

B.E Power Engineering 4th Year 2nd Semester Examination, 2019

Power Plant Operation and Maintenance Management

Time: 3 hrs.

Full Marks: 100

Use separate Answer Scripts for each part

Part-I: (Marks: 50)

1. a) What are the different systems you will line up for start up of Boiler Feed Pump?
b) In the event of total power failure in the plant what are the major operations are to be dealt with in boiler, turbine & generator? Marks: 5+5
2. a) What are the major classifications of Boiler tube leakages?
b) Explain the tube leakage due to Caustic Corrosion. Marks: 3+4
3. Describe briefly the different activities which are carried out in boiler, turbine and generator for the synchronisation of Turbo-Generator Set from initial commissioning. Marks: 10

OR

Describe briefly the sequential activities for boiler light-up in cold start-up process

Marks: 10

4. A thermal power plant station has two units of 200 MW(Unit-1 & Unit-2) plant. In the month of April, the units run at 80% and 86% Plant Load Factor (PLF) respectively. Units-1,2 consumed average 15 MW and 13MW to run their auxiliaries. Unit-1 & 2 were out of grid for 3 days & 1 days for planned shut down and 12 hours & 20 hours for forced outages respectively. Unit-1 & 2 was out of grid for 18 hours & 10 hours due to grid restriction respectively. Unit-1 & 2 was out of grid for 1 day & 12 hours due to coal supply problem respectively. Unit 1 & 2 consumed average 160 T/hr, 150T/hr coal during generation period at GCV of 12000 kJ/kg. Determine the followings:
 - i) Total generation of station in the month of April in MU and Station PLF.
 - ii) Availability Factor for Station (%)
 - iii) Loading Factor of Units (%)

- iv) Equipment Partial loading of Units (%)
- v) Gross Heat Rate of Units
- vi) Auxiliary Power consumption of the station (%)

Marks : 15

5. a) Write down the different functions of maintenance store department. Discuss them briefly.
b) What are the processes involved in the control of stock level in store?

Marks: 6+2

OR

- a) What is the objective of maintenance management system?
b) Discuss the different systems adopted for effective maintenance management system?

Marks: 2+6

B.E. POWER ENGINEERING FOURTH YEAR SECOND SEMESTER, 2019**Subject : Power Plant Operation
& Maintenance****PART-II****Full Marks : 50****Use separate answer scripts for each group/part****Answer any five questions from the following.**

1. What is Automatic Generation Control? - Explain with the help of diagram AVR and ALFC loop. 5+5
2. Describe the different types of Modern Exciters being used for Alternator excitation mentioning their special features. 10
3. a) What is protective relaying? Explain primary and back up protection. Mention the desirable qualities of Protective relaying. What is Sensitivity Factor? 7
b) Find the Open loop gain of an AVR loop if the static error does not exceed 2%. 3
4. a) Deduce Static Performance of AVR loop and compensation in AVR loop. 5
b) Draw the block diagram of Primary ALFC loop. 5
5. A subgrid has total rated capacity of 3000 MW. It encounters a load increase of 40 MW, when the normal operating load is 2000 MW. Assume inertia constant (H) to be 5 sec and regulation of the generators in the system as 3 Hz/P.U.MW. Find a) ALFC loop parameters, b) static frequency drop, c) transient response of the ALFC loop. Assume load frequency dependency to be linear. 10
6. Write short notes on any two of the following. 5×2=10
 - a) Economic operation of energy generating system
 - b) Constraint in economic operation of Power System
 - c) Basic connection of Trip circuit
 - d) Voltage balance differential relay