy systems in electrical system.
CAEE003.05	Use the renewable energy sources to meet the constraints in electrical and electronics engineering field.
CAEE003.06	Explain the working of hydro power plant and its importance in the power system
CAEE003.07	Discuss the principles and operations of photovoltaic effect.
CAEE003.08	Describe the layout and working of solar power plant in electrical systems.
CAEE003.09	Build the flow chart of maximum power point tracking system.
CAEE003.10	Illustrate the principle of various types of solar concentrators.

CAEE003.11	Demonstrate the construction and working principle of wind energy systems.
CAEE003.12	Discuss the principle and operation of induction generator in wind energy system.
CAEE003.13	Demonstrate the importance of wind energy system and types of turbines.
CAEE003.14	Generalize the construction and working of nuclear power plant in power systems.
CAEE003.15	Illustrate the effect of nonrenewable energy sources on the environment.
CAEE003.16	Apply the concepts of renewable energy sources to solve real-world applications.
CAEE003.17	Possess the knowledge and skills for employability and to succeed national and international level competitive examination.

S. No	QUESTION	Bloom's Taxonomy Level	Course Learning Outcomes
UNIT - I THERMAL POWER STATIONS			
PART – A (SHORT ANSWER QUESTIONS)			
1	Why pulverized fuel is preferred?	Understand	CAEE003.01
2	What are advantages and disadvantage of a thermal power plant?	Understand	CAEE003.01
3	Compare the performance of different types of boilers used in Thermal station?	Understand	CAEE003.01
4	What are the functions of Economizer Super Heater?	Understand	CAEE003.01
5	What is the impact of thermal power plant on environment? System?	Remember	CAEE003.15
6	What is the function of Super Heater in thermal plant?	Understand	CAEE003.01
7	What are the applications of thermal power plant?	Understand	CAEE003.01
8	What are the different types steam turbines used in thermal power plant?	Understand	CAEE003.01
9	Compare a nuclear power plant with thermal power plant?	Understand	CAEE003.04
10	What are the important thermal power plants in India?	Understand	CAEE003.01
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	CAEE003.01
2	Draw a general layout of a modern thermal power plant and explain working of different circuits?	Understand	CAEE003.01
3	Discuss and compare the performance of different types of boilers used in thermal power plants?	Understand	CAEE003.01
4	What are the different merits and demerits of thermal power plant?	Understand	CAEE003.01
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	CAEE003.01

6	Write the important considerations in the site selection of thermal power plant in modern power system?	Understand	CAEE003.01
7	Write the advantages, disadvantages of thermal power plant and give some important thermal power plants in India?	Understand	CAEE003.04
8	Give the comparison of steam power plant and nuclear power plant on the basis of different factors?	Understand	CAEE003.04
9	Explain important functioning of Economizer, Air Pre-heater and super - heater in thermal power plant.	Understand	CAEE003.01
10	Draw a general layout of a modern thermal power plant and explain the working of different parts in the thermal power plant?	Understand	CAEE003.01

**UNIT – II
HYDROELECTRIC POWER STATIONS**

PART – A (SHORT ANSWER QUESTIONS)

1	What is the importance of Hydro electric power plant?	Understand	CAEE003.05
2	What are the advantages of Hydro electric power plant?	Understand	CAEE003.06
3	What are the disadvantages of Hydro electric power plant?	Understand	CAEE003.06
4	Explain various components used in Hydro electric power plant?	Understand	CAEE003.06
5	Explain about importance of Penstock?	Understand	CAEE003.06
6	Explain the functioning of Penstock?	Understand	CAEE003.06
7	Explain about importance of Surge tank?	Understand	CAEE003.06
8	What are the different turbines used in Hydro electric power plant?	Understand	CAEE003.06
9	Explain about importance of Impulse turbine	Understand	CAEE003.06
10	Explain about importance of Reaction turbine?	Understand	CAEE003.06

PART – B (LONG ANSWER QUESTIONS)

1	With a neat diagram explain working operation of Hydro electric power plant?	Understand	CAEE003.06
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	CAEE003.02
3	Explain the Schematic arrangement of Hydro electric power station?	Understand	CAEE003.06
4	Explain the various turbines used in Hydro electric power station?	Understand	CAEE003.06
5	Explain surge tank and penstock in Hydro electric power station?	Understand	CAEE003.06
6	Explain the Choice of site for Hydro electric power station?	Understand	CAEE003.06
7	Explain the Impulse turbine and Reaction turbines used in Hydro electric power station?	Understand	CAEE003.06
8	Explain about Constituents of Hydro electric power plant?	Understand	CAEE003.06
9	Compare Hydro electric power station with thermal power plant?	Understand	CAEE003.04
10	Compare merits and de-merits of Hydro electric power station with thermal power plant?	Understand	CAEE003.04

UNIT – III
SOLAR ENERGY AND PHOTOVOLTAIC SYSTEMS

PART – A (SHORT ANSWER QUESTIONS)

1	Define solar altitude angle?	Understand	CAEE003.08
2	What is the drawback in solar energy conversion?	Remember	CAEE003.03
3	Explain different types of solar cells?	Understand	CAEE003.07
4	What are the advantages and limitations of renewable energy sources?	Understand	CAEE003.16
5	Explain briefly the different types of solar energy measuring instruments?	Understand	CAEE003.08
6	What is the importance of maximum power point tracking (MPPT) in solar system?	Remember	CAEE003.09
7	Distinguish between diffuse radiation and beam radiation?	Understand	CAEE003.08

