MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : PE-ME801B/PE-ME802B Power Plant Engineering

UPID : 008278

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following : [1 x 10 = 10]

(I) What is used to reduce the sulfur emission in the FBC system?

(II) What is Mach number?

(III) Define blade friction coefficient.

(IV) What is evaporative condenser?

(V) Load duration curve indicates _____

(VI) What do you mean by station cost?

(VII) Can coal be transported through pipeline?

(VIII) Write down the expression of the area-velocity relation used in the nozzle.

(IX) What is symmetrical blading?

(X) Name two factors that create loss of vacuum in a condenser.

(XI) What is superheating?

(XII) What is soot blowers?

Group-B (Short Answer Type Question)

Answer any three of the following : [5 x 3 = 15]

2. A power plant using steam as working fluid operates on a Rankine cycle. The boiler and condenser pressures are 30 bar and 1 bar. The conditions of steam entering the turbine is dry saturated. Find the thermal efficiency of the plant. Neglect the pump work. [5]

3. Discuss the merits of forced draught over induced draught. [5]

4. What are the different losses which are generally taken into account in designing the draught system? [5]

5. Write a short note on electrostatic precipitator. [5]

6. Write a short note on cooling pond used in thermal power plants. [5]

Group-C (Long Answer Type Question)

Answer any three of the following : [15 x 3 = 45]

7. (a) In a steam power plant, steam is supplied at 100 bar and 500 ^{O}C and the condenser pressure is 0.05 bar. The steam is reheated after passing through a first-stage turbine to its original temperature and then expanded to condenser pressure. The reheating is carried out when the steam becomes just dry saturated. Assume the isentropic efficiency of each stage of expansion as 85% Find the efficiency of the plant. [10]

(b) Also, find steam required per hour if the capacity of the plant is 100 MW. Neglect the feed pump work. [5]

8. (a) What do you understand by the word Draught? [3]

(b) How are the draughts classified? [2]

(c) Find the expression of draught produced by a chimney in mm of water head. [10]

9. (a) List out the major advantages of high-pressure boilers in modern thermal power plants. [5]

(b) What do you understand by a supercharged boiler? [5]

(c) What is the difference between fouling and slagging? [3]

(d) What are their effects on boiler performance? [2]

10. (a) What is the necessity of coal storage? [5]

(b) Discuss the different methods of coal storage. [10]

11. (a) Define the function of nozzle and name some applications where it is used. [5]

(b) Derive an expression relating the critical pressure ratio to the index of expansion n for expansion in a nozzle. [10]

*** END OF PAPER ***