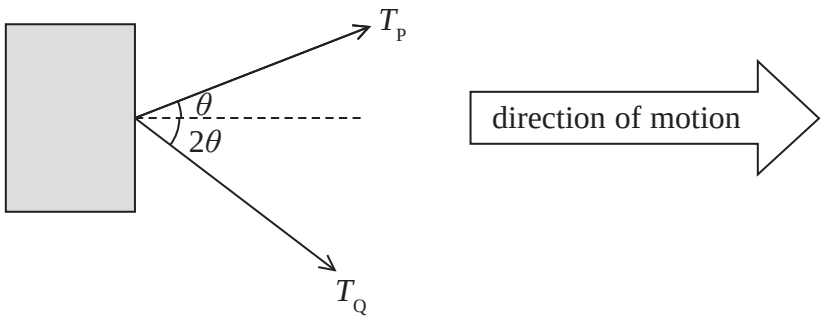
1. A box is pulled along the floor using two identical ropes. The tensions in the ropes act in the directions shown and have magnitudes T_P and T_Q. The box moves at a constant speed in the direction shown.



The magnitude of the frictional force acting on the box is equal to

☒ **A** $T_P \sin\theta + T_Q \sin 2\theta$

☒ **B** $T_P \cos\theta + T_Q \cos 2\theta$

☒ **C** $T_P + T_Q$

☒ **D** zero

(Total for Question 9 = 1 mark)

2 A potential difference of 600 mV is applied across a circuit component.
What is the energy transferred when a charge of 2 C flows through the component?

☒ **A** 1200 J

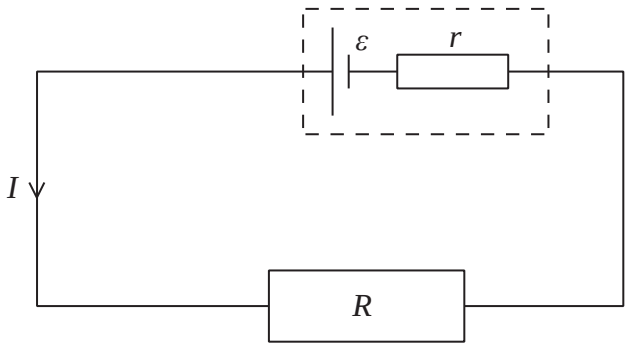
☒ **B** 300 J

☒ **C** 1.33 J

☒ **D** 1.2 J

(Total for Question = 1 mark)

3 The diagram represents a resistor of resistance R in a series circuit with a cell of e.m.f. ε and internal resistance r.



Which of the following correctly gives the potential difference V across the internal resistance?

☒ **A** $V = \dfrac{\varepsilon(R + r)}{r}$

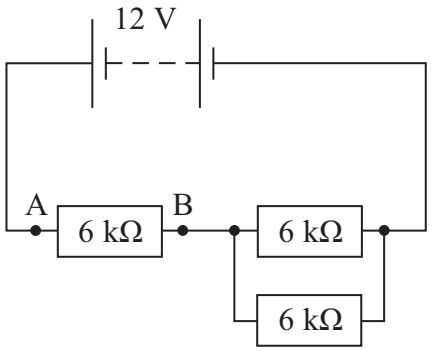
☒ **B** $V = \dfrac{\varepsilon R}{R + r}$

☒ **C** $V = \dfrac{\varepsilon(R + r)}{R}$

☒ **D** $V = \dfrac{\varepsilon r}{(R + r)}$

(Total for Question = 1 mark)

4 A combination of resistors is connected to a 12 V supply of negligible internal resistance.



The potential difference between points A and B is

☒ **A** 4 V

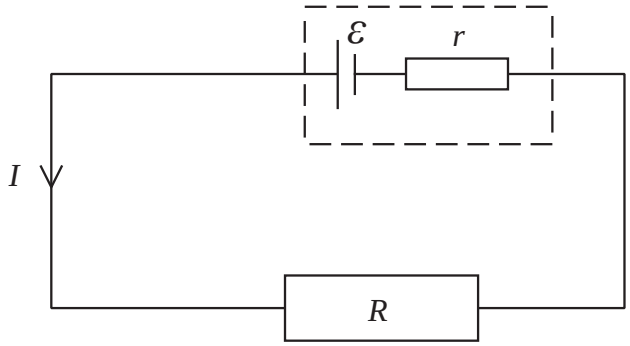
☒ **B** 6 V

☒ **C** 8 V

☒ **D** 12 V

(Total for Question 1 mark)

5 The diagram shows a resistor of resistance R across a cell of e.m.f. ε and internal resistance r.



Which of the following is a correct expression for the current I ?

☒ **A** $I = \varepsilon / r$

☒ **B** $I = \varepsilon / R$

☒ **C** $I = \varepsilon / (R + r)$

☒ **D** $I = \varepsilon / (R - r)$

(Total for Question = 1 mark)

6 Which of the following expresses the volt in SI base units?

☒ **A** $\text{kg m}^2\text{ s}^{-2}\text{ C}^{-1}$

☒ **B** $\text{kg m}^2\text{ s}^{-3}\text{ C}$

☒ **C** $\text{kg m}^2\text{ s A}^{-1}$

☒ **D** $\text{kg m}^2\text{ s}^{-3}\text{ A}^{-1}$

(Total for Question 1 mark)

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