# Answer on the question #60094, Chemistry / Physical Chemistry

**Question:**

11 Which of these is true of an isochoric system?
Takes place at constant temperature
Heat is allowed into the system but not allowed out of the system
Volume remains constant
Pressure is not constant

12 The molar heat capacity of Al is 24.4 J/mol/$^{o}C$. How much heat energy is required to heat 100 g of Al from 20 $^{o}C$ to 80 $^{o}C$? (Al = 27)
146000 J
30000 J
813000 J
5422 J

13 The first law of thermodynamics deals with
conservation of energy
thermodynamic equivalence
entropy
absolute zero temperature.

14 Which of the following expressions is associated with the law of conservation of energy?
dG = dH – TdS
q = mCdT
dE = q + w
H = E + PV

15 If a gas absorbs 1000 J of heat and expands by 0.5 $dm^{3}$ against a constant pressure of 4 atms (1 atm = 100000 Pa), then the change in internal energy is approximately
-800 J
800 J
1200 J
-1200 J

**Answer :**

11. Volume remains constant
12. The amount of heat is calculated as :

$$Q = nc(T_2 - T_1),$$

where $n$ is the number of the moles of substance, $c$ is molar heat capacity and $T_2$ and $T_1$ are the final and the starting temperatures, respectively.
To find the number of the moles, we should divide the mass by the molar mass, which is 27 g/mol for aluminium.

$$Q = \frac{100\ (g)}{27\ (g \cdot mol^{-1})} \cdot 24.4\ (J \cdot mol^{-1} \cdot C^{-1}) \cdot \big(80(C) - 20(C)\big)$$

$$Q = 5422.2\ J, or\ 5.42\ kJ$$

13. The first law of thermodynamics deals with conservation of energy.
14. dE = q + w
15. 1000 J – $0.5 \cdot 10^{-3}(m^3) \cdot 4 \cdot 10^5(Pa)$ = 800 J