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**COURSE: Fundamentals of Thermodynamics** (**MENG244) –Group 1**

**Semester: Spring (2018-2019)**

**Name of Experiment:** The Electric Steam Generator- Take home experiment

**Submission Due: 3rd April 2019. (Students will lose 5 marks for each day of late submission)**

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Submitted by:

 Student No:

 Group No:

Date of experiment:

Date of submission:

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 **EVALUATION**

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|  |  |
| **Data , Results & Graphs (50%)**  |  |
| **Discussion, Conclusion & Answer to Questions (30%)** |  |
| **Neat and tidy report writing (20%)**  |  |
| **Overall Mark** |  |

**Honor Pledge:**

By submitting this report I pledge that I have neither given nor received unauthorized assistance on this assignment.

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 Date Signature

1. **Objective and Introduction**

The objective of the steam generator experiment is to practice thermodynamics of evaporation of water and to analyze energy requirement for liquid-gas phase change of saturated steam.

1. **Experimental procedure**
2. Use an electric kettle for boiling the water.
3. Fill the kettle up to a certain volume (between 1-2 liter)
4. Turn on the electricity
5. Measure and record the operational time of the kettle till boiling.
6. **Activities**
	1. **Determination of the power rating of the kettle**
* Please assume initial temperature (before boiling) T1=20 °C and final temperature (after boiling) T2= 100 °C.
* Measure the weight of the water before boiling process and neglect the weight loss of water during the boiling process.
* Assume P=constant at 1 atm during the boiling process.
* Assume that in the final state, water is in saturated mixture state and the quality *X*=10%.
* Calculate specific enthalpy of compressed liquid water for initial state (h1) by using equation h = cp. T, and calculate the enthalpy of saturated mixture by reading hf and hfg values from table A4 for the given quality value.
* Measure the kettle operational time during the boiling process.
1. Calculate the power rating of kettle by using the equation below;

Please show / describe all steps used for determination of initial and final enthalpies, measurement of time and calculation of water mass.

 $w\_{electric}=\frac{m\_{water}×\left(h\_{2}-h\_{1}\right)}{∆t}$

1. Show the process on a T-v diagram. Please insert the T, P and v values in the diagram