

3

microwave

power = 1.25 kW

↑ energy/time

time = 126 s
3 sig figs

mass = 250 g
2 or 3 sig figs

Microwave Energy = 1.25 kW · 126 s

= 1.25 × 10³ W · 126 s

= 1.25 × 10³ J/s · 126 s

= ~~1.25~~ 1.25 × 10³ × 1.26 × 10² J

= 1.575 × 10⁵ J

= 1.58 × 10⁵ J

How much energy does it take to heat the water from 20°C to 100°C.

ΔE_{thermal (heat)} = m · c · ΔT
↑ mass ↑ specific heat of water
250g ↑ 80°C
2 sig figs

c = specific heat
= ~~4.186~~ (J / (g · °C))
4.186

heating H₂O ↓

joules per gram per degree Celsius

ΔE = 250 · ~~4.186~~ · 80 J = ~~4.8 × 10⁴~~ 8.372 × 10⁴ J
4.186 2 sig figs

Ratio of energies: $\frac{8.372 \times 10^4 \text{ J}}{1.58 \times 10^5 \text{ J}}$

$= 5.298 \dots \times 10^{-1} = \boxed{5.3 \times 10^{-1}}$

(80°C only has 2 sig figs) \uparrow

2 sig figs \rightarrow

$= 53\%$

$= 53 \times 10^{-2}$

47% lost to heating cup, oven, air, microwaves escaping oven, etc