Heat Problems for Chapter 10

Name _____ Period _____

Show your method for each problem: The Hup, Two, Three, Four.

1. The temperature in a classroom is 24.0^{o}C. What is the Kelvin reading? Ans: 297^{o} K. Hint: K = C + 273.

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2. Liquid nitrogen boils at 77.0^{o}K. What is the reading on the Celsius scale? Ans: -196.2^{o}C. Hint: K = C + 273.

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3. How many calories will be needed to change the temperature of 500.0 g of water from 20.0^{o}C to 100.0^{o}C? Ans: 4.00 X10^{4} cal. *Hint: Use $Q = mc\Delta t$.*

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4. What is meant by the coefficient of linear expansion?

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5. What provision is made to allow for the expansion of (a) concrete highways, (b) bridges?

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6. A piece of copper pipe is 5.00 m long at 20.0 ^{o}C. If it is heated to 70.0^{o}C, what is the increase in its length? Coefficient of expansion for Cu is 16.8 X 10^{-6} Δl/l^{o}C. Ans: 4.20 XI0^{-3} m.

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7. How much heat is given out when 85.0 g of lead cools from 200.0^{o}C to 10.0^{o}C? c for lead = 0.03 cal/g.C^{o}. Ans: 4.9 X10^{2} cal. *Hint: Use $Q = mc\Delta t$.*

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8. If 10.0 g of water at 0.0^{o}C is mixed with 20.0 g of water at 30.0^{o}C, find the final temperature of the mixture? c for water = 1.00 cal/g.C^{o}. *Hint: Heat Lost = Heat Gained, so $Q_l = Q_g$.* Ans: 20.0^{o}C.

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9. How many calories are given off by 50.0 g of steam at 100.0 ^{o}C when it condenses to water at 100.0^{o}C ? Heat of condensation for steam is 538 cal/g. Ans: 2.69 X10^{4} cal.

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10. Using the *Example Warming Curve Problem* found in your notes or at the on-line notes, calculate the **Total number of calories** needed to change 20.00 grams of ice at -15.00^{o}C to water vapor at +125.00^{o}C. **Show each of the five steps!** Ans: 14,760 calories.