

9. An ideal gas is heated at a constant pressure of 2.0×10^5 Pa from a temperature of -73°C to a temperature of $+27^\circ\text{C}$. The initial volume of the gas is 0.10 m^3 . The heat energy supplied to the gas in this process is 25,000 J. What is the increase in internal energy of the gas?

A. 25,000 J

B. 10,000 J

C. 15,000 J

D. $-5,000$ J

E. 7,674 J

F. Not enough information

Ans. _____

SAMPLE TEST

1. A hydrogen bomb of 1 megaton size generates 8.4×10^{15} joules of kinetic energy. If all the kinetic energy generated by this bomb were used to heat a cube of water 2.0×10^3 meters on each side, what would be the temperature increase of the water? The water is initially at 25°C , and the density of water is $1.0 \times 10^3 \text{ kg/m}^3$.

A. 0.25°C
 B. 500°C
 C. 1050°C

D. $2.0 \times 10^9^\circ\text{C}$
 E. Not close to any of the above

Ans. _____

2. On a summer day, you keep the air conditioner in your room running. Which one among the following is the hot reservoir (*h*) and which the cold reservoir (*c*)?

1. the air outside
2. the compartment inside the air conditioner where the air is compressed
3. the freon gas which is the working substance (expands and compresses in each cycle)
4. the air in the room

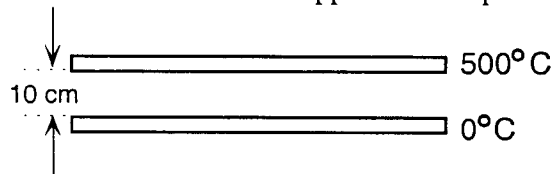
A. h (1), c (2)
 B. h (1), c (3)
 C. h (1), c (4)
 D. h (2), c (1)

E. h (2), c (3)
 F. h (2), c (4)
 G. h (3), c (1)
 H. h (3), c (2)

I. h (3), c (4)
 J. h (4), c (1)
 K. h (4), c (2)
 L. h (4), c (3)

Ans. _____

3. Two horizontal metal plates are separated vertically by a distance of 10 cm. The temperature of the upper plate is 500°C and that of the lower plate is 0°C . If air fills the space between the plates, the dominant mode of heat transfer from upper to lower plate is



A. Conduction

B. Convection

C. Radiation

Ans. _____