

[All Rights Reserved]



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Building Services Engineering

Second Year, Second Semester Examination – 2016

BSE 2203 - Heat Generation and Distribution Systems

Instructions for Candidates:

Answer all questions

All questions carry equal marks

No. of questions : 04

No. of pages : 03

Time : 02 hours

01. (i) “Poor water treatment may lead to poor performance of a boiler”. Explain the above statement.

(3 marks)

(ii) Explain how poor water treatment affects to the lifetime of the boiler tubes.

(3 marks)

(iii) Dissolved oxygen may lead to corrosion of boiler tubes and shell. Explain the mechanical de-aeration process used to remove dissolved oxygen in feed water.

(5 marks)

(iv) What is meant by the term “TDS level” of water? Explain the method used to control the TDS level of water in the boiler?

(6 marks)

(v) Compare and contrast water tube and fire tube boilers.

(8 marks)

[Total 25 Marks]

02. (i) Define “Boiler efficiency”.

(3 marks)

(ii) Explain how the efficiency of a boiler is calculated using indirect method.

(8 marks)

(iii) “Indirect method of efficiency calculation is mostly preferred to evaluate the performance of a boiler”. Explain this statement.

(3 marks)

(iv) Describe the how the flue gas temperature is related with the performance of a boiler.

(3 marks)

(v) Explain how the wasted heat in a boiler system is used to increase the performance of a boiler.

(8 marks)

[Total 25 Marks]

03. (i) Explain the functions of a steam trap in a steam distribution system. (3 marks)

(ii) List three basic types of steam traps used in steam distribution system. (3 marks)

(iii) Explain the operation mechanism of following types of steam traps

(a) Bi-metallic trap

(b) Inverted bucket trap

(8 marks)

(iv) Explain in brief the functions of following components in steam distribution systems

(a) Steam separator

(b) Strainer

(c) Drain pipe

(d) Air vent

(8 marks)

(v) With a neat sketch explain how you fix a Y-type strainer to a steam pipe line. (3 marks)

[Total 25 Marks]

04. (i) What do you understand by waste heat recovery? (2 marks)

(ii) Describe the operating principles of following waste heat recovery mechanisms.

(a) Heat wheel

(b) Heat pipe

(6 marks)

(iii) Explain the two mechanisms used to recover waste heat in a steam distribution system.

(6marks)

(iv) Explain working principles of following solar water heating systems.

(a) Thermosiphon system

(b) Closed loop active system

(6 marks)

(v) What are the advantages of insulating steam distribution lines?

(2 marks)

(vi) Explain the importance of Economic thickness of insulation when designing suitable insulation for steam distribution lines.

(3 marks)

[Total 25 Marks]