8	What are conventional sources of energy?	Understand	CAEE003.02
9	Explain the importance of solar energy in the present day energy crisis?	Understand	CAEE003.05
10	Explain Photovoltaic effect?	Understand	CAEE003.07
11	Explain briefly the different types of solar energy measuring instruments?	Understand	CAEE003.08
12	Explain briefly the different types of solar energy measuring instruments?	Understand	CAEE003.08

PART – B (LONG ANSWER QUESTIONS)

1	Explain instruments for measuring solar radiation and explain important applications of solar system?	Understand	CAEE003.08
2	Write the important differences between renewable and non renewable source.	Understand	CAEE003.04
3	Explain and derive expression for beam and diffuse radiation?	Understand	CAEE003.08
4	Explain the working of a Pyranometer?	Understand	CAEE003.08
5	Explain solar grid?	Understand	CAEE003.08
6	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Remember	CAEE003.09
7	Explain why it is necessary to develop non-conventional method of generating Electrical energy?	Understand	CAEE003.05

8	Write the important advantages of renewable and non renewable source.	Understand	CAEE003.05
9	Write a short note on Photovoltaic effect, semiconducting materials, band gap theory, and photo emission of electrons in solar system?	Understand	CAEE003.07
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	CAEE003.10
11	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Remember	CAEE003.09

12	Explain about Maximum power point techniques used in Solar System how this technique improves s system efficiency?	Remember	CAEE003.09
UNIT – IV WIND ENERGY			
PART – A (SHORT ANSWER QUESTIONS)			
1	Mention two important wind turbine generator installations in India?	Understand	CAEE003.13
2	What is the type of generator used in wind power plant?	Understand	CAEE003.12
3	How the wind mills are classified?	Understand	CAEE003.11
4	What are the disadvantages of wind power?	Understand	CAEE003.11
5	What is meant by pitch angle?	Understand	CAEE003.13
6	Explain vertical wind mills with neat sketch?	Understand	CAEE003.11
7	Constant speed constant frequency WTG unit?	Understand	CAEE003.11
8	Explain the mechanism of production of local winds?	Understand	CAEE003.11
9	Explain about Induction Generator?	Understand	CAEE003.12
10	What are the advantages of wind power?	Understand	CAEE003.11
PART – B (LONG ANSWER QUESTIONS)			
1	Write and explain wind power equation?	Understand	CAEE003.11
2	Explain principle operation of an induction generator which is used in wind plant?	Understand	CAEE003.12
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	CAEE003.11
4	What is meant by pitch control and Yaw control in Wind energy plant?	Understand	CAEE003.13
5	Explain permanent magnet generator and an induction generator?	Understand	CAEE003.12
6	Explain different types of generating systems for wind energy.	Understand	CAEE003.12
7	Explain how the variations of wind velocity and its directions are taken care in Wind energy systems?	Understand	CAEE003.11
8	Explain various components used in Wind energy system also write the important Wind energy systems in India?	Understand	CAEE003.11
9	State and briefly explain the factors that are determine the output power form wind energy system?	Understand	CAEE003.11
10	Explain the betz criterion and also write the main applications of wind energy?	Understand	CAEE003.11
UNIT – V NUCLEAR POWER STATIONS			
PART – A (SHORT ANSWER QUESTIONS)			
1	What are the different merits and demerits of nuclear power plant?	Understand	CAEE003.14
2	Compare a nuclear power plant with thermal power plant?	Remember	CAEE003.03
3	Discuss about nuclear fission process?	Understand	CAEE003.14

4	What is the impact of nuclear power plant on environment?	Remember	CAEE003.15
5	What are the applications of nuclear power plant?	Understand	CAEE003.14
6	What is the function of Moderator in nuclear plant?	Understand	CAEE003.14
7	What is the function of control rods in nuclear plant?	Understand	CAEE003.14
8	What are the advantages of a nuclear power plant?	Understand	CAEE003.14
9	What are the important nuclear power plants In India?	Understand	CAEE003.14
10	What is the importance of nuclear power plants in India?	Understand	CAEE003.14
PART – B (LONG ANSWER QUESTIONS)			
1	Explain the important components used in nuclear power plant with neat diagram?	Understand	CAEE003.14
2	Explain the operation of nuclear power plant with neat diagram?	Understand	CAEE003.14
3	Explain importance of moderator, control rod and heat exchanger in nuclear power plant?	Understand	CAEE003.14
4	What are the advantages and disadvantages of nuclear power plant?	Understand	CAEE003.14
5	Write the important differences between renewable and non renewable source?	Remember	CAEE003.03
6	Give the classification of nuclear reactors and explain about BWR, PWR and FBR with a neat sketch.	Understand	CAEE003.14
7	Explain importance of moderator, control rod and Heat exchanger in nuclear power plant?	Understand	CAEE003.14
8	Write the important difficulties between renewable and non renewable source?	Understand	CAEE003.04
9	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	CAEE003.14
10	Explain below in nuclear power plant i) Control rod iii) Moderator ii) Heat exchanger iv) Cooling systems in nuclear plant.	Understand	CAEE003.14

Prepared by: Mr. Mahesh Thati Assistant Professor, EEE

HOD, EEE