

POWER STATION PRACTICE

(EE-705/2)

Use separate answer script for each half.

Answer SIX questions, taking THREE from each half.

Two marks are reserved for neatness in each half.

Time: 3 hour

Full Marks: 70

FIRST HALF

1. a) What do you mean by the terms *unit auxiliary* and *station auxiliary* of a thermal power station? State the importance of auxiliary power in a thermal power station. [2+3]
- b) Draw a single line diagram of a typical auxiliary power distribution system in a thermal power station. Show only two or three loads in each bus of different voltage levels. Why is the unit auxiliary bus sectionalized? [5+1]
- 2 a) Is it mandatory to provide a *Bus Transfer* arrangement to all units? State the effect of improper auxiliary bus transfer. Explain FAST Bus transfer scheme. [1+2+2]
- b) Explain, with necessary diagram, the Auto Change-over scheme. [6]
- 3 a) Draw a typical capability curve of an alternator used in Gas Turbine / Thermal power plant. What are the operating limits usually imposed on these units? [2+3]
- b) "Strongly under-excited operation of a turbo-alternator connected to an infinite bus is neither encouraged from power system point of view nor from alternator point of view" – Why? [6]
- 4 a) Explain, with necessary block diagrams, different types of process control used in coal fired power station. [5]
- b) Explain, with a neat diagram, pulverized fuel combustion control. [4]
- c) Draw a neat diagram of primary and secondary air system. [2]

5 a) Is pre-commissioning test on a power transformer at site essential? Name different types of tests done on a power transformer at site before its use. State with reasons the vector group of a Generator-Transformer.

[1+2+2]

b) Explain i) vector group test. ii) core-balance test. [3+3]

SECOND HALF

6.a) What are the different sources of energy for electricity generation.

[3]

b) Name different important components of a thermal power station.

[3]

c) What factors should be taken into consideration while selecting the site for a steam power generation?

[5]

7. a) What are the different types of boilers ?

[3]

b) Write down the differences between fire tube and water tube boilers.

[4]

c) Write down the advantages of high pressure boiler.

[4]

8.a) Why is pulverized fuel used in a modern power system? [4]

b) Write down the advantages of steam turbine over the steam engine.

[5]

c) Explain why thermal plants are not suitable for supplying fluctuating loads?

[2]

9. Describe the key points of the design of the Electrical System of a typical 4x500 MW thermal power station. [11]

10. Write short notes on any two of the following:

a) Hydrogen cooling

b) Load centre

c) Layout of a steam power plant

[2 x5.5]