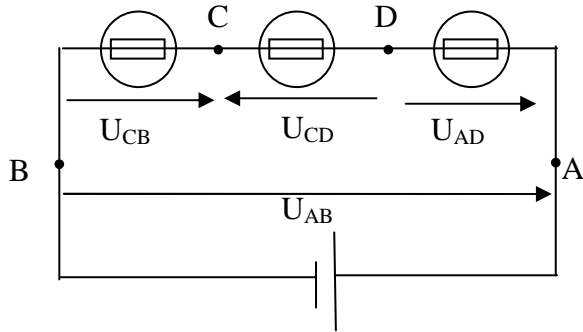


## حل التمرين 09



حسب قانون إضافة التوترات :

$$U_{AB} = U_{AD} + U_{DC} + U_{CB}$$

$$U_{DC} = -U_{CD} \Rightarrow U_{AB} = U_{AD} - U_{CD} + U_{CB}$$

$$U_{AB} = U_{AD} - U_{CD} + U_{CB} = 4 - 9 + 5 = 0 \quad \text{العمود 1}$$

$$U_{AB} = U_{AD} - U_{CD} + U_{CB} = -7 - 2 + 5 = -4V \quad \text{العمود 2}$$

$$U_{AD} = U_{AB} + U_{CD} - U_{CB} = 16 + (-7) - 9 = 0V \quad \text{العمود 3}$$

$$U_{CB} = U_{AB} + U_{CD} - U_{AD} = -20 + 4 - (-7) = -7 \quad \text{العمود 4}$$

$$U_{CD} = U_{AD} - U_{AB} + U_{CB} = 2 - 15 + 2 = -11V \quad \text{العمود 5}$$

$$U_{AD} = U_{AB} + U_{CD} - U_{CB} = -19 + 8 - (-6) = -5V \quad \text{العمود 6}$$

$$U_{AB} = U_{AD} - U_{CD} + U_{CB} = 3 - (-5) + 4 = 12V \quad \text{العمود 7}$$

العمود 7	العمود 6	العمود 5	العمود 4	العمود 3	العمود 2	العمود 1	
+4	-6	+2	-7	+9	-4	+5	$U_{CB}(V)$
-5	+8	-11	+4	-7	+2	+9	$U_{CD}(V)$
+3	-5	+2	-7	0	-7	+4	$U_{AD}(V)$
12	-19	+15	-20	+16	-4	0	$U_{AB}(V)$