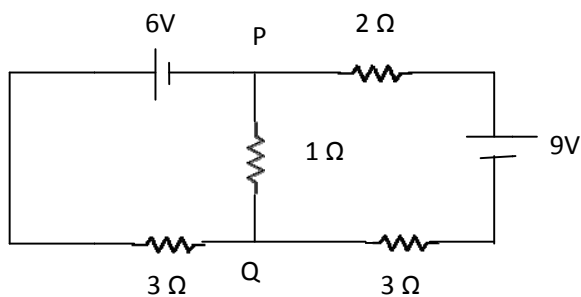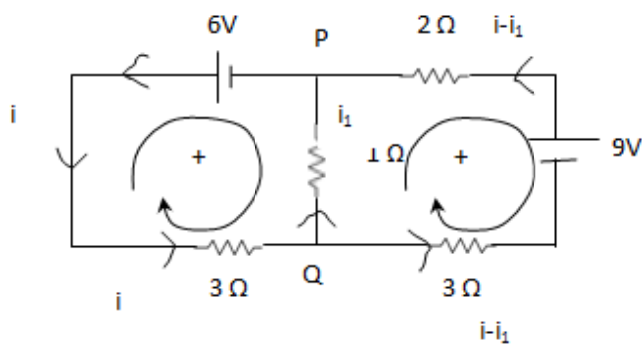18. In the circuit shown, the current in the 1Ω resistor is:

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

Answer:

Applying Kirchhoff's rule distribution of currents are as shown, clock wise direct is taken positive.

Now applying Kirchhoff's 2nd law in circuits

$-3i - i_1 = -6$ or $3i + i_1 = 6 \rightarrow (1)$

$for\ the\ 2nd\ loop$

$i_1 - 3(i - i_1) - 2(i - i_1) = -9$

$or\ 6i_1 - 5i = -9 \rightarrow (2)$

$from\ (1)we\ have\ i = \dfrac{6 - i_1}{3}$

$putting\ in\ (2)\ 6i_1 - 5\left(\dfrac{6 - i_1}{3}\right) = -9$

$or\ 18i_1 - 30 + 5i_1 = -27$

$or\ i_1 = \dfrac{3}{23} = 0.13$

Positive sign of current indicates direction shown in diagram is correct i.e. from Q to P

$correct\ option\ is\ (3)0.13\ A\ from\ Q\ to\ P$