- **10.** On the basis of thermochemical equations (a), (b) and (c), find out which of the algebric relationships given in options (i) to (iv) is correct.
 - (a) C (graphite) + O_2 (g) \longrightarrow CO_2 (g) ; $\Delta_r H = x \text{ kJ mol}^{-1}$
 - (b) C (graphite) + $\frac{1}{2}$ O₂ (g) \longrightarrow CO (g) ; $\Delta_r H = y \text{ kJ mol}^{-1}$
 - (c) $CO(g) + \frac{1}{2}O_2(g) \longrightarrow CO_2(g)$; $\Delta_p H = z \text{ kJ mol}^{-1}$
 - (i) z = x + y
 - (ii) x = y z
 - (iii) x = y + z
 - (iv) y = 2z x

Solution:

(iii) is the correct answer

Explanation:

$$C + O2 \rightarrow CO2 \tag{1}$$

$$C + 0.502 \rightarrow CO \tag{2}$$

$$CO + 0.5O2 \rightarrow CO2 \tag{3}$$

So,
$$(2) + (3) = (1)$$

Hence, y + z = x