$Q = m \times c_p \times (\Delta T)$ $\quad \frac{q}{m \mid c_p \mid \Delta T}$ $\quad c_p = \frac{q}{m \cdot \Delta T}$ $\quad \Delta T = T_F - T_i$

1. $c_p = \frac{(1086.75\,J)}{(15.75\,g)(150\,^\circ C)} = \boxed{0.46\ J/g\cdot{}^\circ C}$

2. $Q = (10.0\,g)(0.90\,J/g\cdot{}^\circ C)(33\,^\circ C) = \boxed{297\,J}$

3. $T_F = \frac{(5275\,J)}{(50.0\,g)(0.50\,J/g\,^\circ C)} + 20.0\,^\circ C = \boxed{231\,^\circ C}$

4. $c_p = \frac{(6.75 \times 10^4\,J)}{(1500.0\,g)(25\,^\circ C)} = \boxed{1.8\ J/g\cdot{}^\circ C}$

5. $Q = (100.0\,g)(4.186\,J/g\,^\circ C)(33\,^\circ C) = \boxed{1.38 \times 10^4\,J}$

6. $c_p = \frac{(455\,J)}{(25.0\,g)(130\,^\circ C)} = \boxed{0.14\,J/g\,^\circ C}$

7. $c_p = \frac{(198\,J)}{(55.0\,g)(15\,^\circ C)} = \boxed{0.24\ J/g\cdot{}^\circ C}$

8. $\Delta T = \frac{(1000.0\,J)}{(150.0\,g)(0.96\,J/g\,^\circ C)} = \boxed{6.9\,^\circ C}$