THE STEPS TO SOLVE PHYSICS PROBLEMS

In physics, setting out is really important and marks are allocated as to how you set out your answers.
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After reading the questions, the steps you should use to complete all calculations are as follows:

Step 1: Write down what you need to find.
Step 2: Write down the information given.
Step 3: Select the appropriate equation from the Formula And Data Sheet and write this down
Step 4: Substitute the given quantities into the equation
Step 5: Simplify the equation
Step 6: Express the answer in the appropriate units and significant figures

Example

2.00 L of water is placed in a plastic kettle and the element is switched on. If the element operates at 1.00×10^3 W and at 90.0 % efficiency for 10.0 s and assuming no heat transfer to the kettle, find the rise in the water temperature.

Solution

P = 1000 W t = 10 s Efficiency = 90 % m = 2 L = 2 kg C = 4180 J kg^{-1} K^{-1} ΔT = ?

Q = E = P x t = 1000 x 10 = 10000 J

If 90 % efficiency then only 90 % of Q is transferred

$$Q_{effective} = \frac{90 \times Q}{100} = \frac{90 \times 10000}{100} = 9000 \text{ J}$$

$$Q = m \times C \times \Delta T$$

$$9000 = 2 \times 4180 \times \Delta T$$

$$\Delta T = \frac{9000}{2 \times 4180} = \frac{9000}{8360} = 1.08 \text{ K}$$

Note the answer must be given in 3 significant figures.