Problems

12.2 First law of Thermodynamics: Thermal Energy and Work 25.

Some amount of energy is transferred by heat into a system. The net work done by the system is 50\,\text{J}, while the increase in its internal energy is 30\,\text{J}. What is the amount of net heat?

a. {-80}\,\text{J}
b. {-20}\,\text{J}
c. 20\,\text{J}
d. 80\,\text{J}

26.

Eighty joules are added by heat to a system, while it does 20\,\text{J} of work. Later, 30\,\text{J} are added by heat to the system, and it does 40\,\text{J} of work. What is the change in the system's internal energy?

a. 30\,\text{J}
b. 50\,\text{J}
c. 60\,\text{J}
d. 110\,\text{J}

12.4 Applications of Thermodynamics: Heat Engines, Heat Pumps, and Refrigerators 27.

A coal power station functions at 40.0 percent efficiency. What is the amount of work it does if it takes in 1.20×10^{12} J by heat?

a. 3×10^{10} J
b. 4.8×10^{11} J
c. 3×10^{12} J
d. 4.8×10^{13} J

28.

A heat engine functions with 70.7 percent thermal efficiency and consumes 12.0 kJ from heat daily. If its efficiency were raised to 75.0 percent, how much energy from heat would be saved daily, while providing the same output?

a. −10.8 kJ
b. −1.08 kJ
c. 0.7 kJ
d. 7 kJ