(1.) $q = ?$
$m = 1000\,g$
$\Delta T = 100^\circ C$
$C = 4.184\ \frac{J}{g^\circ C}$

$q = m \times C \times \Delta T$
$= (1000\,g)(4.184\ \frac{J}{g^\circ C})(100^\circ C)$
$q = 418{,}400\ J$ or $418\ KJ$ OR 100,000 cal

(2.) $q = ?$
$m = 1000\,g$ Cu
$\Delta T = 100^\circ C$
$C = 0.46\ \frac{J}{g^\circ C}$

$q = m \times C \times \Delta T$
$= (1000\,g)(0.46\ \frac{J}{g^\circ C})(100^\circ C)$
$q = 46{,}000\ J$ or $46\ KJ$

(3.) $m = 50\,g\ H_2O$
$T_i = 65.0^\circ C$
Hot $\Delta T = -20^\circ C$

$m = 40\,g\ H_2O$
$T_F = 45^\circ C$

a. $q = m \times C \times \Delta T$
$= (50\,g)(4.186\ \frac{J}{g^\circ C})(-20^\circ C)$
$q = -4186\ J$ or $-4.2\ KJ$ or 1000 cal

b. $q = +4186\ J$ or 1000 cal

c. $4186\,J = (40\,g)(4.186\ \frac{J}{g^\circ C})(45^\circ C - T_i)$
$25^\circ C = 45^\circ C - T_i$
$-20^\circ C = -T_i$
$20^\circ C = T_i$

$4186 = 7534.8 - 167.36\,T_i$

(4.) $q = 300\ cal$
$m = 30\ g\ Al$
$\Delta T = ?$
$C = 0.21\ \frac{cal}{g°C}$

$q = m \times C \times \Delta T$

$\Delta T = \frac{q}{m \times C} = \frac{300\ cal}{(30\ g)(0.21\ \frac{cal}{g°C})}$

$\Delta T = 47.6°C$

(5.) $m = 60g$
$q = -200\ cal$
$\Delta T = -50°C$
$(T_F - T_i \rightarrow 0°C - 50°C)$
$C = ?$

$q = m \times C \times \Delta T$

$C = \frac{q}{m \times \Delta T} = \frac{-200\ cal}{(60g)(-50°C)}$

$C = 0.067\ \frac{cal}{g°C}$

(6.) $C_{Al} = 0.215\ \frac{cal}{g°C}$ $\quad C_{Cu} = 0.092\ \frac{cal}{g°C}$

Suppose you have equal masses...
If absorb same amt. of heat energy...
which would have greater temperature change?

$q = m \times C \times \Delta T$

$\Delta T = \frac{q}{m \times C}$

Copper would have the greater temperature b/c it has a smaller specific heat, meaning it can't absorb as much heat with out increasing in temperature.

gold ring	water
(7.) $m = 22.25\,g$	$m = 20.0\,g$
$\Delta T = 100°C_i$ to $27.5°C_f$	$\Delta T = T_i = 25.0°C$, $T_f = 27.5°C$
	$C = 4.186\ \frac{J}{g°C}$

a. $27.5°C - 25°C = 2.5°C$ H_2O

b. $q = m \times C \times \Delta T$

$= (20.0g)(4.186\ \frac{J}{g°C})(2.5°C)$

$q = 209.3\,J$ or $50\,cal$

c. $27.5°C - 100°C = -72.5°C$ ring

$q = -209.3J$ d. Ring lost 209.3J of energy (the same amt gained by H_2O)

e. $C = \frac{q}{m \times \Delta T} = \frac{-209.3\,J}{(22.25g)(-72.5°C)}$

$C = 0.13\ \frac{J}{g°C}$ or $0.0310\ \frac{cal}{g°C}$

(8.) $m = 100g$	$m = 1000\,g$
$\Delta T = 25°C$ to $60°C$	$\Delta T = 25°C$ to $60°C$
$35°C$	$35°C$
$C = 4.186$	$C = 4.186$
$q = m \times C \times \Delta T$	$q = m \times C \times \Delta T$
$= (100g)(4.186)(35°C)$	$(1000g)(4.186)(35°C)$
$q = 14,651\,J$	$q = 146,510$

a. yes, both increased by 35°C

b. yes b/c speed ∴ temp. directly related

c. no ... 2nd beaker gained more heat energy for the same change in temperature

(9.) $m = 50\,g$ Pb

$\Delta T = 25°C - 250°C$

$= -225°C$

$C = 0.128 \frac{J}{g°C}$ or $0.0305 \frac{cal}{g°C}$

$129 \frac{J}{kg\,K}$

a. $q = m \times C \times \Delta T$

$= (50g)(0.128 \frac{J}{g°C})(-225°C)$

$q = -1440\ J$ lost or 343 cal

b. $m = 100g$

$\Delta T = ?$

$C = 4.186 \frac{J}{g°C}$

$q = +1440J$

$q = m \times C \times \Delta T$

$\Delta T = \frac{q}{m \times C} = \frac{1440J}{(100g)(4.186 \frac{J}{g°C})}$

$\Delta T = 3.44°C$

c. $\Delta T = 3.44 = T_F - T_i$

$3.44°C = 25°C - T_i$

$-21.56°C = -T_i$

$T_i = 21.56°C$