Solutions to p55

1. **VIt = mcΔT**
120(8)(20minutes*60s/min) = m(4.19 J/{g C})(40 - 18)
m = 12497 g

2. **VIt = mcΔT**
120(I)(3*3600) = 100 000 g(4.19 J/{g C})(30-20)
I = 3.23 A
V = IR
R = V/I = 120/3.23 = 37 Ω

3. **VIt = mcΔT**
12(2)(t) = 250g((4.19 J/{g C})(12)
t = 523.5 s = 523.5/60 = 8.7 min

4. **VIt = mcΔT**
5(2)(12*60) = 100(4.19)(30 - t)
7200 = 419(30 - t)
7200/419 = 30 -t
t = 30 - 7200/419 = 12.8 ^{o}C

5. **VIt = mcΔT**
12(2)(11.5) = 20(c) (130 - 10)
c = 0.115 J/(g C)
The material is francium. None match the table, but you could use Mc = 25, so M = 25/0.115 = 217. The metal whose molar mass is closest to 217 g/mole is Fr.

6. a. 1 A = C/s
b. Since R= V/I , then 1 Ω = [J/C]/[C/s] = Js/C^{2}.
c. 1 W = 1 J/s
d. since conductance is the reciprocal of resistance, the answer is the reciprocal of Js/C^{2}= C^{2}/ (Js)