

Practice Quiz 6

1) Gas in a constant-volume gas thermometer registers a pressure of 75.0 kPa at 0°C. Assuming ideal behavior, what is the pressure of this gas at 200°C?

- A) 120 kPa
- B) 130 kPa
- C) 140 kPa
- D) 150 kPa

Answer: B

2) The coefficient of linear expansion of lead is $29 \times 10^{-6} \text{ K}^{-1}$. What change in temperature will cause a 10-m long lead bar to change in length by 3.0 mm?

- A) 5.0 K
- B) 10 K
- C) 15 K
- D) 20 K

Answer: B

3) An aluminum electric tea kettle has a mass of 500 g. It has a 500-W heating coil. How long will it take to heat up 1.0 kg of water from 18°C to 98°C in the tea kettle? The specific heat of aluminum is 900 J/(kgXK).

- A) 5 minutes
- B) 7 minutes
- C) 12 minutes
- D) 15 minutes

Answer: C

4) A 350-g piece of metal at 100°C is dropped into a 100-g aluminum cup containing 500 g of water at 15°C. The final temperature of the system is 40°C. What is the specific heat of the metal, assuming no heat is exchanged with the surroundings? The specific heat of aluminum is 900 J/(kgXK).

- A) 1900 J/(kgXK)
- B) 2600 J/(kgXK)
- C) 3300 J/(kgXK)
- D) 3800 J/(kgXK)

Answer: B

5) A gas expands from an initial volume of 0.040 m³ and an initial pressure of 210 kPa to a final volume of 0.065 m³ while its temperature is kept constant. How much work is done by the system?

- A) 3.7 kJ
- B) 4.1 kJ
- C) 5.6 kJ
- D) 7.9 kJ

Answer: B

6) An ideal monatomic gas undergoes a reversible expansion to 1.5 times its original volume. In which of these processes does the gas have the largest loss of internal energy?

- A) at constant pressure
- B) if the pressure increases in proportion to the volume
- C) at constant temperature
- D) adiabatically

Answer: D

7) The molar specific heat is the amount of heat required to raise the temperature of what amount of matter by one unit of temperature?

- A) one tooth
- B) one unit of mass of a material
- C) one mole of a substance
- D) one molecule of a substance

Answer: C

8) What is the molar specific heat of an ideal monatomic gas, expressed in terms of the gas constant R ?

- A) R
- B) $3R/2$

C) $5R/2$

D) $5R/3$

Answer: B

9) For an ideal monatomic gas,

A) $C_p = C_v$.

B) $C_p > C_v$.

C) $C_p < C_v$.

D) More information is needed to answer this question.

Answer: B

10) A certain ideal gas has a molar specific heat at constant volume $C_v = 7R/5$. What is its molar specific heat at constant pressure?

A) $12R/5$

B) $7R/3$

C) $12R/7$

D) $4R$

Answer: A

11) An ideal monatomic gas undergoes a process that takes it from an initial pressure P_1 and an initial volume V_1 to a final pressure P_2 and a final volume V_2 , where $V_2 = V_1$ and $P_2 = 2P_1$. The process is carried out in two steps: an isothermal expansion to an intermediate volume V , followed by an adiabatic compression to its final volume. What is the intermediate volume V , in terms of the initial volume V_1 ?

A) $1.5V_1$

B) $21V_1$

C) $7.3V_1$

D) $2.8V_1$

Answer: D