

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
Diploma Engineering, Mid Sem-2022-23-Examination

Semester: 4th

Subject Code: 03609253

Subject Name: THERMAL ENGINEERING-2

Date: (20/01/2023)

Time: (1hr: 15min)

Total Marks: 40

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is considered to be Authentic.

Q.1 Answer any Six out of Ten. (2 Marks Each) (12)

1. Identify dryness fraction in real life application.
2. Define: 1. Dry Steam 2. Wet Steam.
3. List four industrial applications of steam.
4. Write equation of enthalpy and Entropy of superheated steam.
5. Write use of throttling process.
6. Define boiler according to IBR
7. What is boiler draft?
8. Write function of safety valve, air pre heater.
9. Trace (1)Sensible heat (2) Triple Point with example.
10. List types of mountings.

Q.2 A) Explain Tripple Point diagram with neat sketch. (03)**OR**

A) Describe the process of steam formation with T-S Diagram. (03)

B) Draw Mollier chart and label it different region. (03)

OR

B) Explain throttling calorimeter with sketch. (03)

C) Give detail classification boiler. (04)

OR

C) Write factors affecting selection of boiler. (04)

D) Calculate enthalpy and entropy of 10kg of steam at 12bar pressure and 0.85 dryness fraction. $V_g=0.16321 \text{ m}^3$, $h_f=798.4 \text{ kJ/kg}$, $h_{fg}=1984.3 \text{ kJ/kg}$, $S_f=2.216$ $S_g=4.303 \text{ kJ/kg k}$ (04)**OR**D) Steam enters an engine at pressure of 12 bar with 67°C degree superheat. Find out enthalpy of steam. $h_f=798.4 \text{ kJ/kg}$, $h_{fg}=1984.3 \text{ kJ/kg}$ $C_p=2.1 \text{ kJ/kg k}$, (04)**Q.3 A) Explain water level indicator with neat sketch (03)****OR**

A) Describe Pressure Gauge with neat sketch. (03)

B) Explain Air Pre heater with neat sketch. (03)

OR

B) Explain Economizer with neat sketch (03)

C) Draw details drawing of Benson Boiler with neat sketch. (04)

OR

C) Draw details drawing of Cochran Boiler with neat sketch.. (04)

D) The following data was collected during the trail of boiler (1) The pressure of steam generated = 12 bar (2) Condition of steam = 0.9 dry (3) Feed water temperature = 27°C (4) steam generated = 1100 Kg/hr (5) Coal used =130 Kg/hr (6) C.V. of coal =28,000 KJ/Kg (7) Specific heat of water = 4.167 KJ/KgK. Find (1) Boiler efficiency (2) Equivalent evaporation (me). $h_f=798.4 \text{ kJ/kg}$, $h_{fg}=1984.3 \text{ kJ/kg}$ $C_p=2.1 \text{ kJ/kg k}$ (04)**OR**D) The following data was collected during the trail of boiler (1) The pressure of steam generated = 10 bar (2) Condition of steam = 0.85 dry (3) Feed water temperature = 22°C (4) Average quantity of steam generated = 2500 Kg/hr (5) Coal used =250 Kg/hr (6) C.V. of coal =28,000 KJ/Kg (7) Specific heat of water = 4.2 KJ/KgK. Find (1) Boiler efficiency (2) Equivalent evaporation (me). $h_f=762.61 \text{ kJ/kg}$, $h_{fg}=2013.6 \text{ kJ/kg}$ (04)

QUESTION

Q1 .1

Q1 .1. (2 marks)

(12)

1. Explain the difference between a saturated vapor and a superheated vapor.

2. Explain the difference between a saturated liquid and a subcooled liquid.

3. Explain the difference between a saturated mixture and a subcooled mixture.

4. Explain the difference between a saturated mixture and a superheated mixture.

5. Explain the difference between a saturated mixture and a subcooled mixture.

6. IBR is a saturated mixture of saturated liquid and saturated vapor.

7. Explain the difference between a saturated mixture and a subcooled mixture.

8. Explain the difference between a saturated mixture and a superheated mixture.

9. Explain the difference between a saturated mixture and a subcooled mixture.

10. Explain the difference between a saturated mixture and a superheated mixture.

Q1 .2

Q1 .2. (3 marks)

(03)

Q1 .2.1. (3 marks)

(03)

Q1 .2.2. (3 marks)

(03)

Q1 .2.3. (3 marks)

(03)

Q1 .2.4. (3 marks)

(03)

Q1 .2.5. (3 marks)

(03)

Q1 .2.6. (3 marks)

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Q1 .2.7. (3 marks)

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