

GANPAT UNIVERSITY**B. Tech. Semester: VI Mechanical Engineering****Regular CBCS Examination April - June 2015****2ME604 Power Plant Engineering****Time: 3 Hours****Total Marks: 70**

- Instruction:**
- 1 All questions are compulsory
 - 2 Figure to the right indicates full marks
 - 3 Use steam table and mollier chart if necessary

Section - I

- Que. - 1**
- (A) Discuss in detail about Benson Boiler with neat sketch. [6]
- (B) Exhaust steam having a quality of 0.9 enters at a surface condenser pressure of 0.13 bar and comes out as a water at 45° C. The circulating water enters at 25° C and leaves at 40° C. Estimate quantity of circulating water and condenser efficiency if $M_s = 10^3$ kg/hr [6]

OR

- Que. - 1**
- (A) What do you mean by Supercharging? Discuss in detail about Velox Boiler with neat sketch. [6]
- (B) What are the main components of nuclear reactor? Explain their functions. [6]

- Que. - 2**
- (A) Explain main functions of any draught system. What are the advantages and limitations of natural draught system [6]
- (B) Explain in detail about various methods of feed water treatment. [5]

OR

- Que. - 2**
- (A) Compare Forced and Induced draught system [6]
- (B) Give the comparison of forced draft and induced draft cooling tower. [5]

- Que. - 3** [12]

In a combined cycle power plant, the air is supplied at a rate of 2000 tons/hr and temperature 20°C. The pressure ratio is 7:1. Inlet pressure to compressor and outlet pressure from the turbine may be taken as 1 bar. The isentropic efficiency for compressor = 80% and for turbine = 85%. The C.V of oil used = 45,000 kJ/kg. The data for steam turbine is given below. The temperature of gas used for steam generation is increased 1200°C by burning the fuel in the exhaust coming out from gas turbine. The condition of steam generated in the boiler is 50 bar and 500°C. The condenser pressure = 0.1 bar. The temperature of gas going to stack = 200°C. Find out the following :

- 1) Total power generating capacity of the plant.
- 2) Overall efficiency of the plant.
- 3) Mass of fuel used per hr.

Take $C_{pa} = 1$ kJ/kg-K, $\gamma = 1.4$ for air and $C_{pg} = 1.1$ kJ/kg-K.
 $\gamma = 1.33$ for gas. Do not neglect the fuel.

Section – II

- Que. – 4 (A) Discuss various factor affecting the site selection for thermal power [6]
(B) Draw a net line diagram of inplant coal handling and indicate the name of equipments used at different stages. Also discuss coal preparation [6]

OR

- Que. – 4 (A) Classify solid fuel firing system in detail. Also describe under stoker fuel firing system with neat sketch. [6]
(B) Write advantages and disadvantages of pulverize fuels in thermal power [6]

- Que. – 5 (A) Discuss pneumatic ash handling system. [5]
(B) Discuss cyclone separator with neat sketch also discuss advantage and disadvantage of cyclone separator [6]

OR

- Que. – 5 (A) Discuss electrostatic precipitator in ash handling system [5]
(B) Describe effect of flyash on the soil quality in detail and crop yield. [6]

- Que. – 6 (A) Discuss Cyclone burner with neat sketch [6]
(B) Describe various important modern methods for control of sulphur dioxide. [6]

END OF PAPER