8. The pressure-volume work for an ideal gas can be calculated by using the expression $w = -\int_{V_i}^{V_f} p_{ex} dV$. The work can also be calculated from the pV– plot by using the area under the curve within the specified limits. When an ideal gas is compressed (a) reversibly or (b) irreversibly from volume V_i to V_f, choose the correct option.

(i) w (reversible) = w (irreversible)

(ii) w (reversible) < w (irreversible)

(iii) w (reversible) > w (irreversible)

(iv) w (reversible) = w (irreversible) + $p_{ex}.\Delta V$

Solution:

(ii) w(reversible) < w (irreversible)

Explanation: