3 **(a)** State an expression, in terms of work done and heating, that is used to calculate the increase in internal energy of a system.

.....

.....

.....[2]

(b) State and explain, in terms of your expression in **(a)**, the change, if any, in the internal energy

(i) of the water in an ice cube when the ice melts, at atmospheric pressure, to form a liquid without any change of temperature,

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.....

.....[3]

(ii) of the gas in a tyre when the tyre bursts so that the gas suddenly increases in volume. Assume that the gas is ideal.

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.....

.....

.....[3]

[Turn over