Capacitor Energy Past Paper Questions   Name ………………………

1.   A 10 mF capacitor is charged to 10 V and then discharged completely through a small motor. During this process, the motor lifts a weight of mass 0.10 kg. If 10% of the energy stored in the capacitor is used to lift the weight, through what approximate height will the weight be lifted?

   A   0.05 m

   B   0.10 m

   C   0.50 m

   D   1.00 m

                                                                                         (Total 1 mark)

2.   In experiments to pass a very high current through a gas, a bank of capacitors of total capacitance 50 µF is charged to 30 kV. If the bank of capacitors could be discharged completely in 5.0 ms what would be the mean power delivered?

   A   9.0 MW

   B   4.5 MW

   C   110 kW

   D   22 kW

                                                                                         (Total 1 mark)

3.   The graph shows how the charge stored by a capacitor varies with the potential difference across it as it is charged from a 6 V battery.
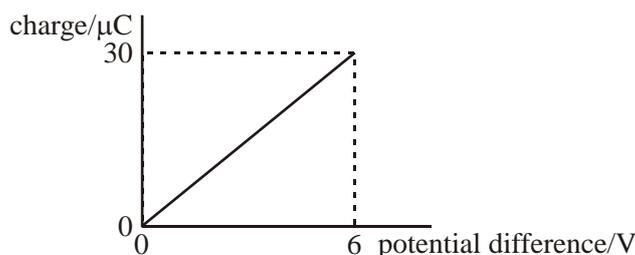
   Which one of the following statements is **not** correct?

   A   The capacitance of the capacitor is 5.0 µF.

   B   When the potential difference is 2 V the charge stored is 10 µC.

   C   When the potential difference is 2 V the energy stored is 10 µJ.

   D   When the potential difference is 6 V the energy stored is 180 µJ.

                                                                                         (Total 1 mark)

4. (a) For a capacitor of capacitance C, sketch graphs of charge, Q, and energy stored, E, against potential difference, V.

Q |

V

graph A

E |

V
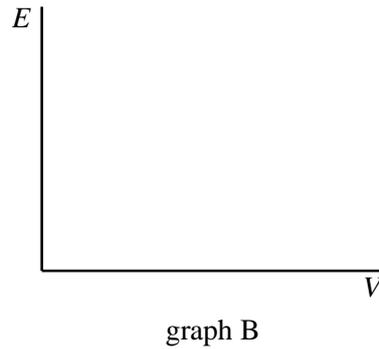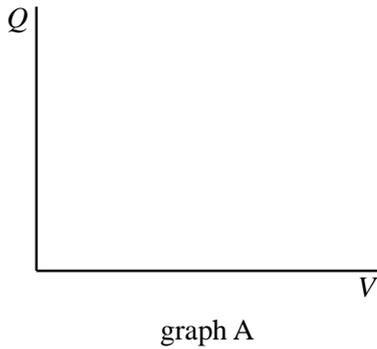
graph B

What is represented by the slope of graph A?

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(3)

(b) A capacitor of capacitance 0.68 F is charged to 6.0 V. Calculate

(i) the charge stored by the capacitor,

....

....

(ii) the energy stored by the capacitor.

....

....

(2)
(Total 5 marks)

5. A camera flashgun uses the discharge of a capacitor to provide the energy to produce a single flash. In a particular flashgun a 4700 µF capacitor is initially charged from a 90 V supply.

(a) Calculate

(i) the charge stored by the capacitor when it is fully charged,

....

....

(ii) the energy stored by the fully-charged capacitor,

....

....

(iii) the average current which flows if total discharge of the capacitor takes place effectively in 30 ms.

....

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(Total 3 marks)