20-08

Question 342 0.35-78%

An ideal monatomic gas originally in state A is taken reversibly to state B along the straight line path shown in figure 4. What is the change in the internal energy of the gas for this process?

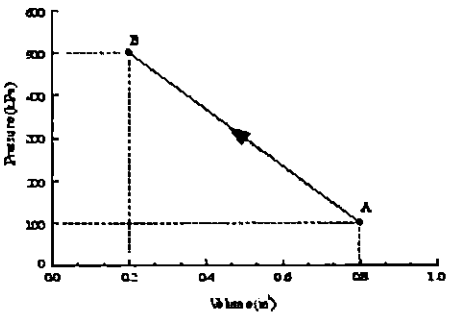

Figure 4

(a) -180 kJ.
(b) 180 kJ.
(c) 30 kJ.
(d) -30 kJ.
(e) -15 kJ.

20-11 The Adiabatic Expansion of an Ideal Gas

20-11

Question 343

Helium gas at 27 degrees C is compressed adiabatically to 1/2 of its initial volume. Find its temperature after compression. [gamma (helium) = 1.67]

(a) 152 degree C.
(b) 075 degree C.
(c) 520 degree C.
(d) 204 degree C.
(e) 307 degree C.

20-11

Question 344 0.69-35%

An ideal gas (gamma = 1.40) expands slowly and adiabatically. If the final temperature is one third the initial temperature, by what factor does the volume change?

(a) 12.5
(b) 10.0
(c) 18.0
(d) 15.6
(e) 14.0

20-11

Question 345

A cylinder contains 4 moles of a diatomic ideal gas (Cv = 5R/2) at a temperature of 27 degrees-C and a pressure of 1.5 atm. temperature reaches 127 degrees-C. How much work is done by the gas in this process?

(a) 986 calories
(b) 562 calories
(c) 418 calories
(d) 794 calories
(e) 150 calories

20-11

Question 346

The air in an automobile engine at 20 degree-C is compressed from an initial pressure of 1 atm and a volume of 200 cm**3 to a final volume of 20 cm**3. Find the final temperature if the air behaves like an ideal gas (gamma = 1.4) and the compression is adiabatic.

(a) 50 degree-C
(b) 10 degree-C
(c) 463 degree-C
(d) 20 degree-C
(e) 526 degree-C

20-11

Question 347 0.34-36%

An ideal gas (gamma = 1.3) is initially at V = V1, T = 273 K and P = 1.0 atm. The gas is compressed adiabatically to half its original volume. It is then cooled at a constant pressure to its original temperature. The ratio of the final volume to the initial volume is:

(a) 0.4
(b) 2.0
(c) 0.5
(d) 0.2
(e) 1.0

20-11

Question 348 0.41-31%

Which one of the following statements is TRUE? The temperature of an ideal gas decreases in an

(a) adiabatic compression.
(b) increase in pressure at constant volume.
(c) isobaric expansion.
(d) isothermal compression.
(e) adiabatic expansion.

20-11

Question 349

An ideal monatomic gas goes through the process in T-V diagram of figure (1). At Point A, the temperature is 400 K, and the volume is 2 liters. If the volume at point B is 10 liters, what is the temperature at point C be?

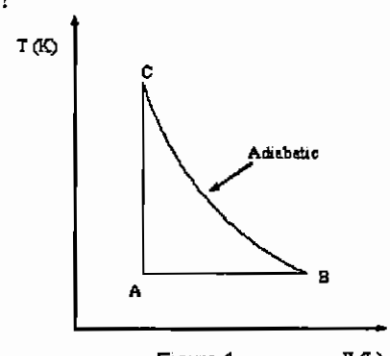

Figure 1

(a) 4.00*10**3 K
(b) 2.00*10**3 K
(c) 5.89*10**3 K
(d) 1.17*10**3 K
(e) 2.00*10**2 K

20-11

Question 350
An ideal diatomic gas, initially at a pressure Pi = 1.0 atm and volume Vi, is allowed to expand isothermally until its volume doubles. The gas is then compressed adiabatically until it reaches its original volume. The final pressure of the gas will be:
(a) 1.7 atm.
(b) 0.4 atm.
(c) 2.0 atm.
(d) 1.3 atm.
(e) 0.5 atm.

20-11

Question 351
In an adiabatic process, the temperature of one mole of an ideal monatomic gas is decreased from 500 K to 400 K. What is the work done during the process in calories?
(a) 300
(b) 400
(c) 500
(d) 200
(e) 100

20-11
).44-46%

Question 352
Initially, an ideal monatomic gas containing 10.0 moles occupies a volume of 30.0 L at a pressure of 5.00 atm. It is then compressed adiabatically to a final volume of 12.0 L. What is the final temperature of the gas ?
(a) 157 K
(b) 457 K
(c) 844 K
(d) 420 K
(e) 336 K

20-11
).48-55%

Question 353
One mole of an ideal monatomic gas is initially at 300 K and 1.0 atm. The gas is compressed adiabatically to 2.0 atm. What is the final volume of the gas ?
(a) 0.079 m**3
(b) 0.025 m**3
(c) 0.016 m**3
(d) 0.056 m**3
(e) 0.041 m**3

20-11

Question 354
An ideal diatomic gas, initially at a pressure Pi = 1.0 atm and volume Vi, is allowed to expand isothermally until its volume doubles. The gas is then compressed adiabatically until it reaches its original volume. The final pressure of the gas will be:
(a) 0.5 atm.
(b) 1.7 atm.
(c) 2.0 atm.
(d) 1.3 atm.
(e) 0.4 atm.