An-Najah National University

Engineering Faculty – Energy Conservation and Auditing – Quiz #1

Student name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Registration number:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

An industrial facility is owns a steam boiler that heats water from 20 oC and atmospheric pressure (84 kJ/kg enthalpy) to 180 oC and 18.5 psi (2824.6 kJ/kg enthalpy). The boiler operates on oil #2 fuel (36 MJ/L and 5.5 Nis/L). The current stack emissions O2% equals to 10, stack gas temperature equals to 370 oC, and the ambient air temperature equals to 20 oC. A new energy engineer discussed the ideas of reducing stack gas temperature to 270 oC (using flue gas to air preheater), and O2% level to 5%. Calculate the potential savings if the production mass flow rate equals to 400 kg/hr, and the boiler operates 2200 hours per year.