1. **Calculate the total amount of heat that would be required to raise the temperature of a 24 g sample of iron 52°.**

Q = **???**

S = 0.45 J/g° (From Table 3.2 for Iron)

W = 24 g

ΔT = 52°

Q = S x W x ΔT

Q = 0.45 J/g° **x** 24 g **x** 52° = ~~561.6~~ J = **5.6×10^2 J**

The Input Data has only 2 Sig Figs & ∴ (i.e., Therefore) the answer can have only 2 Sig Figs...

---

2. **Calculate the amount of heat that it would late to raise the temperature of a 1.2 Kg block of Aluminum by 35°.**

Q = **???**

S = 0.89 J/g° (From Table 3.2 for Aluminum)

W = 1.2 Kg

W = 1.2 Kg x 1,000 g/Kg = 1,200 g

ΔT = 35°

Q = S x W x ΔT

Q = 0.89 J/g° **x** 1,200 g **x** 35° = ~~37,380~~ J = **3.7×10^4 J**

The Input Data has only 2 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

3. **Calculate the amount of heat that it would take to raise 321 g of water from just above its freezing point to just below its boiling point.**

Q = **???**

S = 4.184 J/g° (From Table 3.2 for Liquid Water)

W = 321 g

ΔT = ? = T(Freezing) - T(Boiling) = 0.000,000,01 - 99.999,999,999 = 99.999,999,99°

Q = S x W x ΔT

Q = 4.184 J/g° **x** 321 g **x** 99.999,999,99° = ~~134,306.4~~ J = **1.34×10^5 J**

The Input Data has 3 and up Sig Figs & ∴ the answer can have only 3 Sig Figs...

---

4. **What is the weight of a sample of iron to which was applied 343 J which caused its temperature to change by 420°?**

Q = 343 J

S = 0.45 J/g° (From Table 3.2 for Iron)

W = ???

ΔT = 420°

W = Q / (S x ΔT)

W = 343 J / **(**0.45 J/g° **x** 420°**)** = ~~1.8148148~~ g = **<u>1.8 x 10^0 g (1.8 g would also be OK)</u>**

The Input Data has only 2 or 3 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

5. **A sample of Aluminum was heated by 25 J and its temperature subsequently increased from 120° to 136°. What was its weight?**

Q = 25 J

S = 0.89 J/g° (From Table 3.2 for Aluminum)

W = ???

ΔT = 136° - 120° = <u>16</u>°

W = Q / (S x ΔT)

W = 25 J / **(**0.89 J/g° **x** 16°**)** = ~~1.755618~~ g = **<u>1.8 x 10^0 g (1.8 g would also be OK)</u>**

The Input Data has only 2 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

6. **When a pot of molten iron was dropped in a container of liquid water it delivered a total heat of 12,342 J which raised the water temperature by 12°. What is the weight of the water in that container.**

Q = 12,342 J

S = 4.184 J/g° (From Table 3.2 for Liquid Water)

W = ???

ΔT = 12°

W = Q / (S x ΔT)

W = 12,342 J / **(**4.184 J/g° **x** 12°**)** = ~~245.8174~~ g = **<u>2.5 x 10^2 g</u>**

The Input Data has from 2-5 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

7. **Calculate the specific heat for a new allow make out of Silver, Gold, Mercury, & Iron based on the fact that a 6.2 g sample was heated with 84 J and its temperature rose from 4° till 15°.**

Q = 84 J

S = ???

W = 6.2 g

ΔT = 11°

S = Q / (W x ΔT)

S = 84 J / **(**6.2 g **x** 11°**)** = ~~1.2316716~~ J/g° = **<u>1.2 x 10^0 J/g° (1.2 J/g° would also be OK)</u>**

The Input Data has 2 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

8. **A 1.23 Kg block of Tofu was heated by 378 J and its temperature raised by 0.045°. What is the Specific Heat Capacity of that Tofu?**

Q = 378 J

S = ???

W = 1.23 Kg

W = 1.23 Kg x 1,000 g/Kg = <u>1,230 g</u>

ΔT = 0.045°

S = Q / (W x ΔT)

S = 378 J / **(**1,230 g **x** 0.045°**)** = ~~6.8292683~~ J/g° = **<u>6.8 x 10^0 J/g° (6.8 J/g° would also be OK)</u>**

The Input Data has 2 or 3 Sig Figs & ∴ the answer can have only 2 Sig Figs...

---

9. **If one took a 400 Kg block of iron and applied 23,440 J of heat to it, how much would it heat up?**

Q = 23,440 J

S = 0.45 J/g° (From Table 3.2 for Iron)

W = 400 Kg

W = 400 Kg x 1,000 g/Kg = <u>400,000 g</u>

ΔT = ???

ΔT = Q / (S x W)

ΔT = 23,440 J / **(**0.45 J/g° **x** 400,000 g**) =** ~~0.1302222~~ ° = **<u>1.3 x 10^{-1} ° (0.13 ° would also be OK)</u>**

The Input Data has 2 -4 Sig Figs & ∴ the answer can have only 2 Sig Figs...