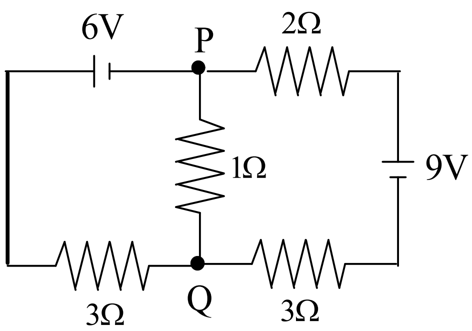
Question

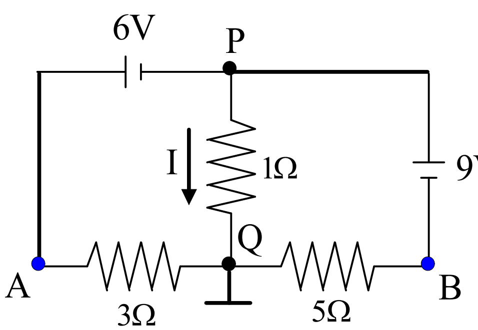


In the circuit shown, the current in the 1Ω resistor is:

(1) 0A
(2) 0.13A, from Q to P
(3) 0.13A, from P to Q
(4) 1.3A, from P to Q

Solution 1

2Ω & 3Ω resistors are in series. Hence, the equivalent circuit is:



Let us choose Q as reference potential, or $V_Q = 0$.

$V_A = V_P + 6$
$V_B = V_P - 9$

Junction law at Q gives us,

$$\frac{V_P}{1} + \frac{V_A}{3} + \frac{V_B}{5} = 0 \qquad (\because V_Q = 0)$$

$$\therefore V_P + \frac{V_P + 6}{3} + \frac{V_P - 9}{5} = 0$$

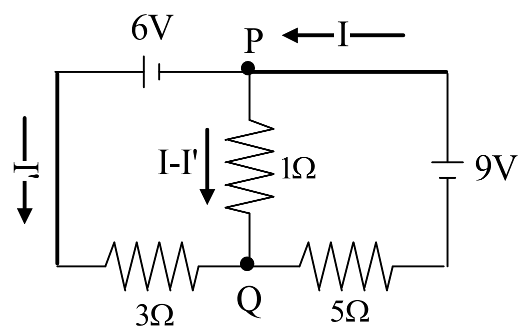
$$\therefore V_P = -0.13V$$

$$I = \frac{V_P}{1} = -0.13A$$

Hence, Option (2).

Solution 2

2Ω & 3Ω resistors are in series. Hence, the equivalent circuit is:



Starting from P and going anticlockwise for the large loop,

$$-6 + 3I' + 5I - 9 = 0$$
$$\therefore 5I + 3I' = 15 \ldots\ldots\ldots\ldots\ldots\ldots(*)$$

Starting from P and going clockwise for the small loop,

$$9 - 5I - 1(I - I') = 0$$
$$\therefore 6I - I' = 9 \ldots\ldots\ldots\ldots\ldots\ldots\ldots(\#)$$

From (*) & (#), I - I' = - 0.13 A

Hence, Option (2).