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Name of Examination : **Winter 2021** - (Preview)

Course Code & Course Name : **ME453UD - Steam Technology**

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Maximum Marks : **60**

Duration : **3 Hrs**

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Answer Key Submission Type: No marking scheme and solution

Instructions:

1. All questions are compulsory.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

q.1) Solve any three questions.

- a) Give the comparison between 'Fire-tube and water-tube' boilers. [4]
- b) Which factors are considered while selecting refractory material for boiler? [4]
- c) What is steam trap? What are the functions of steam traps? [4]
- d) List down few housekeeping measures by which wastes can be reduced. [4]

q.2) Solve any three questions.

- a) Give the comparison between 'Fire-tube and water-tube' boilers. [4]
- b) Which factors are considered while selecting refractory material for boiler? [4]
- c) Describe IS Pipe color codes used for boiler piping. [4]
- d) Explain the concept of waste minimization with suitable examples. [4]

q.3) Solve any three questions

- a) What is the function of boiler mountings? Can a boiler work without mountings? [4]
- b) What are the applications of refractory materials in boiler? [4]
- c) An oil fuel with a lower calorific value of 44700 kJ is burnt in a boiler with air-fuel ratio as 20: 1. Neglecting ash, calculate the maximum temperature attained in the furnace of the boiler. Assume that whole of the heat of combustion is given to the products of combustion and their average specific heat is 1.08. Take boiler room temperature as 38°C. [4]
- d) Give the steps involved in waste minimization methodology and explain briefly. [4]

q.4) Solve any two questions.

- a) Explain the following terms relating to steam formation: [6]
 - (i) Dryness fraction of steam.
 - (ii) Enthalpy of wet steam.
 - (iii) Superheated steam.
- b) What is condensate? What is condensate recovery? Why return condensate reuse. [6]
- c) Explain direct and indirect method for measuring boiler efficiency. [6]

q.5) All question are compulsory.

- a) Explain the types of steam traps. [6]
- b) Explain (i) Evaporative capacity of a boiler. [6]
 - (ii) Boiler efficiency.
 - (iii) Evaporation ratio.

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