3. 200g water is heated from 40°C to 60°C. Ignoring the slight expansion of water, the change in its internal energy is close to (Given specific heat of water = 4184 J/kgK):

[Main Online April 9, 2016]

(a) 167.4 kJ (b) 8.4 kJ (c) 4.2 kJ (d) 16.7 kJ

(d) Volume of water does not change, no work is done on or by the system (W = 0)

According to first law of thermodynamics

$Q = \Delta U + W$

For Isochoric process $Q = \Delta U$

$\Delta U = \mu c dT = 2 \times 4184 \times 20 = 16.7$ kJ.