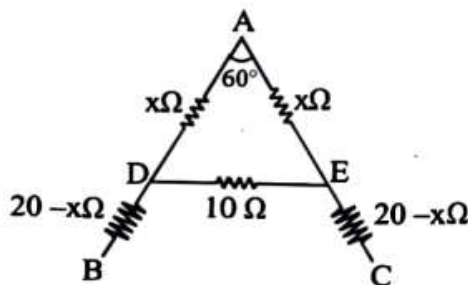## Q 03

A letter 'A' is constructed of a uniform wire with resistance $1.0\,\Omega$ per cm, The sides of the letter are 20 cm and the cross piece in the middle is 10 cm long. The apex angle is 60. The resistance between the ends of the legs is close to:

(a) $50.0\,\Omega$ (b) $10\,\Omega$ (c) $36.7\,\Omega$ (d) $26.7\,\Omega$

answer

(d)

For ADE $\dfrac{1}{R'} = \dfrac{1}{2x} + \dfrac{1}{10}$

or $R' = \dfrac{20x}{10 + 2x}$

$R_{BC} = \dfrac{20x}{10 + 2x} + 20 - x + 20 - x$ ...(i)

or $\dfrac{20x}{10 + 2x} + 40 = 2x$

Solving we get

$x = 10\,\Omega$

Putting the value of $x = 10\,\Omega$ in equation (i)

We get

$R_{BC} = \dfrac{20 \times 10}{10 + 2 \times 10} + 20 - 10 + 20 - 10$

$= \dfrac{80}{3} = 26.7\,\Omega$