

## Practice numerical based on theory and practical concept of composite wall

Q.1 A wall 30 mm thick of size 5m X 3m made of red bricks ( $k=0.35 \text{ W/mK}$ ). It is covered on both sides by the layers of plaster 2cm thick ( $k=0.6 \text{ W/mK}$ ). The wall has a window of size 1m X 2m. The 12 mm thick window glass is having thermal conductivity of  $1.2 \text{ W/mK}$ . Estimate the rate of heat flow through the wall. The temperatures of inner and outer face are  $10^\circ\text{C}$  and  $40^\circ\text{C}$  respectively.

Q.2 A heater of  $150 \text{ mm} \times 150 \text{ mm}$  size and  $800 \text{ W}$  rating is placed between two slabs A and B. Slab A is 18 mm thick with  $k = 55 \text{ W/m K}$ . slab B is 10 mm thick with  $k = 0.2 \text{ W/m K}$ . Convective heat transfer coefficients on outside surface of slab A and B are  $200 \text{ W/m}^2 \text{ K}$  and  $45 \text{ W/m}^2 \text{ K}$  respectively. If ambient temperature is  $27^\circ\text{C}$ , calculate maximum temperature of the system and outside surface temperature of both slabs.