**ME6502 HEAT AND MASS TRANSFER DAILY TEST-2 (20-07-18) III MECH**

01) A furnace wall consists of three layers. The inner layer of 10 cm thickness is made of

firebrick (k =1.04 W/mK). The intermediate layer of 25 cm thickness is made of masonry brick

(k = 0.69 W/mK) followed by a 5 cm thick concrete wall (k = 1.37 W/mK). When the furnace is

in continuous operation the inner surface of the furnace is at 800°C while the outer concrete

surface is at 50°C. Calculate the rate of heat loss per unit area of the wall, the temperature at the

interface of the firebrick and masonry brick and the temperature at the interface of the masonry

brick and concrete. (**15MARKS)**

02) A plane wall 20 cm thickness generates heat at the rate of 5 x 104 W/m3 when an electric current is passed through it. The convective heat transfer coefficient between each face of the wall and the ambient air is 60 W/m2K. Determine.  
• The surface temperature .  
• The maximum temperature in the wall. Assume ambient air temperature to be 25°C and the thermal conductivity of the wall material to be 16 W/mK. **(15MARKS)**

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