A Level · OCR · Physics

🕐 5 mins   ❓ 5 questions

Multiple Choice Questions

Capacitors in Circuits

Capacitance / Electron Flow in Charging & Discharging / Capacitors in Series & Parallel Circuits / Circuits Containing Capacitors & Resistors / Energy Stored by a Capacitor

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Total Marks   **/5**

**1** The graph below shows the variation of potential difference V with charge Q for a capacitor.
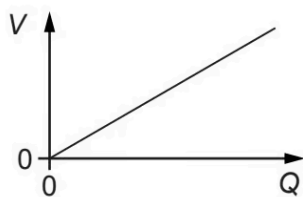
Which row is correct for the gradient of the graph and the area under the graph?

	Gradient of graph	**Area under the graph**
A	capacitance^{-1}	work done
B	capacitance^{-1}	permittivity
C	capacitance	power
D	capacitance	energy

(1 mark)

2 The diagram below shows a capacitor connected to a cell, a switch and a resistor.
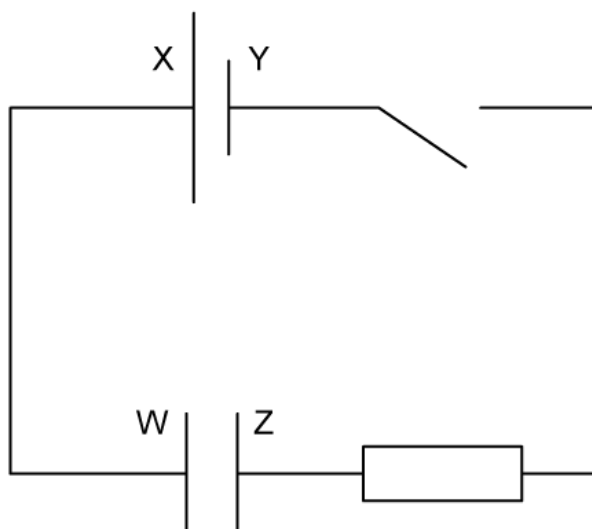

The switch is moved to the on position and the capacitor begins to charge.

Which row of the table gives the correct direction of electron flow and the correct description of how the rate of flow of charge changes with time?

	Electron flow	**Rate of flow of charge**
A.	W to X and Y to Z	Increases
B.	W to X and Y to Z	Decreases
C.	X to W and Z to Y	Increases
D.	X to W and Z to Y	Decreases

(1 mark)

3 Three capacitors with capacitance of 2 µF, 3 µF and 4 µF are connected as shown below.
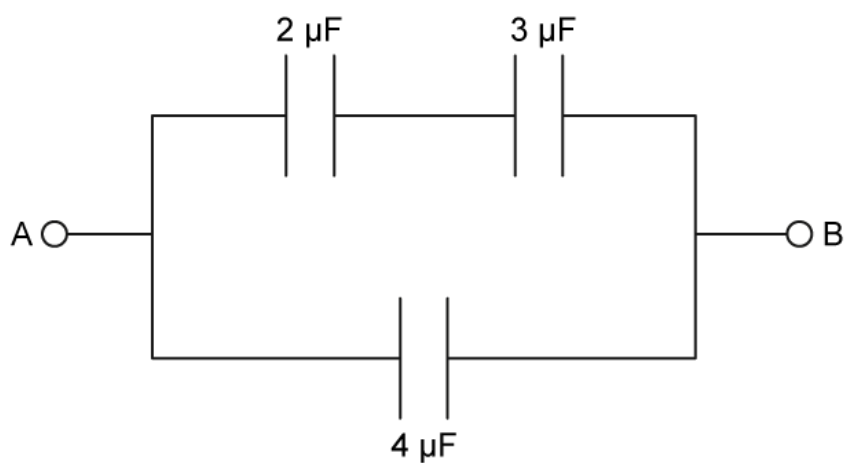
What is the total capacitance between points **A** and **B**?

   A. 2.2 µF

   B. 4.8 µF

   C. 5.2 µF

   D. 6.5 µF

(1 mark)

4 A capacitor is connected to a cell with e.m.f. ε and a resistor of resistance R as shown

below.
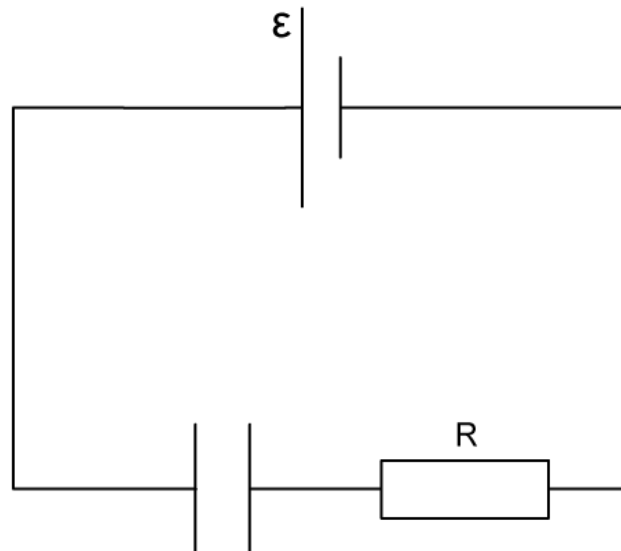
When fully charged the energy stored on the capacitor is *W*.

Which of the following changes to the circuit would make the energy stored 2*W*?

   A. Doubling the value of *ε*.

   B. Halving the value of *R*.

   C. Adding an identical capacitor in series with the existing one.

   D. Adding an identical capacitor in parallel with the existing one.

(1 mark)

5   A capacitor of capacitance 470 μF is connected across a resistor. After a certain amount of time, the charge has dropped from 2.6 mC to 2.3 mC.

What is the loss of energy stored in the capacitor?

   A. 96 μJ

   B. 0.83 mJ

   C. 1.6 mJ

   D. 3.1 mJ

(1 mark)