



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Food Engg. & Technology)
VIII Semester Final Re- Examination – August 2023
2019 Admission

Meen.2205

Boiler and Steam Engineering (1+1)

Marks: 50
Time: 2 hours

I Fill in the blanks

(10x1=10)

- 1 The fuel mostly used in boiler is
 - 2 One kg of carbon monoxide requires kg of oxygen and produces 11/7 kg of CO₂.
 - 3 The locus of saturated liquid line and saturated vapour line meets at
 - 4 An economizerthe steam raising capacity of a boiler.
 - 5 The mechanical draughtthe amount of smoke.
- State True and False**
- 6 Dulong formula is used for finding the lower calorific value of fuels.
 - 7 One kg of hydrogen requires 8 kg of oxygen and produces 9 kg of H₂O.
 - 8 With increase in pressure the boiling point of water decreases and enthalpy of evaporation increases.
 - 9 An air preheater decreases evaporative capacity of the boiler.
 - 10 In fire tube boilers, the flames and hot gases pass through the tubes which are surrounded by water.

II Write short notes on ANY FIVE of the following

(5x2=10)

- 1 List the merits and demerits of liquid fuels over solid fuel.
- 2 How will you convert mass analysis into volumetric analysis?
- 3 Determine the quantity of heat required to produce 1 kg steam at a pressure of 6 bar at a temperature of 25°C, when the steam is dry saturated.
- 4 List the advantages of superheated steam.
- 5 Write short note on efficiency of chimney.
- 6 List the advantages of water tube boiler.
- 7 Write short note on boiler regulation act.

III Answer ANY FIVE of the following

(5x4=20)

- 1 A sample of coal has the following composition by mass:
Carbon 75%, hydrogen 6%; Oxygen 8%; Nitrogen 2.5% ; Sulphur 1.5% and ash 7%. Calculate its higher and lower calorific value per kg of coal using Dulong's formula.
- 2 The volume analysis of a gas is CO₂ – 14%; CO- 1%; O₂ – 5% and N₂ – 80%. Calculate the fuel gas composition by mass.
- 3 Derive an expression for the external work done during evaporation.
 - (i) when the steam is wet
 - (ii) when the steam is dry
 - (iii) when the steam is superheated steam
- 4 Discuss briefly on Locomotive boiler with help of suitable sketch.
- 5 Discuss briefly on Lancashire boiler with help of suitable sketch.
- 6 Explain about boiler mountings.
- 7 Discuss briefly on combustion principles.

IV Write an essay on ANY ONE of the following

(1x10=10)

- 1 Discuss briefly on energy audit in steam boilers.
- 2 How boilers are classified and explain the construction and working of Cochran boiler with help of suitable sketch.
