19 The battery of a small tablet computer is initially uncharged. It is connected to a constant 10 W power supply for 2.0 hours to charge the battery.

The efficiency of the charging process is 80%.

What is the total energy stored in the battery?

A 1.6×10^1 J **B** 1.6×10^3 J **C** 5.8×10^4 J **D** 5.8×10^6 J

20 An initially stationary firework explodes and splits into two fragments that move horizontally in opposite directions.

The total kinetic energy transferred to the fragments by the explosion is E.

One fragment has mass m and the other one has mass $2m$.

What is the speed of the fragment of mass m immediately after the explosion?

A $\sqrt{\frac{E}{m}}$ **B** $\sqrt{\frac{2E}{m}}$ **C** $\sqrt{\frac{2E}{3m}}$ **D** $\sqrt{\frac{4E}{3m}}$

21 A spring is fixed at one end and extended by applying force F to the other end. The spring has extension x and elastic potential energy E_P. The spring constant is k.

The spring obeys Hooke's law.

Which relationship is correct for this spring?

A $E_P \propto F$ **B** $E_P \propto x$ **C** $E_P \propto k$ **D** $E_P \propto x^2$

22 A force–extension graph is produced for a metal wire.

What **must** describe the limit of proportionality of the wire?

A the point at which the wire breaks

B the point beyond which Hooke's law is not obeyed

C the point beyond which the wire cannot return to its original length

D the point beyond which the wire starts to deform plastically