1. \( \frac{100 \, \Omega \, (50 \, \Omega \, + \, 100 \, \Omega) \times 6 \, V}{100 \, \Omega \, (50 \, \Omega \, + \, 100 \, \Omega \, + \, 100 \, \Omega)} \times 6 \, V = 4 \, V \)

2. \( \frac{100 \, \Omega \, (50 \, \Omega \, + \, 100 \, \Omega \, + \, 100 \, \Omega)}{50 \, \Omega \, + \, 100 \, \Omega \, + \, 100 \, \Omega \, + \, 100 \, \Omega} \times 6 \, V = 2.4 \, V \)

3. Resistance of parallel combination = 50 \( \Omega \). So the 6 V supply potential difference splits equally between the two 50 \( \Omega \) and p.d. across AB is 3 V.

4. resistance of whole potential divider is 10 k\( \Omega \)
   
   \[
   \text{p.d. across } 4 \, k\Omega = \frac{4 \, k\Omega}{10 \, k\Omega} \times 20 \, V = 8 \, V
   \]
   
   \[
   \text{p.d. across } 6 \, k\Omega = \frac{6 \, k\Omega}{10 \, k\Omega} \times 20 \, V = 12 \, V
   \]
   
   \[
   \text{p.d. across } 10 \, k\Omega = \frac{10 \, k\Omega}{10 \, k\Omega} \times 20 \, V = 20 \, V
   \]

5. The resistance has been connected as a variable resistor. The multimeter has an extremely high resistance so that wherever one moves the sliding contact the p.d. is set up across the voltmeter which always reads 6 V! The redrawn diagram should show the ends of the resistance connected across the battery

6. The resistance of whole potential divider is 400 W. The supply p.d. 12 V splits between the fixed 300 W resistor and the 100 W potentiometer in the ratio of their resistances. So there will be 9 V across 300 W and 3 V across 100 W.

   When the slide contact from B is next to A the p.d. tapped between A and B is 0 V; when the slide is at the other end of the potentiometer the full p.d. of 3 V is across AB.