Thermal Physics Revision

Q1. Complete the following table;

|  |  |
| --- | --- |
| **Degrees Celsius** | **Kelvin** |
| 0°C | 273 K |
| 340°C | 613 K |
| 178°C | 451 K |
| -271 °C | 2 K |
| 157 °C | 430 K |

Q2. An **isolated system** isset up with 600mL water at 300K and 400g copper at 670 K (ccopper= 390 J kg-1 K). At what temperature will equilibrium be achieved, in degrees celsius?

mw=

cw=

mc=

cc=

Ti(water)= 300 *K*

Ti (copper)= 670 *K*

Tf is unknown for both substances. But as equilibrium will be reached, this value will be the same for both substances.

So,

Q3. 1kg of ice at -30°C is added to a 2kg cast iron pot at 10°C on top of a stove. After 30min, 400g of boiling water remains in the pot. At what power is the stove operating? (ccast iron= 460 J kg-1 K)

Steps required

Q1 Heat solid ice from -30°C to 0°C

Q2 Melt ice to liquid

Q3 Heat up liquid water from 0°C to 100°C

Q4 Vaporize 600g of water to steam

AND

Q5 Heat up cast iron from 10°C to 100°C

Power=energy/time

Q4. Using an example, explain the difference between temperature and heat.

Temperature is ave kinetic energy of particles. Heat is total kinetic energies of all particles in a system. Plus suitable example.

Q5. Burning 1 kg of petrol produces 32.6 MJ of energy.

1. If the efficiency of a particular car is 28%, how much of this energy from the petrol is converted into useful mechanical energy?

Rearranging gives;

b) What happens to the remainder of the energy?

Lost as heat in engine etc.