Code: 17D11202

M.Tech II Semester Supplementary Examinations January/February 2019

**ADVANCED ENERGY TECHNOLOGIES**

(Thermal Sciences & Energy Systems)

(For students admitted in 2017 only)

Time: 3 hours Max. Marks: 60

Answer all the questions

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1 (a) List different types of waste heat boilers and discuss briefly about Rotary Kilns with a neat sketch.

(b) Explain the working of supercharged boiler with a neat sketch. What are the advantages over conventional boilers?

**OR**

2 (a) Draw the line diagram of Loeffler Boiler and discuss its relative merits and demerits.

(b) Discuss about corrosion and deposition in boilers and its prevention.

3 (a) Explain about atmospheric Fluidized Bed Combustor with a neat sketch.

(b) How does the temperature of a Fluidized Bed Combustor system can be controlled?

**OR**

4 (a) What are the advantages of fluidized bed systems?

(b) What are the major factors responsible for the corrosion of steam turbines in Fluidized Bed Combustor system? How this problem is solved in practice?

5 (a) What are the relative merits and demerits of using air or $O_2$ in a gasification plant when gasification plant is integrated with a closed cycles.

(b) What future developments are expected in combined cycle plants?

**OR**

6 (a) Draw the line diagram for two different PFBC systems which are commonly used and discuss their relative merits and demerits.

(b) Discuss the part load behavior of combined cycle plant and compare with conventional gas turbine plant of the same capacity.

7 (a) What do you under stood by cogeneration of power and process heat? Explain its thermodynamic advantage.

(b) What is a back pressure turbine? What are its applications?

**OR**

8 (a) Explain co-generation plant efficiency.

(b) What is a pass-out turbine and when it is used?

9 (a) What are the different economic sources of waste heat? How are they graded?

(b) Draw the neat sketch of a cascade system for extraction of waste heat and generate the power? Why such cascade systems are preferred for waste heat from gas turbine plant?

**OR**

10 (a) Why Rankine cycle is preferred in waste heat recovery system? What is the importance of fluid used in heat recovery?

(b) Explain the importance of heat pump for waste heat recovery purposes.

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