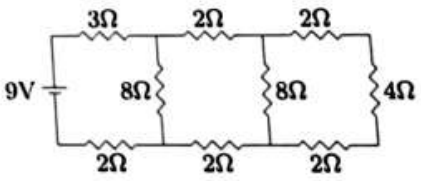
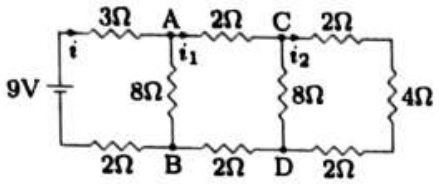
Q 12

In the circuit shown in the figure, the current through (1998)



(A) the 3 Ω resistor is 0.50 A
(B) the 3 Ω resistor is 0.25 A
(C) the 4 Ω resistor is 0.50 A
(D) the 4 Ω resistor is 0.25 A

Sol. Let R_1 and R_2 be the effective resistances of the circuits to the right of CD and AB, respectively (see figure). These resistances are given by $R_1 = 2+4+2 = 8\ \Omega$ and $R_2 = 2 + (8 \parallel R_1) + 2 = 2 + (8 \parallel 8) + 2 = 8\ \Omega$.



Effective resistance of the complete circuit is $R = 3+(8 \parallel R_2)+2 = 3+(8 \parallel 8)+2 = 9\ \Omega$. Thus the current in 3 Ω resistor is $i = V/R = 9/9 = 1$ A. Current i is equally divided at node A giving $i_1 = 0.5$ A. Current i_1 is further divided into two equal parts at node C giving $i_2 = 0.25$ A, the current through 4 Ω resistor.

Ans. D ⊡