KERALA AGRICULTURAL UNIVERSITY
B.Tech. (Food Engg) 2019 Admission
IV Semester Final Examination- -November 2021

Meen 2205 **Boiler and Steam Engineering (1+1)**

Marks: 50
Time: 2 hours

I **Fill in the blanks** **(10x1=10)**

1. _____ Number of flue tubes in Lancashire boiler.
2. In locomotives draught if produced by_____.
3. _____ Coal has low calorific value.
4. Chemical composition of coal is given by_____.
5. At critical point latent heat vaporization is_____.

State True and False

6. An economizer decreases the steam raising capacity of a boiler.
7. Liquid fuels have lower efficiency than solid fuels.
8. The fire tubes in a Cochran boiler are horizontal.
9. The chimney draught varies with height of chimney.
10. A Fusible Plug in a boiler is used to put off fire in the furnace of the boiler when the level of water in the boiler falls to an unsafe limit.

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. What is the difference between the critical point and the triple point?
2. Calculate the dryness fraction (quality) of steam which has 1.5 kg of water in suspension with 50 kg of steam.
3. What do you mean by stoichiometric air-fuel (A/F) ratio?
4. A coal sample gave the following analysis by weight, Carbon 85%, Hydrogen 6%, Oxygen 6%, the remainder being incombustible. Determine minimum weight of air required per kg of coal for chemically correct composition.
5. What is 'diversity factor'? List its advantages in a power system.
6. Merits and demerits of water tube boiler over fire tube boiler.
7. Advantages of Mechanical draught over Natural draught.

III **Answer ANY FIVE of the following** **(5x4=20)**

1. Describe p-T (Pressure-Temperature) Diagram For a Pure Substance.
2. What amount of heat would be required to produce 4.4 kg of steam at a pressure of 6 bar and temperature of 250°C from water at 30°C ? Take specific heat for superheated steam as 2.2 kJ/kg K.
3. What is the difference between higher heating value (HHV) and lower heating value (LHV) of the fuel?
4. How the cost of power generation can be reduced.
5. Derive an expression for chimney height in order to obtain a draught of 'h_w' mm of water column if the boiler used 'm_f' kg of air / kg of fuel. Assume, surrounding air temperature as 'Ta' and flue gas temperature as 'Tg' in degree absolute.
6. Explain boiler accessories in brief.

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 **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Write Essay on Junker gas calorimeter.
2. Write Essay on Locomotive boiler.

****