



UNIVERSITY OF RUHUNA

Faculty of Engineering

Mid -Semester 8 Examination in Engineering: November 2014

Module Number: ME8335 Module Name: Energy Management

[Two Hours]

[Answer all questions, each question carries five marks]

- Q1. (a) Briefly explain what you understand by an Energy Audit. [1 mark]
- (b) List out five basic energy management measures an organization should have. [2.5 marks]
- (c) Name the three levels of energy audits. What would be the expected results of these three levels? [1.5 marks]
- Q2. (a) List out and explain the attributes that a good energy auditor should have. [2 marks]
- (b) Describe the "Ten Step Method" of detailed energy audit by providing "Plan of Action" and purpose / results from each of the plans. [3 marks]
- Q3. (a) Classify the boilers depending on their application (power generation, process industries, and domestic use), fuel type, and orientation. [1 mark]
- (b) Describe how the superheating is obtained in a boiler plant. [1 mark]
- (c) List the safety precautions to be taken in a boiler room. [1 mark]
- (d) State the importance of boiler blow down. Suggest how blow down energy can be recovered. [1 mark]
- (e) Draw a sketch of a thermodynamic steam trap and explain its operations in distribution lines. [1 mark]

Q4. (a) Write the energy balance for a boiler.

[1 mark]

(b) List the energy efficiency opportunities involved with a boiler plant. If you are the plant engineer, state how you would use each opportunity.

[2 marks]

(c) You are given the following operational information for a particular boiler.

- Quantity of steam generated: 8 TPH
- Steam pressure and temperature: 10 kg/cm² and 180 °C
- Enthalpy of steam (dry and saturated) at 10 kg/cm²: 665 kCal/kg
- Feed water temperature: 85 °C
- Feed water enthalpy: 85 kCal/kg
- Coal input: 1.6 TPH
- Gross Calorific Value (GCV) of coal: 4000 kCal/kg

Calculate the efficiency of this boiler.

[2 marks]