





























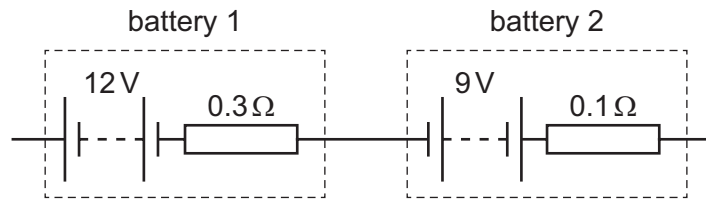








35 Two batteries are connected together, as shown.



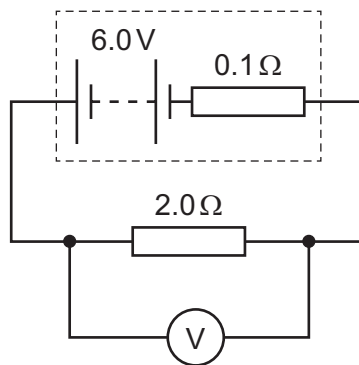
Battery 1 has electromotive force (e.m.f.) 12V and internal resistance  $0.3\Omega$ .

Battery 2 has e.m.f. 9V and internal resistance  $0.1\Omega$ .

What are the e.m.f. and the internal resistance of a single battery that has the same effect as the combination?

	e.m.f./V	internal resistance/ $\Omega$
<b>A</b>	3	0.2
<b>B</b>	3	0.4
<b>C</b>	21	0.2
<b>D</b>	21	0.4

36 The diagram shows a circuit.

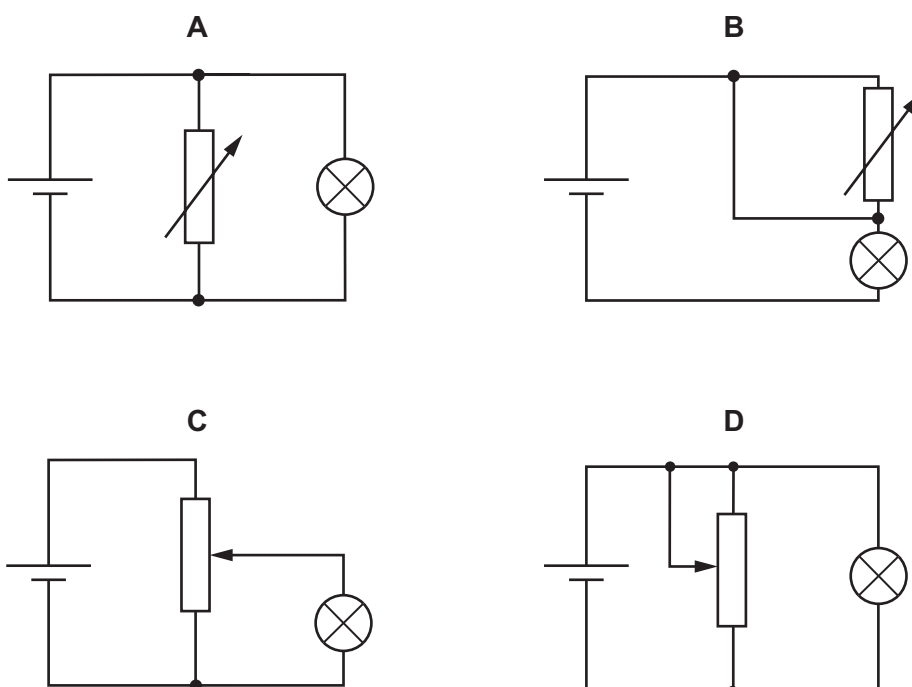


What is the reading on the voltmeter?

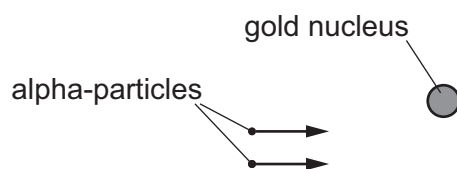
- A** 0.3V      **B** 5.7V      **C** 6.0V      **D** 6.3V

37 In the circuits shown, the cell has negligible internal resistance.

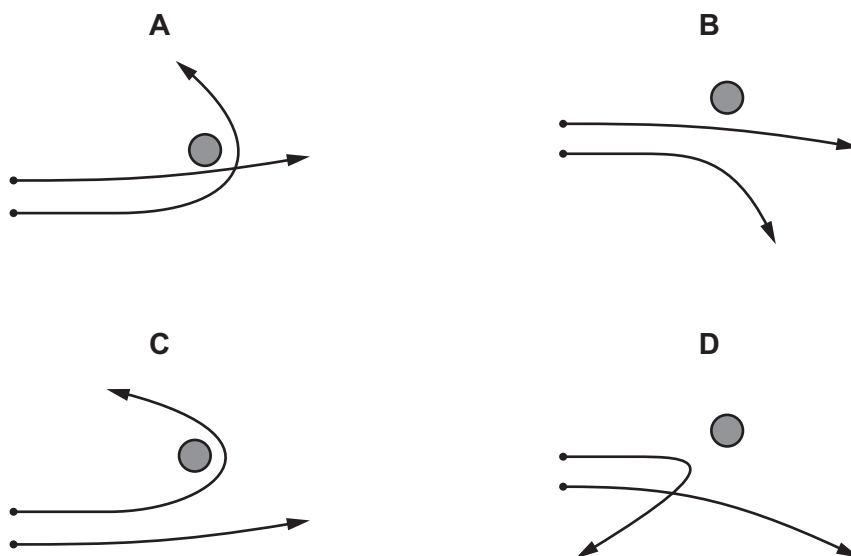
Which diagram shows a potential divider circuit that can vary the potential difference (p.d.) across the lamp?



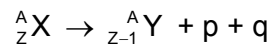
38 Two alpha-particles with the same kinetic energy are moving towards, and are then deflected by, a gold nucleus.



Which diagram could show the paths of the two alpha-particles?



39 The equation represents the decay of a nucleus X to a nucleus Y.



What are particles p and q?

	p	q
<b>A</b>	$\beta^-$ particle	neutron
<b>B</b>	$\beta^-$ particle	proton
<b>C</b>	$\beta^+$ particle	antineutrino
<b>D</b>	$\beta^+$ particle	neutrino

40 Which row gives the correct type and quark composition for the named particle?

	particle	type	quark composition
<b>A</b>	neutron	hadron	u u d
<b>B</b>	neutron	lepton	u d d
<b>C</b>	proton	hadron	u u d
<b>D</b>	proton	lepton	u d d

key

u = up quark

d = down quark

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