Marks: 50
Time: 2 hours

1   Fill up the blanks   (10x1=10)

1   In flue gas analysis by Orsat's apparatus, carbon monoxide is absorbed by_____.

2   _____ is used to measure the calorific value of solid and liquid fuel.

3   _____ Constituents of coal is the most important in the production of coke.

4   All the commercial liquid fuels are derived from_____.

5   A boiler in India should confirm to safety regulations of_____.

State True and False

6   A throttling calorimeter is also used to measure the quality of steam.

7   Locomotive boiler is a water tube boiler.

8   The natural draught is produced by chimney.

9   The properties of water are arranged in the steam tables as functions of temperature.

10   Coal gas is obtained by mixing coal and gas at ambient conditions.

II   Write short notes on ANY FIVE   (5x2=10)

1   Difference between saturated vapour and superheated vapour.

2   What advantages are obtained if superheated steam is used in steam prime movers?.

3   Primary fuels and its importance.

4   A diesel power station has fuel consumption 0.2 kg per kWh. If the calorific value of the oil is 11,000 kcal per kg determine the overall efficiency of the power station.

5   Difference between demand factor and diversity factor.

6   Classification of boilers.

7   Boiler mountings and accessories and its list.

III   Answer any FIVE of the following.   (5x4=20)

1   Mollier chart.

2   Using steam tables, determine the mean specific heat for superheated steam :
     (i) at 0.75 bar, between 100°C and 150°C ;
     (ii) at 0.5 bar, between 300°C and 400°C.

3   Bomb calorimeter used for the determination of heating values with neat sketch.

4   The maximum (peak) load on a thermal power plant of 60 mW capacity is 50 mW at an annual load factor of 50%. The loads having maximum demands of 25 mW, 20 mW, 8 mW and, 5 mW are connected to the power station.Determine: (a) Average load on power station (b) Energy generated per year (c) Demand factor (d) Diversity factor.

P.T.O

5   Requirement of good boiler.

6   Advantages and Limitations of Chimney / Natural Draught

7   A boiler is provided with chimney of 26 m height. The boiler house temperature is 30°C and temperature of flue gases leaving chimney is 300°C.If air supplied to boiler 20 kg/kg of fuel. Calculate (i) Draught in mm of water (ii) velocity of gases passing through chimney with 50% losses of draught in chimney.

IV   **Answer any ONE of the following**   **(1x10=10)**

1   Working of Cochran boiler with neat sketch. Also explain two advantages and two disadvantages.

2   Throttling Calorimeter.

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