Menoufia University
Faculty of Electronic Engineering
Dep. of Industrial Electronics & Control Engineering

Elective Course (6) - Mecha - Tronics Mid Term Exam.
For 4th year students
Date: 2/4/2019, T.A. 1 Houre

Answer The Following Questions:-

1. a. For steady State Conduction, drive the relation of conduction Through A plane wall.

1. b. The interior of an oven is maintained at a temperature of 850°C by means of a suitable control apparatus. The oven walls are 500 mm thick and are fabricated from a material of thermal conductivity 0.3 W/m-deg. For an outside wall temperature of 250°C, workout the resistance to heat flow and the heat flow per squre meter of wall Surface. Also calculate the temperature at point 200 mm from the interior side.

2. a. Drive the relations which control the Heat flow between Surface and Surroundings: Cooling and Heating of fluids.

2. b. An electric heater of exposed surface area 0.09 m^2 and output 600 watt is designed to operate fully submerged in water. Calculate the surface temperature of the heater when water is at 37°C and the surface coefficient of heat transfer is 285.3 W/m^2-deg. How this value will be affected if the heater is mistakenly operated at 37°C in air with a surface coefficient of 8.5 W/m^2-deg?

With Best Wishes!!
prof. Dr. Eng. Gaber Allam