



**KERALA AGRICULTURAL UNIVERSITY**

**B.Tech.(Food Engg) 2016 Admission**

**IV Semester Final Examination-July 2018**

**Meen 2205**

**Boiler and Steam Engineering (1+1)**

**Marks: 50**

**Time:2 hours**

**1 Fill up the blanks**

**(10x1=10)**

- 1 The principal constituents of a fuel are -----
- 2 One kg of carbon requires ----- kg of oxygen and produces  $7/3$  kg of CO.
- 3 The latent heat of steam at atmospheric pressure is ----- kJ/kg.
- 4 The mechanical draught produces ----- draught than natural draught
- 5 Water tube boilers produces steam at -----pressure than that of fire tube boiler.

**State True or False**

- 6 Bomb calorimeter is used for finding the lower calorific value of solid and liquid fuels
- 7 One kg of ethylene requires 2 kg of oxygen and produces  $22/7$  kg of CO<sub>2</sub> and  $9/7$  kg of H<sub>2</sub>O.
- 8 For steam critical temperature is 374.15°C and critical pressure is 221.2 bar
- 9 The natural draught reduces the fuel consumption.
- 10 The locomotive boiler has 157 fire tubes and 24superheated tubes

**II Write short notes/answers etc on ANY FIVE**

**(5x2=10)**

- 1 Distinguish between higher and lower calorific value of a fuel
- 2 How will you convert volumetric analysis into Gravimetric analysis
- 3 Enthalpy of Evaporation
- 4 Advantages of super heated steam
- 5 Advantages of mechanical draught
- 6 Advantages of high pressure boilers
- 7 Indian boiler regulation

**P.T.O**

**III Answer any FIVE of the following.**

**(5x4=20)**

- 1 Various properties of liquid fuels
- 2 Discuss briefly on temperature versus total heat graph during steam formation
- 3 Determine the quantity of heat required to produce 1 kg steam at a pressure of 6 bar at a temperature of 25°C, under following conditions:
  - i. When the steam is wet having a dryness fraction 0.9
  - ii. When the steam is dry saturated; and
  - iii. When it is superheated at a constant pressure at 250°C assuming the mean specific heat of super heated steam to be 2.3 kJ/kg K.
- 4 Distinguish between forced draught and induced draught.
- 5 Construction and working of Cochran boiler with help of suitable sketch.
- 6 Distinguish between fire tube and water tube boiler.
- 7 A fuel gas has the following percentage composition by mass: CO<sub>2</sub> – 13.3%; CO- 0.95%; O<sub>2</sub> – 8.35% and N<sub>2</sub> – 77.4%. Convert this into volumetric analysis.

**IV Write an essay on any ONE of the following**

**(1x10=10)**

- 1 How boilers are classified and explain the construction and working of Locomotive boiler with help of suitable sketch.
- 2 Lancashire boiler with help of suitable sketch

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