4. (a) A spherical blackbody has a radius of 30 cm and is placed in a constant temperature environment having temperature $20\,°C$. The blackbody is heated by an internal heater which has a heating power of 1.8 kW.

(i) What is the maximum temperature which the blackbody can attain?
[318.0 K]

(ii) After attaining the maximum temperature, the internal heater is switched off. If the density of the material of the blackbody is 8940 kgm^{-3} and its specific heat capacity is 389J $\text{kg}^{-1}\text{K}^{-1}$, what is the initial rate of fall of temperature of the blackbody?
[4.58×10^{-3} K s^{-1}]

[6 marks]